Groundwater Monitoring Report

RCRA Corrective Action Program
Boeing Renton Facility
Wood Project # PS20203450.2021 The Boeing Company

Prepared for:

The Boeing Company
Seattle, Washington

May 26, 2021

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Prepared by:

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May 26, 2021

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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As approved by the Washington State Department of Ecology in a letter dated July 31, 2020, progress reporting is conducted on a semiannual basis in conjunction with monitoring, operations, and maintenance activities conducted pursuant to the Order and as outlined in the Engineering Design Report (AMEC, 2014).

Wood Environment & Infrastructure Solutions, Inc.

May 26, 2021

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Expiration Date: September 6, 2021

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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 during the wet season of 2021 at The Boeing Company (Boeing) Renton Facility (the Facility) (Figure 1). This work is required under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program being performed at the Facility. 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).

As approved by the Washington State Department of Ecology (Ecology) in a letter dated July 31, 2020, progress reporting is conducted on a semiannual basis in conjunction with monitoring, operations, and maintenance activities conducted pursuant to the Order and as outlined in the EDR.

The following documents summarize ongoing compliance activities conducted at the Facility:

- The original monitoring plan presented in Appendix D of the EDR (AMEC, 2014) was superseded by the Compliance Monitoring Plan (CMP) (Amec Foster Wheeler, 2016a), which was subsequently revised in the Addendum to the CMP (CMP Addendum #1) (Amec Foster Wheeler, 2017).
- The groundwater monitoring program was further revised in the second Addendum to the CMP (CMP Addendum #2) (Wood, 2019), which removed selected areas or wells from the sampling program. These changes were approved by Ecology.
- Boeing submitted a third Addendum to the CMP (CMP Addendum #3) (Wood 2020) to Ecology on June 30, 2020 (CALIBRE, 2020). This addendum recommended further modifications to the groundwater monitoring program at the Facility and was approved by Ecology in July 2020.

Groundwater monitoring and cleanup actions 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 and MA; SVE has been discontinued, and Ecology approved the SVE system decommissioning in 2018);
- Former Fuel Farm AOC Group: (MNA);
- AOC-003: (bioremediation and MA);
- AOC-004: (bioremediation and MA);
- AOC-060: (bioremediation and MA);
- AOC-090: (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). This report includes results from monitoring for Apron A, as semiannual monitoring began in this area starting in the fourth quarter 2016 (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 and comparison with specific criteria are discussed in this report for each SWMU and AOC. The protection of groundwater for beneficial uses for each constituent of concern (COC), are based on site-specific cleanup levels (CULs) specified in the CAP. Ecology has made multiple clarifications and changes to the Model Toxics Control Act (MTCA) since the draft CAP (AMEC 2012) was prepared that are relevant to the Facility CULs. Boeing recently submitted to Ecology some proposed updates to the CULs (CALIBRE 2021a), which are under review by Ecology. The measured COC concentrations in groundwater presented in this report are compared with the CULs specified in the CAP.

This semiannual report:

- Describes work completed during the reporting period;
- 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 semiannual sampling event, 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 reporting period;
- Describes and discusses trends in monitoring data;
- Assesses remediation at each area; and
- Assesses attainment of CULs at the CPOCs.

This report presents information based on monitoring activities conducted during the wet season 2021 for the period from November 2020 through April 2021. In accordance with the requirements of the Order, corrective action activities were conducted at the Facility as described in this report.

1.1 Work completed in the wet season 2021

The following work was completed during the wet season 2021, the period from November 2020 through April 2021:

- On behalf of Boeing, Wood submitted the dry season 2021 report to Ecology on November 13, 2020.
- Substrate injections were conducted on January 25 and 26, 2021. Details for system operations are included in the SVE operations and monitoring summary prepared by CALIBRE as discussed in Section 3.2.
- The injection wells in the Building 4-78/79 area were sampled by CALIBRE on April 1, 2021.
- Landau Associates completed the 2021 site-wide wet season sampling between February 15th and 17th 2021.

1.2 Deviations from required tasks

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

1.3 Deviations from CAP

No deviations from the CAP occurred during this activity period. Modifications proposed in CMP Addendum #3 (CALIBRE, 2020) and approved by Ecology have been incorporated into this sampling event and are summarized in the Compliance Monitoring Plan Deviations subsection for each sampling area.

1.4 Schedule revisions

Modifications to the schedule are presented in CMP Addendum #3, and these changes are summarized in Appendix A. The Ecology-approved modifications in CMP Addendum #3 included a change from both quarterly and semiannual sampling to a sitewide semiannual program with sampling events to occur once each during the wet and dry seasons, in February and August, respectively. The revised monitoring schedule is detailed in Appendix A, Table A-1. This revised sampling schedule began in August 2020.

In 2021, the wet season report will be delivered to Ecology on or before May 30 and the dry season report will be delivered to Ecology on or before November 30.

1.5 Work projected for the next reporting period

The following work is projected for the 2021 dry season event:

- Reporting will be completed in accordance with the Order, CAP, EDR, and changes approved by Ecology, including those modifications proposed in CMP Addendum #3 (CALIBRE, 2020).
- Soil with total petroleum hydrocarbons (TPH) exceeding CULs within the unsaturated and smear zones is planned for excavation on the east side of Building 4-79. Work is expected to take place in mid to late September 2021. More information is provided in Section 3.3.1.2 and a work plan for this event was submitted by CALIBRE Systems, Inc. in January 2021 and approved by Ecology on February 2, 2021.
- Substrate injections to continue enhanced reductive dechlorination treatment for bioremediation will occur in SWMU 172/174, the Building 4-78/79 SWMU/AOC Group, AOC-003, AOC-060, AOC-090, and Apron A.

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 CMP (Amec Foster Wheeler, 2016a) and CMP Addendum #3 (CALIBRE, 2020). Table A-1 summarizes the current groundwater monitoring program and COCs specified in the CAP and revised in CMP Addendum #1 (Amec Foster Wheeler, 2017), CMP Addendum #2 (Wood, 2019) and CMP Addendum #3 (CALIBRE, 2020) 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 specify monitoring requirements for Apron A, which was not included in the CAP. Any changes or exceptions to the sampling or analytical methods cited in Appendix A during the event is 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 event, 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 a secure online storage application, OneDrive. The data validation memoranda are included in Appendix C.

3.0 Corrective action activities completed during the reporting period

This section describes the corrective action activities conducted at the Facility during the wet season of 2021. Operation of the SVE system at SWMU-172/174 continued during the wet season, as discussed in Section 3.2.1.2. Compliance monitoring was conducted in accordance with the CMP (Amec Foster Wheeler, 2016a) and CMP Addendum #3 (CALIBRE, 2020).

3.1 SWMU-168

This section describes corrective action activities conducted at this SWMU. Figure 2 shows the locations of the groundwater monitoring wells at SWMU-168, as well as the groundwater elevation 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 wet season.

3.1.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season. The wells monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. CPOC area wells GW229S and GW231S have been removed from the monitoring plan in this area. COCs remained the same.

3.1.3 Water levels

The groundwater elevation measured during the wet season 2021 groundwater monitoring event at SWMU 168 is summarized in Table 1 and shown on Figure 2. Groundwater elevation contours are not shown since only one well is currently monitored in this group.

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 sampling events in recent years 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 well 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 value measured was 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 well are shown in Table 3. The concentration of VC in the groundwater from CPOC area well GW230I was below the CUL for VC at 0.0764 micrograms per liter (µg/L). Historical trends for VC in GW230I are shown in Appendix D and depicted on Figure 3.

3.2 SWMU-172 and SWMU-174

This section describes corrective action activities conducted at these two SWMUs. The cleanup remedy for SWMU-172 and SWMU-174 is a combination of bioremediation, SVE, and MA. Figure 4 shows the layout of the groundwater monitoring wells and the remediation system for these SWMUs.

3.2.1 Cleanup action activities

3.2.1.1 Installation/construction activities

No installation/construction activities were conducted for these SWMUs during the wet season 2021.

3.2.1.2 Soil vapor extraction and bioremediation operations

The SVE system operated throughout the wet season in 2021, with the exception of two shutdowns. One shutdown occurred from December 21, 2020, until January 5, 2021 due to the holiday break at Boeing. Another shutdown occurred from February 10, 2021, until February 18, 2021 because of heavy snow on site. The system was also sampled for TO-15 compounds during the wet season. Details for system operations are included in the SVE operations and monitoring summary prepared by CALIBRE and included as Appendix E.

3.2.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season event. The wells monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. Downgradient plume area well GW081S, and CPOC area well GW233I were removed from the monitoring plan under Addendum #3. COCs remained the same for SWMU-172 and SWMU-174.

3.2.3 Water levels

Groundwater elevations for the SWMU-172 and SWMU-174 area measured during the wet season event 2021 are summarized in Table 4 and shown on Figure 4. The contoured water level elevation data for February 2021 show that groundwater generally flows northeast from SWMU-172 and SWMU-174 toward the Cedar River Waterway, with an approximate hydraulic gradient of 0.018 foot/foot.

3.2.4 Groundwater monitoring results

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

3.2.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 5. The pH measurements for all SWMU-172 and SWMU-174 monitoring wells were near neutral, between 6.0 and 7.0 standard units. The other natural attenuation parameter results indicate that geochemical conditions were generally uniform and reducing across this area. Reducing conditions indicate the dechlorination of volatile organic compounds (VOCs) are

likely throughout this area. Total organic carbon (TOC) concentrations ranged from 0.96 milligrams per liter (mg/L) to 12.97 mg/L for all SWMU-172 and SWMU-174 monitoring wells.

3.2.4.2 COC results for source and downgradient plume areas

Table 6 lists wet season 2021 analytical results for the SWMU-172 and SWMU-174 COCs. Figures 5 and 6 show 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, and in downgradient plume area wells GW172S and GW173S. Flow generally moves from the vicinity of source area well GW152S to downgradient plume area well GW172S, and from source area well GW153S to downgradient plume area well GW173S. PCE and TCE are the chlorinated solvents that were used at the Facility, and cis-1,2-DCE and VC are breakdown products resulting from biodegradation processes.

Source area groundwater CUL exceedances (Table 6) consisted of:

- GW152S: cis-1,2-DCE and PCE (and the associated duplicate sample),
- GW153S: cis-1,2-DCE, and VC

In the downgradient plume area groundwater CUL exceedances (Table 6) were:

- GW172S: PCE, cis-1,2-DCE and VC
- GW173S: cis-1,2-DCE and VC
- GW226S: No CUL exceedances were observed.

As shown in Figures 5 through 7, the concentrations of COCs in groundwater from source area wells and downgradient plume area wells have generally remained stable or decreased over time.

Arsenic was detected above the CUL in the groundwater from all source area and downgradient plume area wells; both copper and lead were detected above the CULs in the groundwater from GW152S, GW153S, and GW172S; copper was detected above the CUL in the groundwater from GW226S. As shown in Figure 8, the arsenic concentrations in groundwater have generally remained stable since the last sampling event in source area well GW152S and wells from the downgradient plume area; there was an increase in GW153S. The observed range of arsenic in groundwater is within of the naturally occurring background arsenic range reported by Ecology[1] for Washington State (Ecology 2018).

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 9. As shown in Table 6, cis-1,2-DCE was detected above the CUL in the groundwater from CPOC area wells GW232S and GW235I; PCE was also detected above the CUL in the groundwater from GW235I; and VC was detected above the CUL in the groundwater from GW232S. TCE was not detected in the groundwater from the CPOC area wells.

Arsenic was detected above the CUL in the groundwater from all CPOC area wells except for GW235I, and both copper and lead were detected above the CULs in the groundwater from CPOC area wells GW234S and GW236S (Table 6). Figure 10 shows arsenic, copper, and lead concentration trends since the beginning of compliance monitoring in groundwater from the CPOC area wells. As shown in Figure 10, arsenic, copper,

[1] The 2018 Ecology background study is based on testing from over 2,500 supply wells used for potable supply in Puget Sound Basin. All samples are from water supply aquifers with no known anthropogenic impacts. Most wells are non-detect but the natural background range includes more than 130 wells between 10-25 ug/L arsenic and more than 15 wells in the 25-75 ug/L arsenic range. This naturally occurring range is consistent with prior studies by USGS (2000) and Ecology (1989) in Washington State.

and lead concentrations have been stable for approximately one year, or three monitoring events, after a spike occurring in late 2019 through early 2020.

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 wet season 2021. The cleanup remedy for this SMWU/AOC group is bioremediation and MA; SVE has been discontinued and the system was decommissioned. Figure 11 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 SWMU/AOC Group during the wet season 2021.

3.3.1.2 Soil vapor extraction and bioremediation operations

Background:

At the Building 4-78/79 SWMU/AOC Group, soil samples were collected during the second quarter 2018 (Wood, 2018). Analytical results indicated that CULs were attained with one exception: the sample from 4.5 feet below ground surface at well PP13 had a concentration of TPH as gasoline (TPH-G) of 147 milligrams per kilogram (mg/kg), above the CUL of 30 mg/kg.

A revised investigation work plan (CALIBRE, 2019b) to inform the scope of work for excavating the soils near PP13 and GW031S (shown in Figure 11) 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 monitored during subsequent monitoring events 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. TPH-G concentrations in groundwater continue to be monitored. The workplan for soil excavation of the Building 4-78/79 hydrocarbon source area was submitted in January 2021 with an anticipated excavation start date of September 2021 (CALIBRE 2021b) and approved by Ecology on February 2, 2021.

Recent Activities:

Nitrate/sulfate injections were completed on January 25–26, 2021, with sampling taking place on April 1, 2021. Trend charts for *cis*-1,2-DCE and benzene in the nitrate/sulfate injection wells are presented in Figure 12, and charts for TCE and VC in the injection wells are presented in Figure 13.

3.3.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season event. The wells monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. Source area wells GW039S and GW243I; downgradient plume area wells GW038S, GW209S, and GW210S; and CPOC area wells GW238I, GW239I, GW241S, and GW242I were removed from the monitoring plan for this SWMU/AOC group. COCs remained the same for this group.

3.3.3 Water levels

Table 7 presents the groundwater elevations measured during the wet season groundwater monitoring event at the Building 4-78/79 SWMU/AOC group. As shown in Figure 11, the observed direction of groundwater flow from the source area during February 2021 is generally to the west, with a hydraulic gradient of 0.0007 foot/foot.

3.3.4 Groundwater monitoring results

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

3.3.4.1 Natural attenuation/geochemical indicators

The geochemical indicator results are presented in Table 8. In general, source area, downgradient, and CPOC area wells had low levels of DO, ranging from 0.38 to 1.15 mg/L, and high specific conductivity. The pH was near neutral in all wells, between 6.0 and 6.5 standard units. The source area wells showed reducing conditions with low DO and mostly negative ORP readings. Results for the other primary geochemical indicators were generally consistent in all wells. TOC concentrations in source area wells ranged from 5.79 to 34.55 mg/L.

3.3.4.2 COC results for source area

Table 9 lists analytical results for COCs during the wet season event at the Building 4-78/79 SWMU/AOC Group. The CULs established in the CAP for the CPOC are also presented on Table 9. Figures 14 and 15 are trend charts showing historical trends for COCs for the source area wells.

In source area well GW031S (and the duplicate sample) benzene and TPH-G were detected above the CULs, and cis-1,2-DCE was detected below the CUL. In source area well GW033S, benzene, cis-1,2-DCE, and VC exceeded the CULs in groundwater, and TPH-G was detected below the CUL. Groundwater from well GW244S had detections above the CUL for TCE and VC, and detections below the CULs for benzene and cis-1,2-DCE.

Figure 14 shows trends for VOCs in source area wells GW031S and GW033S. COCs shown for GW031S appear to be generally stable with greater annual fluctuations in benzene. Trends in GW033S appear to show greater fluctuation, with cis-1,2-DCE and VC results decreasing over the past six monitoring events. Figure 15 shows trends for VOCs in source area wells GW034S and GW244S. Concentrations of COCs in GW034S appear generally stable, with all COCs except for VC below laboratory detection limits for the past eight monitoring events. COC concentrations in GW244S have generally trended down since monitoring began.

3.3.4.3 COC results for conditional point of compliance area

Groundwater monitoring results in the CPOC area for the wet season 2021 are summarized in Table 9. Trends for CPOC area wells GW143S, GW237S, and GW240D are shown in Figures 16 through 18. Neither cis-1,2-DCE, TCE, nor TPH-G were detected in groundwater from the CPOC area wells at concentrations above the CULs. Benzene and VC were detected above the CUL in groundwater from GW237S. As shown in Figure 16, benzene has been sporadically detected above CULs in the groundwater from CPOC area well GW237S but has not been detected above the CUL in the groundwater from any of the other CPOC wells. Cis-1,2-DCE has been detected sporadically in groundwater above CULs from CPOC area well GW143S (below the CUL in this sampling event) but has not been detected above the CUL in the groundwater from any of the other CPOC area wells (Figure 16).

3.4 Former Fuel Farm AOC group

This section describes corrective action activities conducted at the Former Fuel Farm AOC group during the wet season 2021. The final remedy for the Former Fuel Farm is MNA.

3.4.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the wet season 2021.

3.4.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season. The wells monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. Source area well GW255S, and CPOC area wells GW183S, GW184S, GW212S, GW256S, GW257S, GW258S were removed from the monitoring program for this group. COCs remained the same for this group.

3.4.3 Water levels

Groundwater elevations for the Former Fuel Farm AOC Group measured during the wet season event are summarized in Table 10 and shown on Figure 19. Groundwater elevation contours are not shown since only three wells are monitored in this group and data is too limited to produce accurate contours. Groundwater flow direction is shown based on historical information from this AOC and is to the northeast.

3.4.4 Groundwater monitoring results

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

3.4.4.1 Monitored natural attenuation indicators

The geochemical indicator results are presented in Table 11. Results in Table 11 indicate that geochemical conditions are generally consistent throughout the Former Fuel Farm AOC Group. The pH in CPOC area wells was very close to 6.0 standard units in all wells. DO was generally low across wells in this area, and ORP was moderate for groundwater. The geochemical indicators indicate that conditions are generally conducive to natural attenuation of the COCs for the Former Fuel Farm AOC Group.

3.4.4.2 COC results for source area

The single source area well for this group was removed from the monitoring plan with the acceptance of CMP Addendum #3.

3.4.4.3 COC results for conditional point of compliance area

CPOC area monitoring results are presented in Table 12. Figure 20 shows trend data for CPOC area wells GW211S, GW221S, and GW224S. Figure 20 shows that the wet season event results for these wells are consistent with the historical monitoring results since late 2013. Samples were analyzed for TPH as diesel (TPH-D), motor oil (TPH-O), and Jet A ranges. TPH-D and Jet-A were detected above the CUL in GW221S and GW224S. TPH-O was not detected in any of the CPOC area wells. GW211S has had both TPH-D and Jet-A below the CUL for the past seven monitoring events. The spike in COC concentrations in GW221S during previous monitoring events has returned to normally observed ranges for this well. Concentrations in GW224S appear to be decreasing steadily.

3.5 AOC-001 and AOC-002

Apron R near AOC-001 and AOC-002 is under reconstruction. Therefore, no monitoring was conducted for this area during the wet season 2021. Monitoring wells in these areas were removed on November 25, 2019. Monitoring wells are planned to be reinstalled when construction is complete, currently anticipated for late 2022.

3.6 AOC-003

This section describes corrective action activities conducted at AOC-003 for the wet season event. The cleanup remedy for this AOC is bioremediation and MA. Figure 21 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 wet season event.

3.6.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season. The COCs monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. PCE, TCE, and cis-1,2-DCE were removed as COCs. Wells in the monitoring program remained the same for this AOC.

3.6.3 Water levels

Table 13 presents the groundwater elevations measured during the wet season event at AOC-003. Figure 21 shows the groundwater elevations from this event. Groundwater flow direction is estimated based on historical information of the area.

3.6.4 Groundwater monitoring results

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

3.6.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 14. Results in Table 14 indicate that geochemical conditions are generally consistent throughout this AOC. pH readings were near neutral for all wells in this area. Low DO and negative ORP readings were observed during this monitoring event, indicating reducing conditions.

3.6.4.2 COC results for source and downgradient plume areas

Wells in this group were analyzed for VC. Both the source area and downgradient plume area wells were above the CUL. Figure 22 shows the historical trends of VC in GW249S and GW188S.

3.6.4.3 COC results for conditional point of compliance area

VC was detected at concentrations above the CULs in the groundwater from both CPOC area wells (GW247S and GW248I). Figure 23 shows the historical trends of VC in GW247S and GW248I.

3.7 AOC-004

This section describes corrective action activities conducted at AOC-004 for the wet season event. The cleanup remedy for this AOC is bioremediation and MA. Figure 24 shows the location of groundwater monitoring and bioremediation wells at AOC-004, as well as the groundwater elevations measured during this monitoring event.

3.7.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the wet season event.

3.7.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season. The wells monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. CPOC area well GW174S was removed from the monitoring program for AOC-004. COCs remained the same.

3.7.3 Water levels

Table 16 presents the groundwater elevation measured during the wet season event at AOC-004. Figure 24 shows the groundwater elevation from this event. Groundwater flow directions cannot be determined from the available groundwater elevation data.

3.7.4 Groundwater monitoring results

Groundwater at AOC-004 is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for geochemical indicators are presented in Table 17; results for the AOC-004 COCs are presented in Table 18.

3.7.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 17. The pH reading was near neutral at 6.9 standard units. Moderate DO and a negative ORP readings were observed during this monitoring event.

3.7.4.2 COC results for source area

The source area well in this group was analyzed for lead. Figure 25 shows the historical trend for lead in GW250S.

3.8 AOC-060

This section describes corrective action activities conducted at AOC-060 for the wet season event. The cleanup remedy for this AOC is bioremediation and MA. Figure 26 shows the location of groundwater monitoring and bioremediation wells at AOC-060, as well as the groundwater elevations measured during this monitoring event.

3.8.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the wet season event.

3.8.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season. The wells monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. GW149S, GW252S, and GW254S were removed from the monitoring program. COCs in the monitoring group remained the same.

3.8.3 Water levels

Table 19 presents the groundwater elevations measured during the wet season event at AOC-060. Figure 26 shows the groundwater elevations from this event. Groundwater flow direction is generally to the southwest, toward the Cedar River Waterway, with a hydraulic gradient of approximately 0.005 foot/foot.

3.8.4 Groundwater monitoring results

Groundwater at AOC-060 is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for geochemical indicators are presented in Table 20; results for the AOC-060 COCs are presented in Table 21.

3.8.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 20. The pH was near neutral in this AOC, with one well below 6.0 standard units, and all other wells between 6.0 and 7.0 standard units. High specific conductivity, moderate DO, and negative ORP readings were observed during this monitoring event. Wells in AOC-060 had a large range of TOC results with most wells falling between 2 mg/L and 6 mg/L, and two wells measuring 30.18 mg/L and 653.1 mg/L.

3.8.4.2 COC results for source and downgradient plume areas

Wells in this group were analyzed for cis-1,2-DCE, TCE, and VC (Table 21). Groundwater from all source area and downgradient plume area wells exceeded the CULs for cis-1,2-DCE and TCE.Source area well GW009S and the downgradient plume area well GW014S field duplicate exceeded the CUL for VC. Figure 27 shows historical trends for COCs in GW009S, which have been stable since monitoring began. Figures 27 and 28 show historical trends for COCs in downgradient plume area wells. COC results in GW014S have been generally stable since monitoring began, but GW012S and GW147S exhibit more fluctuation in COC concentrations, possibly due to seasonal groundwater flow variations.

3.8.4.3 COC results for conditional point of compliance area

CPOC area well GW150S had detections of cis-1,2-DCE and VC, but did not exceed CULs. The sample results from GW253I exceeded the CULs for cis-1,2-DCE and TCE and was below the CUL for VC. Figure 29 shows historical trends of COCs in CPOC area wells GW150S and GW253I.

3.9 AOC-090

This section describes corrective action activities conducted at AOC-090 for the wet season event. The cleanup remedy for this AOC is bioremediation and MA. Figure 30 shows the location of groundwater monitoring and bioremediation wells at AOC-090, as well as the groundwater elevations measured during this monitoring event.

3.9.1 Cleanup action activities

No installation/construction activities were conducted for this cleanup action area during the wet season event.

3.9.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season. The wells and COCs monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. Wells GW163I, GW165I, GW175I, GW177I, GW179I, and GW180S were removed from the monitoring program. Analytes were reduced to chlorinated VOCs (CVOCs) and TPH in GW189S, and VC in the remaining wells.

3.9.3 Water levels

Table 22 presents the groundwater elevations measured during the wet season event at AOC-090. Figure 30 shows the groundwater elevations from this event. Determined from historical monitoring events, groundwater flow direction is generally to the west, toward the Cedar River Waterway.

3.9.4 Groundwater monitoring results

Groundwater at AOC-090 is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A. Results for geochemical indicators are presented in Table 23; results for the AOC-090 COCs are presented in Table 24.

3.9.4.1 Monitored attenuation/geochemical indicators

The geochemical indicator results are presented in Table 23. Results in Table 23 indicate that geochemical conditions are consistent throughout this AOC. The pH was near neutral in this AOC, with a range of 6.09 to 6.51 standard units. Low DO and negative ORP readings were observed during this monitoring event. TOC in GW189S was measured at 11.66 mg/L.

3.9.4.2 COC results for source and downgradient plume areas

Groundwater from source area well GW189S exceeded the CUL for TCE, TPH-D, and TPH-O; all other CVOCs and TPH results were below CULs.Historical trends for GW189S show CVOCs are trending downward since the start of monitoring (Figure 31). Downgradient plume area well GW176S exceeded the CUL for VC..

3.9.4.3 COC results for conditional point of compliance area

CPOC area wells GW178S and GW208S exceeded the CUL for VC. The VC detection in well GW207S was below the CUL.

3.10 Building 4-70 area

The Building 4-70 Area was removed from the monitoring program with the acceptance of CMP Addendum #3.

3.11 Lot 20/Former Building 10-71 Parcel

The Lot 20/Former Building 10-71 Parcel was removed from the monitoring program with the acceptance of CMP Addendum #3.

3.12 Apron A area

This section describes corrective action activities conducted at the Apron A area during the wet season event. The cleanup remedy proposed for the Apron A area is bioremediation and MA. Figure 32 shows the locations of the groundwater monitoring wells in the Apron A area.

3.12.1 Cleanup action activities

No construction or operations work was conducted in the Apron A area during the wet season event.

3.12.2 Compliance monitoring plan deviations

No deviations from the CMP occurred for this area during the wet season. The wells monitored in this group changed with the acceptance of CMP Addendum #3 by Ecology. Well GW262S was removed from the monitoring program for this area. COCs monitored for this group remained the same.

3.12.3 Water levels

The depth to groundwater measurements during the wet season at Apron A are presented in Table 25 and on Figure 32. Groundwater elevations are not available because the top of casing elevations was never surveyed. Groundwater flow direction is estimated based on historical information of the area.

3.12.4 Groundwater monitoring results

Results for primary geochemical indicators for groundwater from groundwater monitoring well GW264S are presented in Table 26; results for COCs from this well are presented in Table 27. Groundwater in this area is monitored following the schedule presented in Tables A-1 and A-2 in Appendix A.

3.12.4.1 Monitored attenuation/geochemical indicators

Geochemical parameters are presented in Table 26. Observations included moderate DO, slightly acidic pH of 5.98 standard units, and a negative ORP reading.

3.12.4.2 COC results

Analytes from Apron A samples do not have established CULs to compare to because they were added to the monitoring program after the CMP was in place (Amec Foster Wheeler, 2016a). Additional monitoring of the soil and groundwater in Apron A was completed in 2016 and included installation of the monitoring wells in this area (Amec Foster Wheeler, 2016b). Apron A COCs (cis-1,2-DCE and VC) for GW264S are presented in Table 27. Cis-1,2-DCE was not detected in the groundwater from GW264S. VC was detected in the groundwater from monitoring well GW264S at a concentration of 1.49 µg/L. This exceeds the CUL for VC of 0.11 µg/L in SWMU-168, the closest area of monitoring to Apron A on the west side of the Cedar River Waterway.

4.0 References

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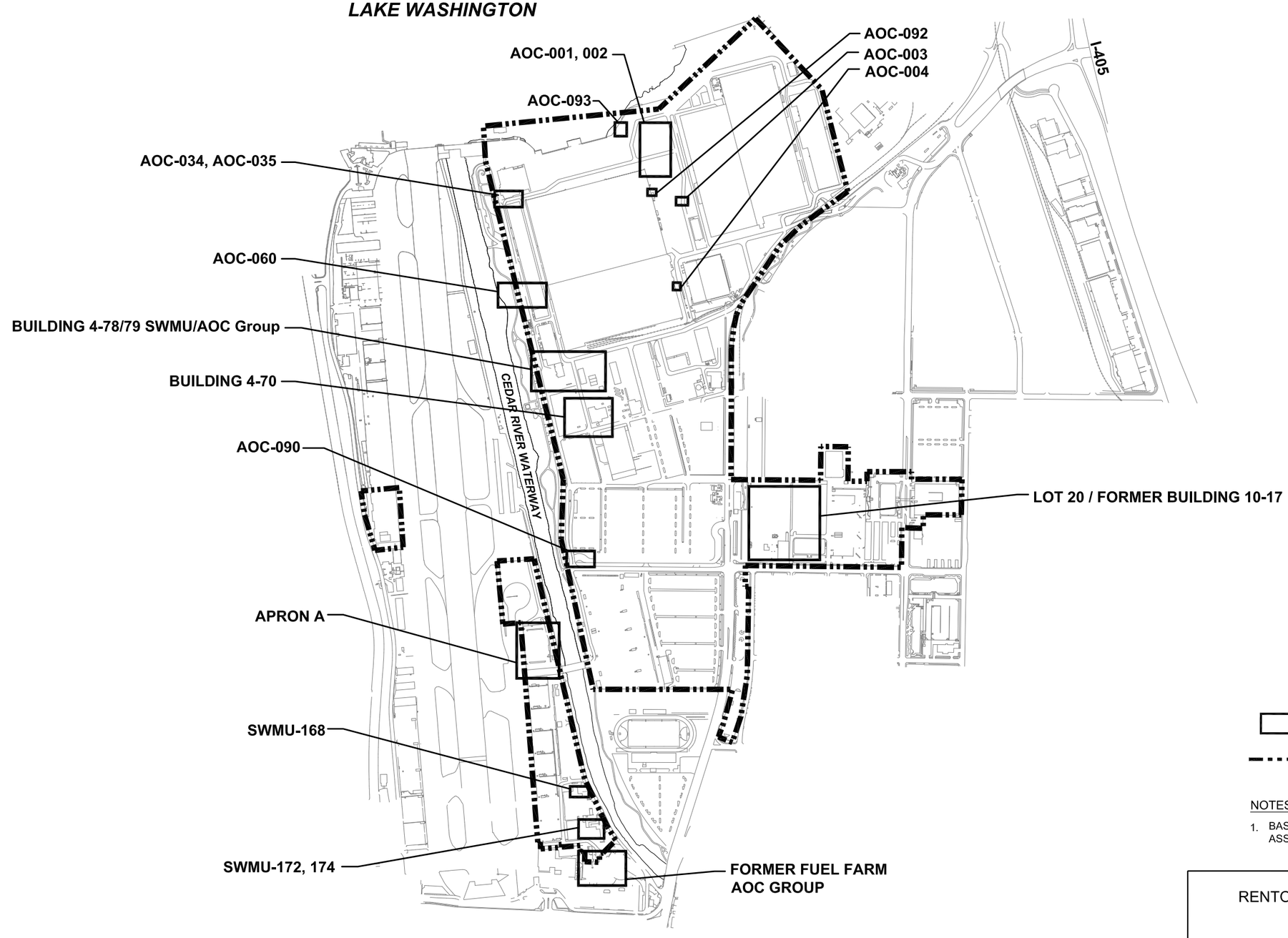
Figures



LEGEND

GENERAL LOCATION OF SWMUs AND AOCs

FACILITY BOUNDARY

NOTES

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

0 400 800

APPROXIMATE SCALE IN FEET

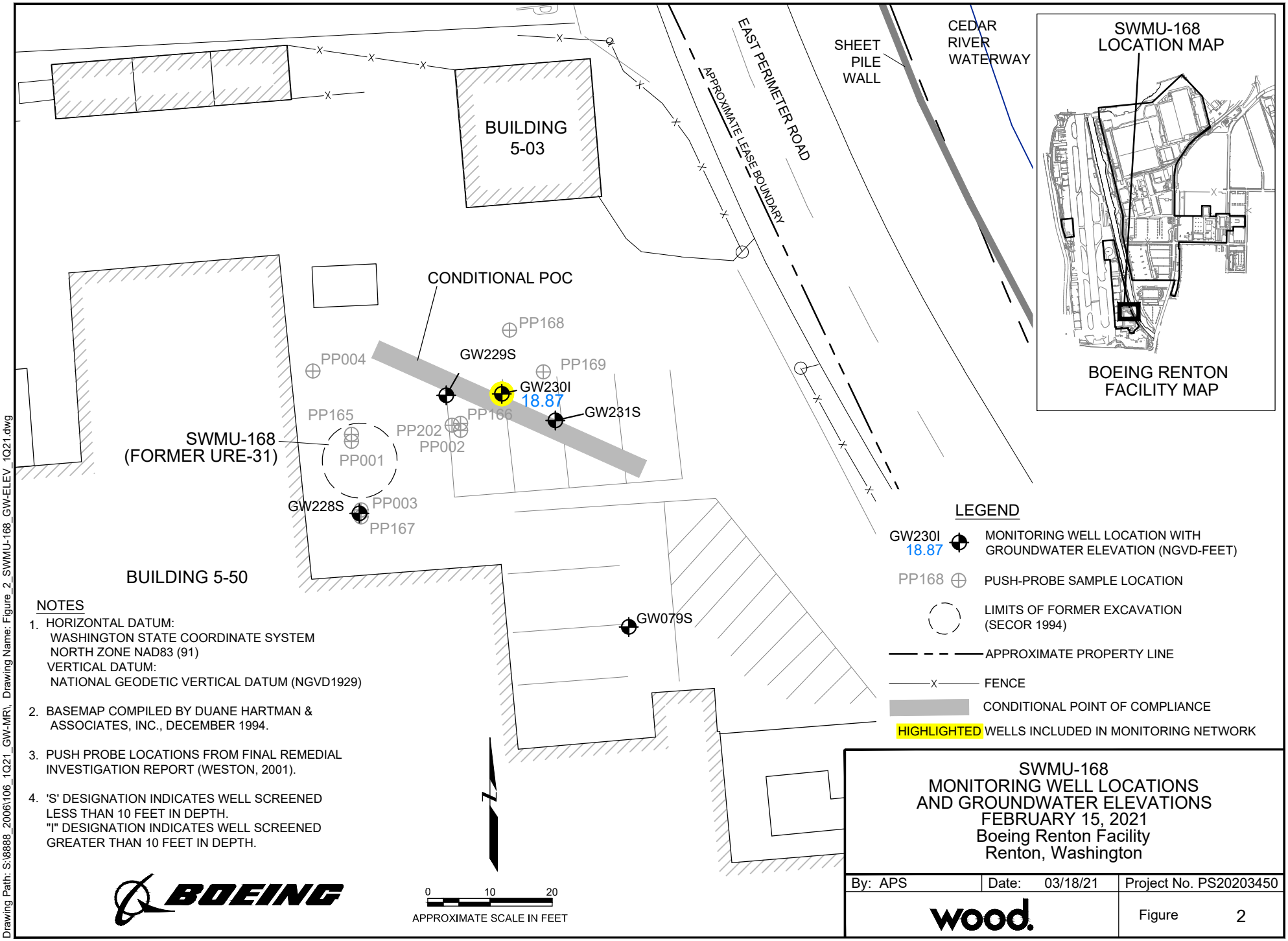
RENTON SWMU AND AOC LOCATIONS

Boeing Renton Facility
Renton, Washington

By: APS	Date: 10/29/20	Project No. PS20203450
wood.		Figure 1

BOEING

Plot Date: 10/29/20 - 10:56am, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\105_3q20_GW-MR\, Drawing Name: BoeingRentonSiteMap_3Q20.dwg



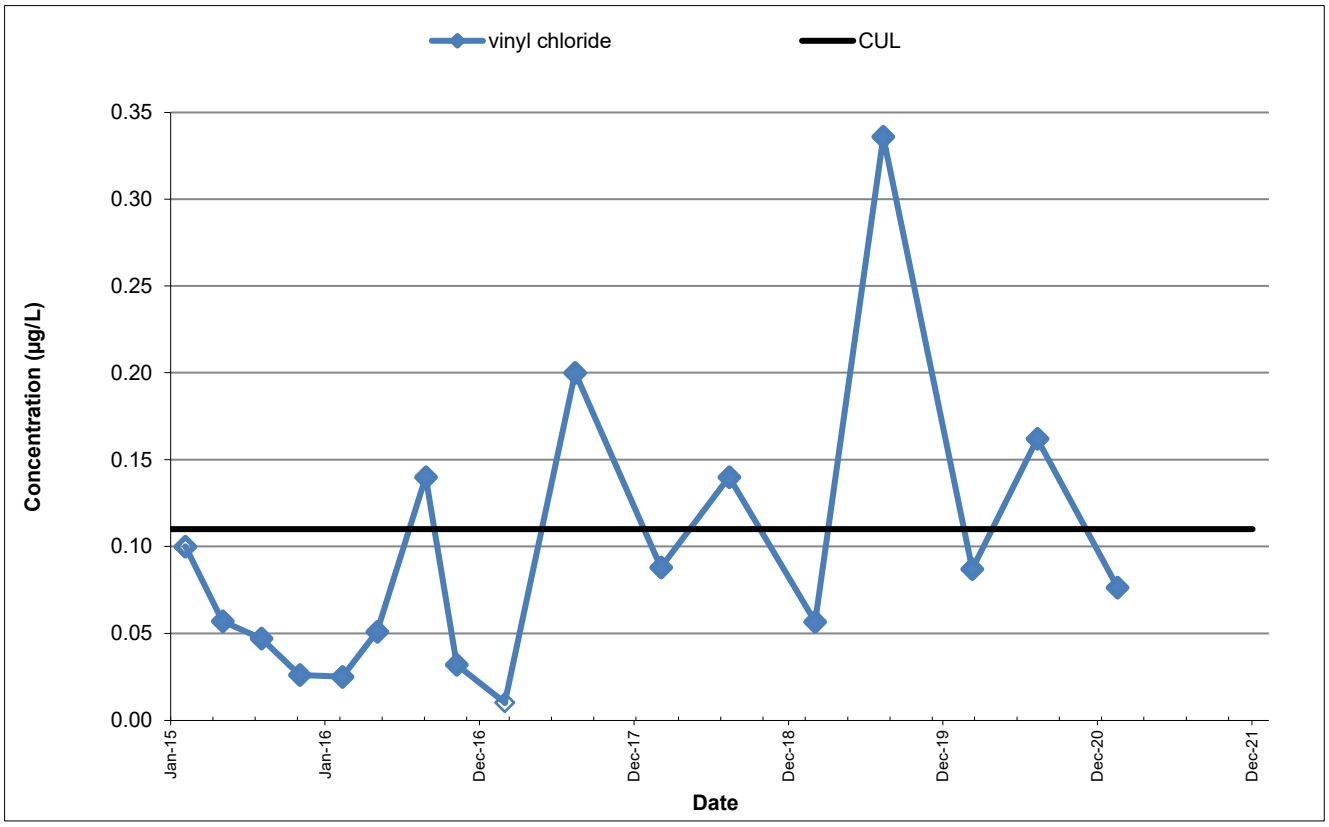
NOTES

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

SWMU-168
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 15, 2021
Boeing Renton Facility
Renton, Washington

By: APS	Date: 03/18/21	Project No. PS20203450
wood.		Figure 2



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

CPOC AREA WELL GW230I

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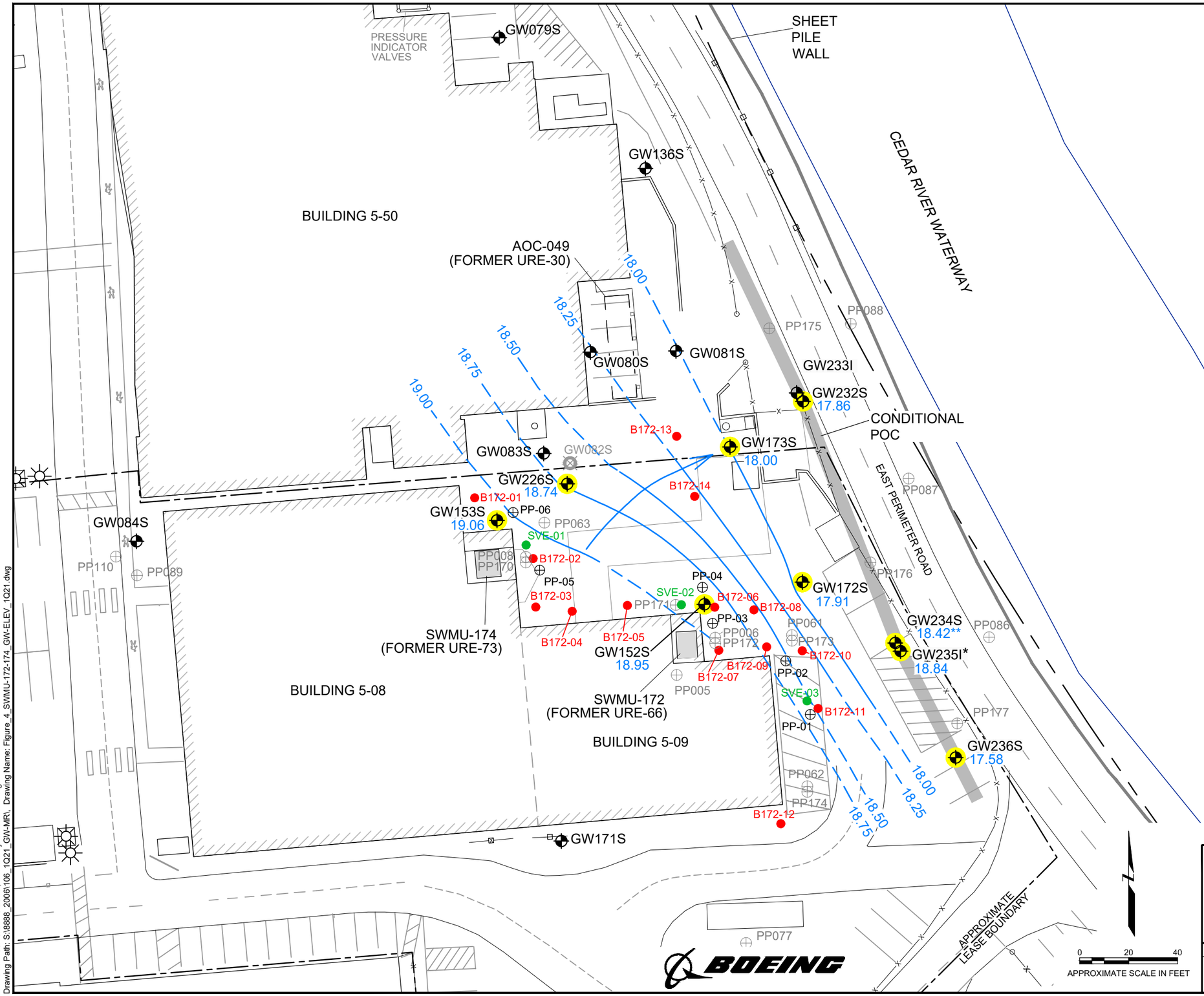
wood.

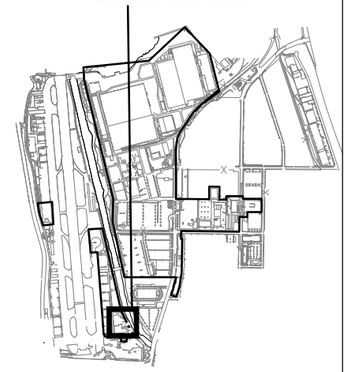
SWMU-168 HISTORICAL VC TREND PLOT FOR
CPOC WELL GW230I
Boeing Renton Facility
Renton, Washington

Project No.
PS20203450

Figure
3



SWMU-172 AND SWMU-174 LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW172S 17.91 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * — WELL SCREENED IN UPPER AND LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- ** — GROUNDWATER WAS NOT INCLUDED IN CONTOURING DUE TO ANOMALOUS MEASUREMENT.
- 18.25 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- GW082S — ABANDONED MONITORING WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK
- SVE-02 — SVE WELL
- B172-10 — BIOREMEDIATION INJECTION WELL
- PP171 — PUSH PROBE SAMPLING LOCATION
- PP-01 — PUSH PROBE SAMPLE LOCATION COMPLETED IN JUNE 2018

NOTES

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

SWMU-172 AND SWMU-174 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS FEBRUARY 15, 2021

Boeing Renton Facility
Renton, Washington

By: APS	Date: 03/19/21	Project No. PS20203450
wood.		Figure 4

Plot Date: 03/19/21 - 9:25am, Plotted by: adam.stenberg
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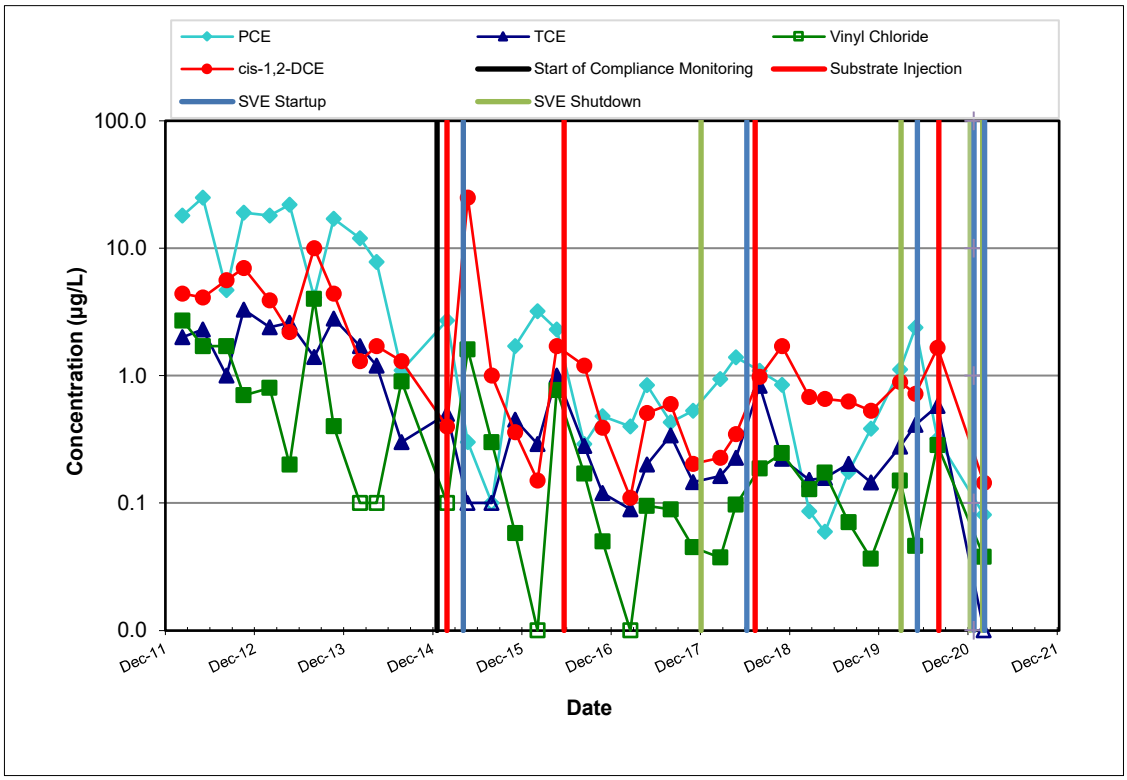
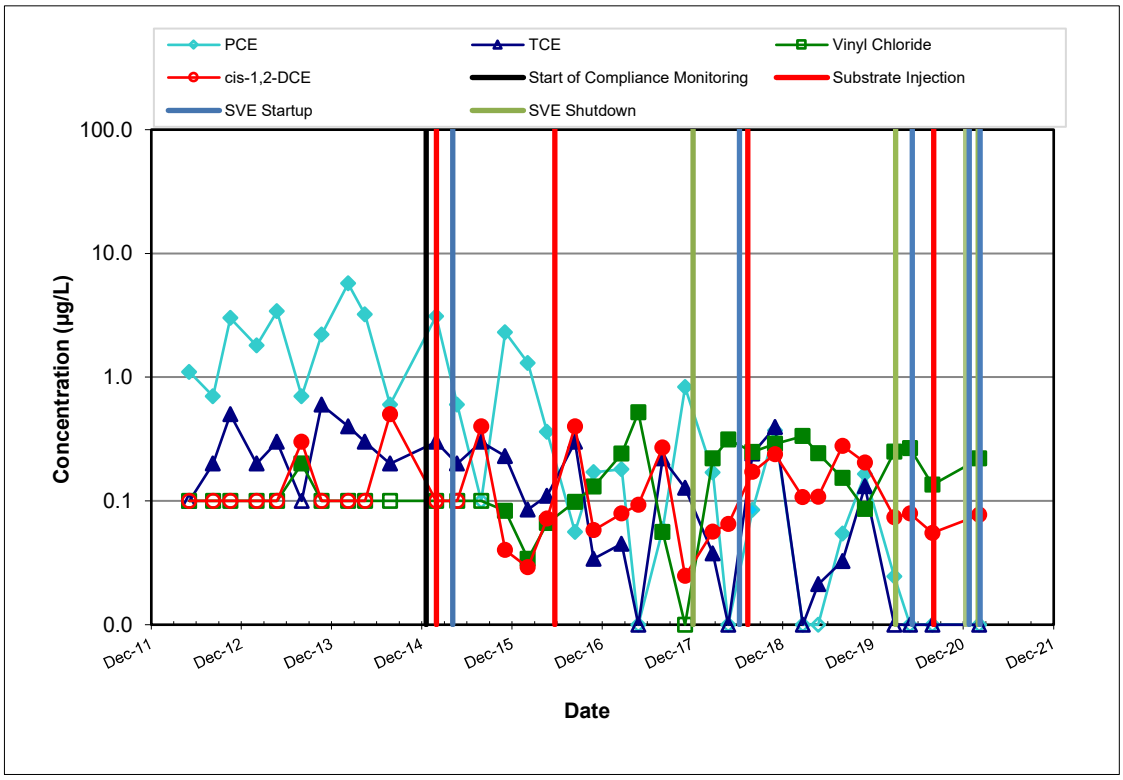


SOURCE AREA WELL GW152S

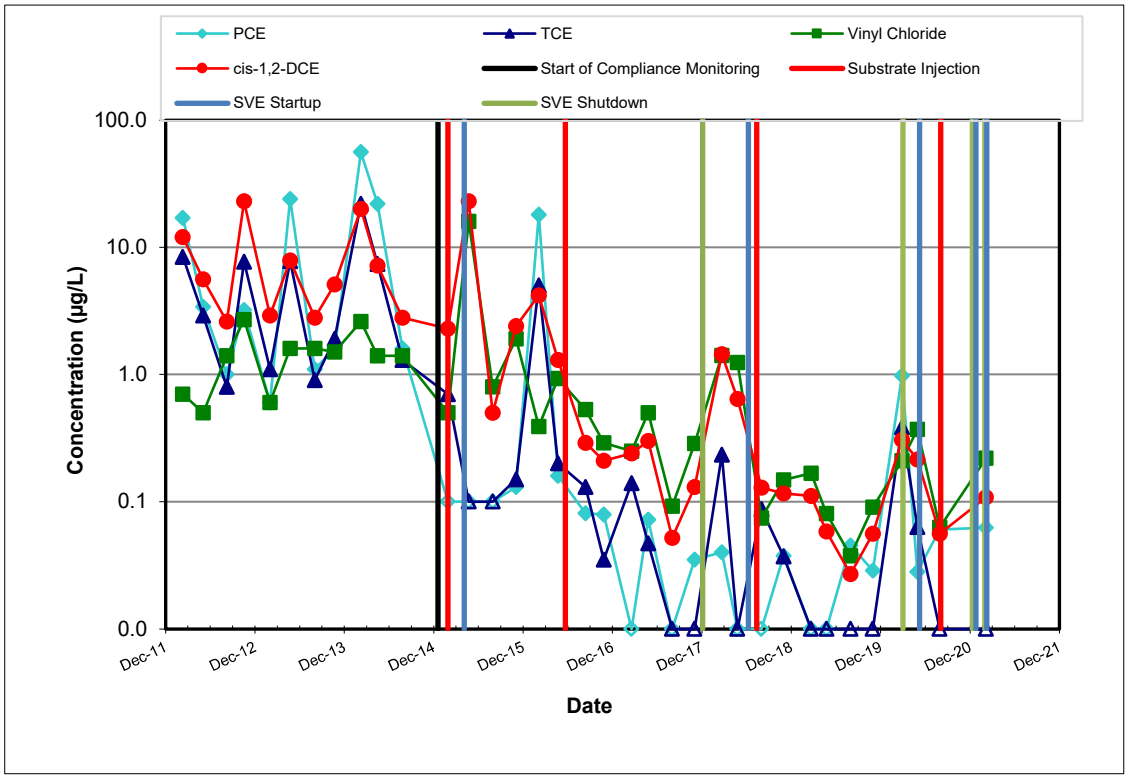


SOURCE AREA WELL GW153S

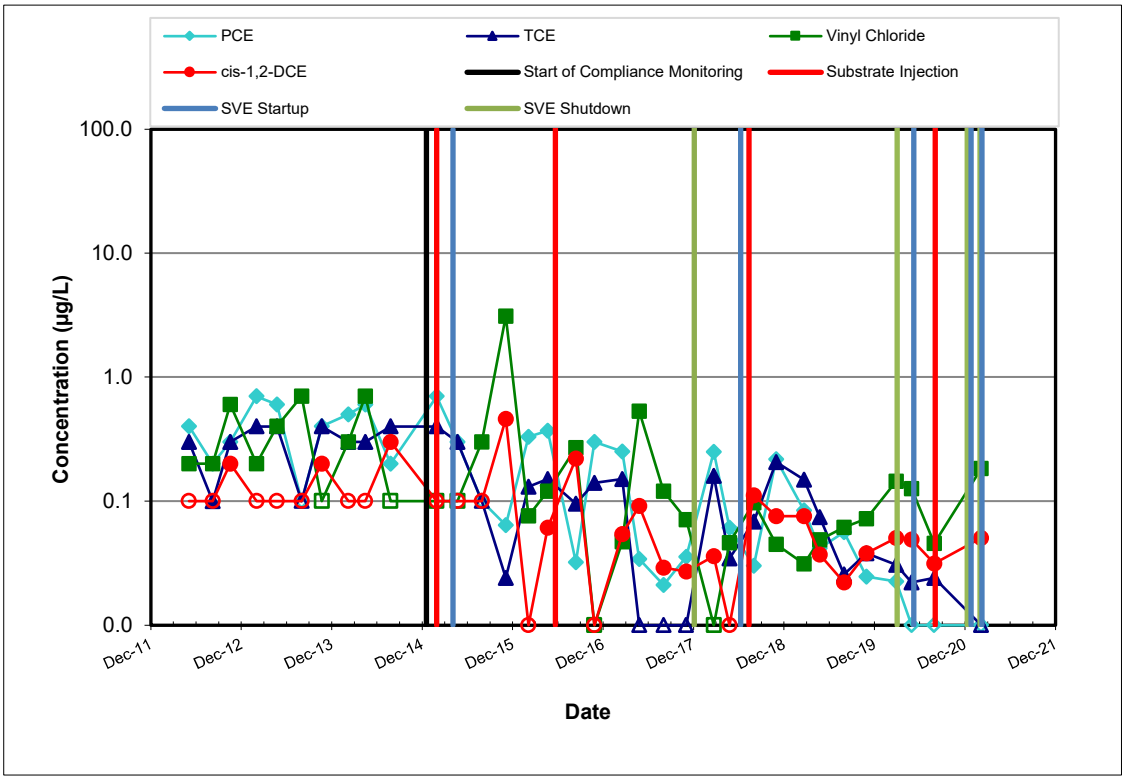
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 5 to 10_ SWMU_172-174.xlsx

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR SOURCE AREA WELLS GW152S AND GW153S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 5



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.

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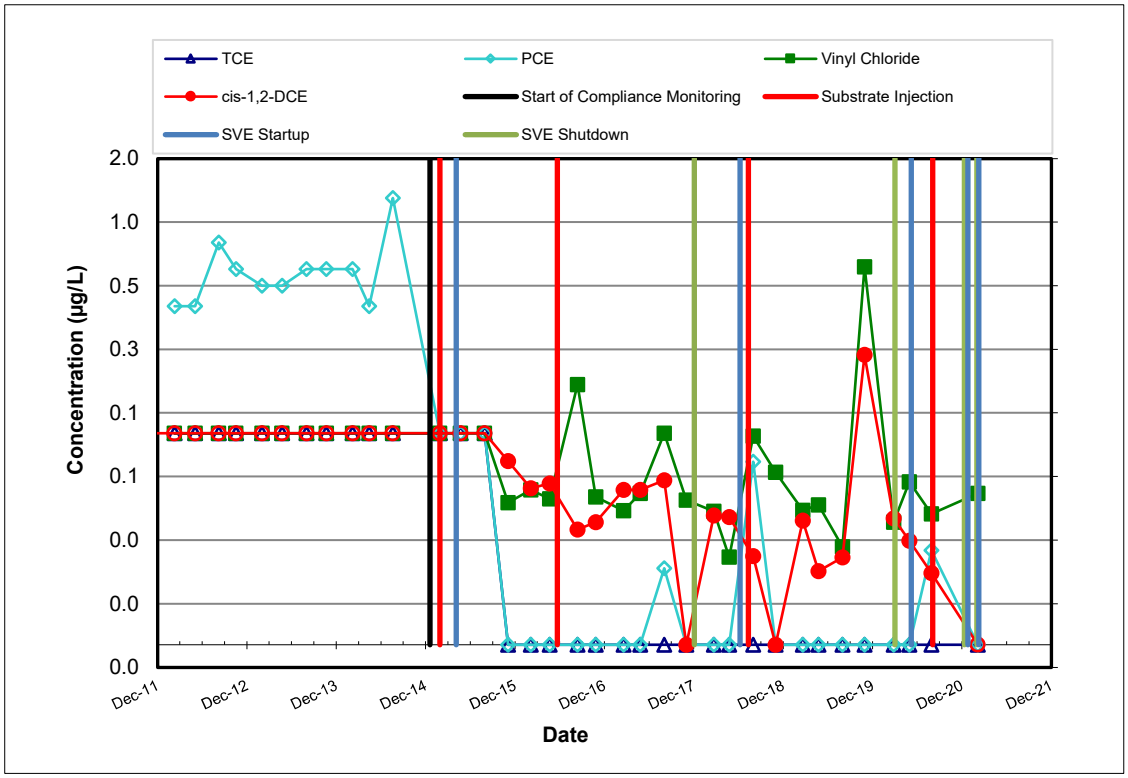
wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW172S AND GW173S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 6



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

DOWNGRADIENT PLUME AREA WELL GW226S

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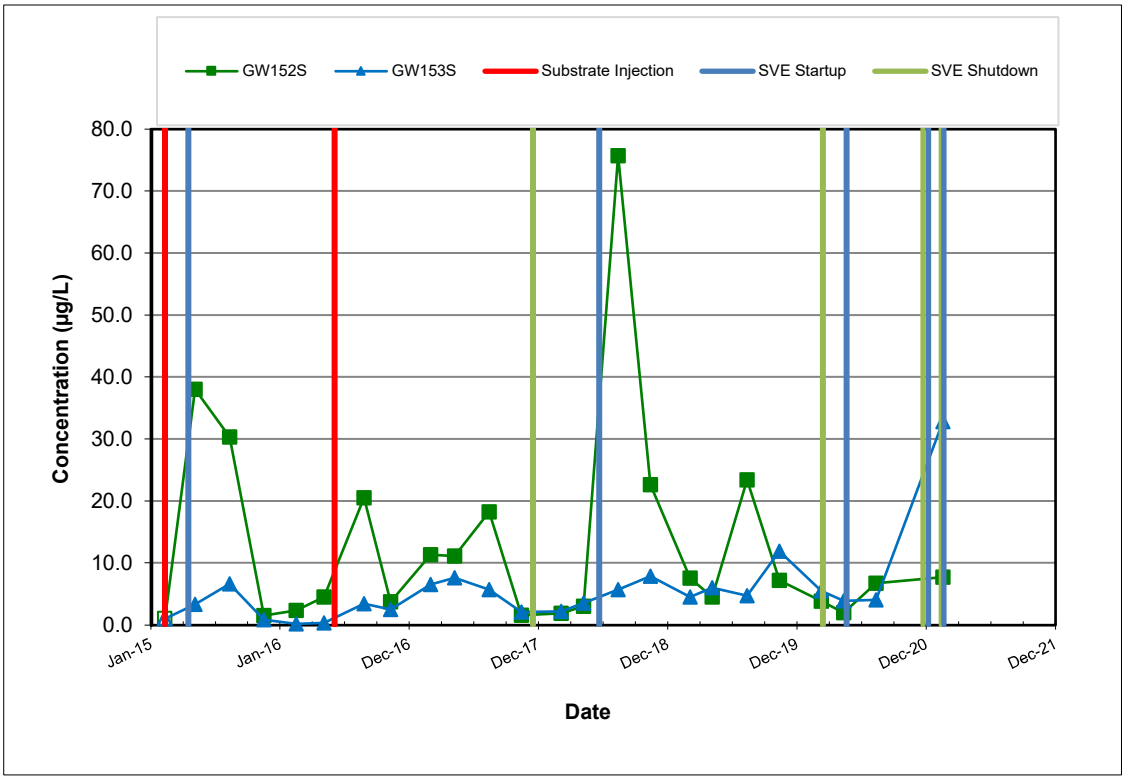
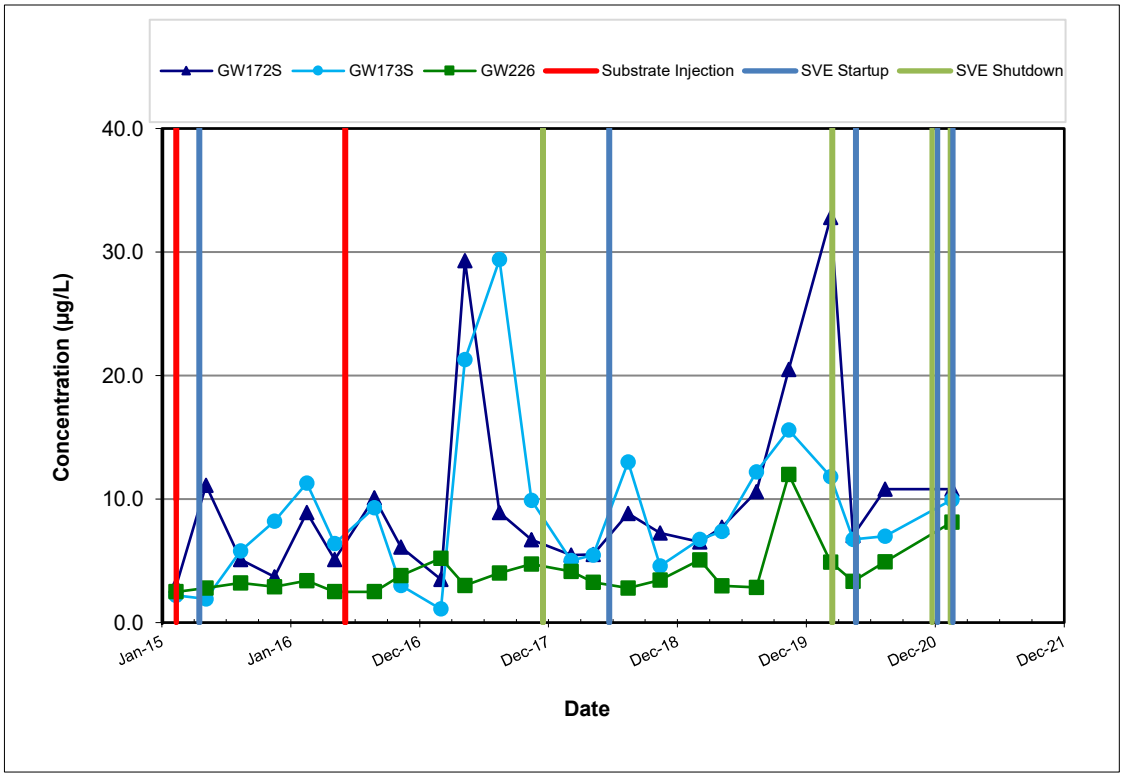
wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELL GW226S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 7



TOTAL ARSENIC IN SOURCE AREA WELLS

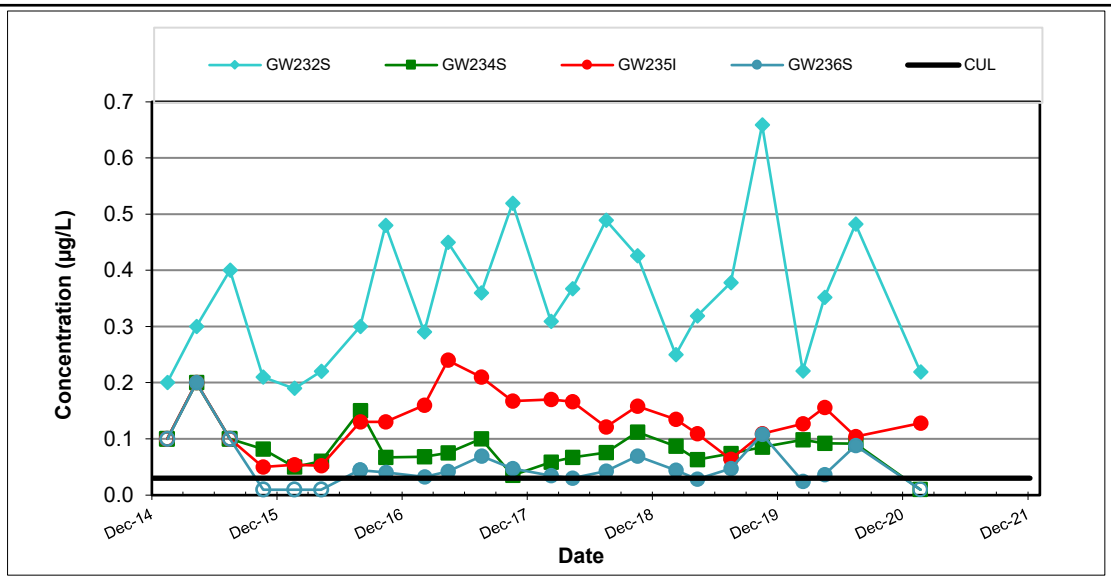


TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

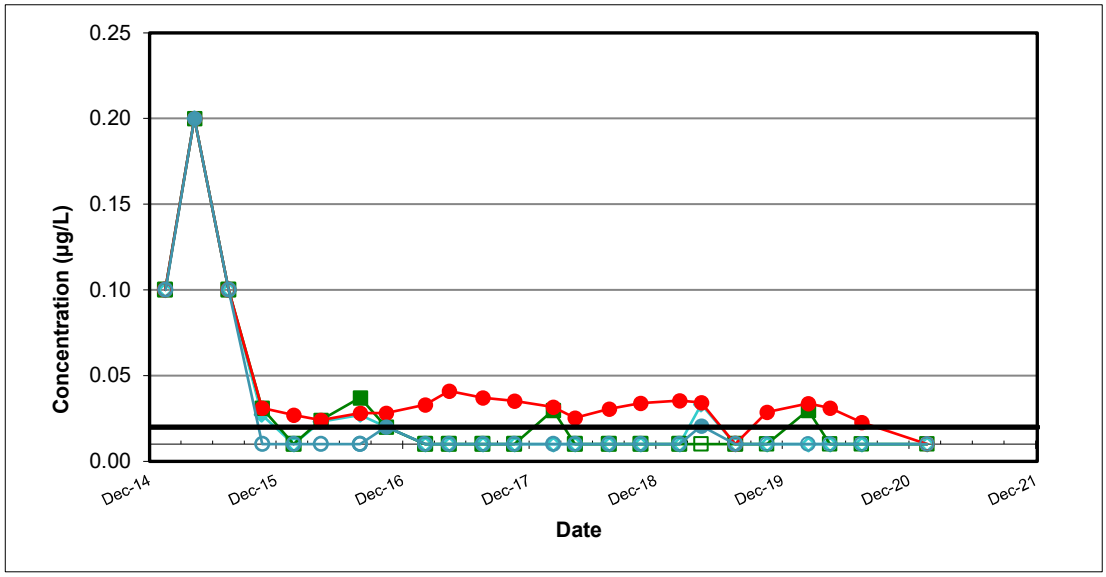
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 5 to 10_ SWMU_172-174.xlsx

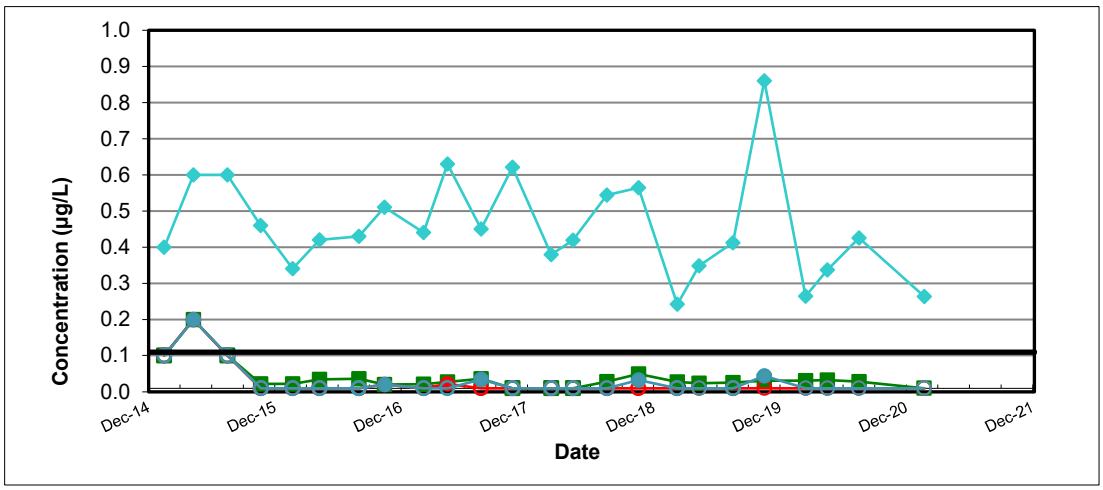
wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC IN SELECT SOURCE AREA AND DOWNGRADIENT PLUME AREA WELLS Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 8



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. PS20203450 Figure 9

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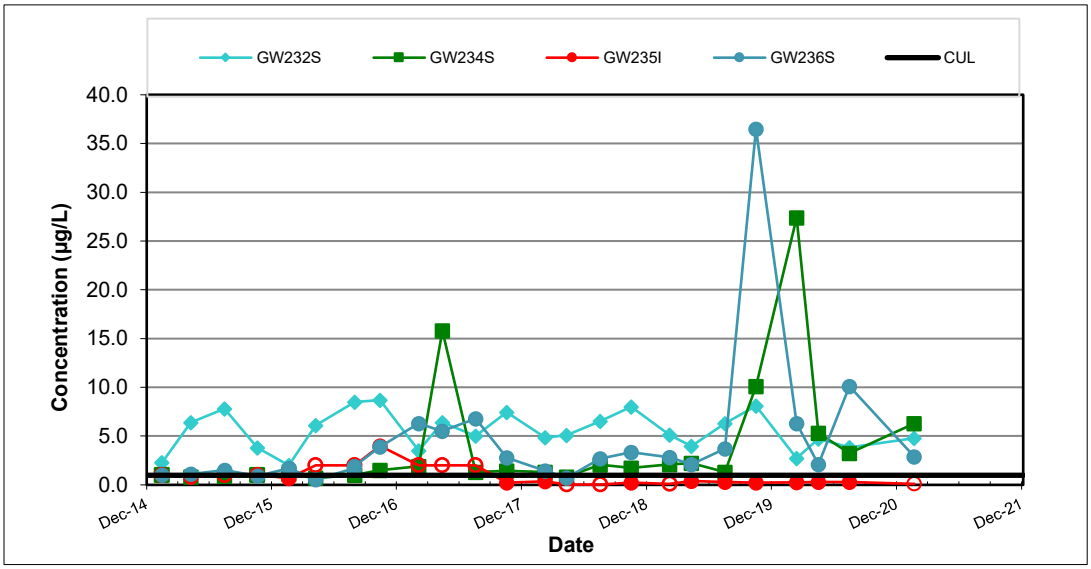
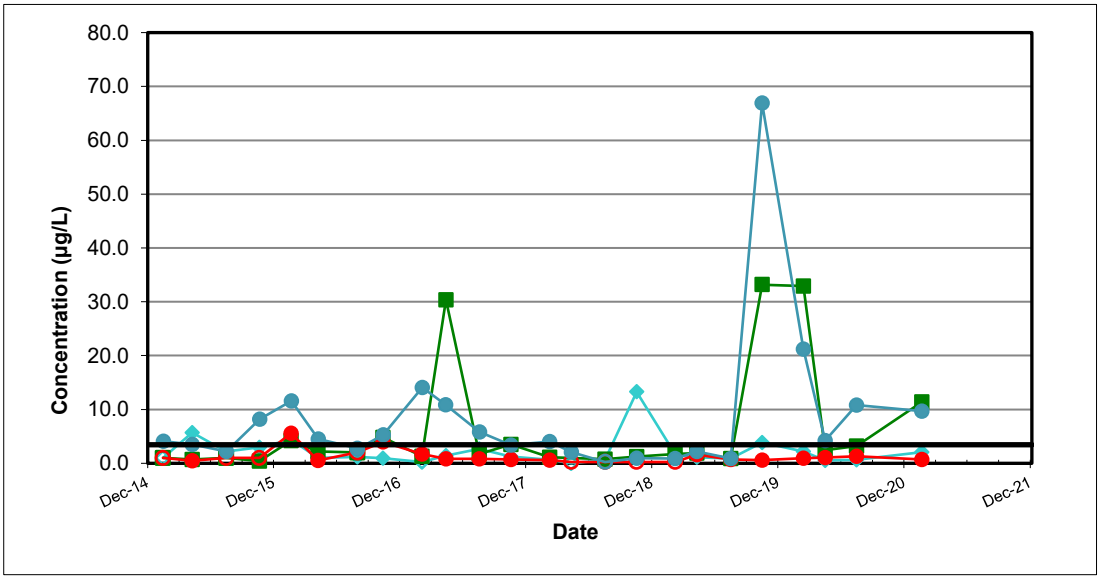
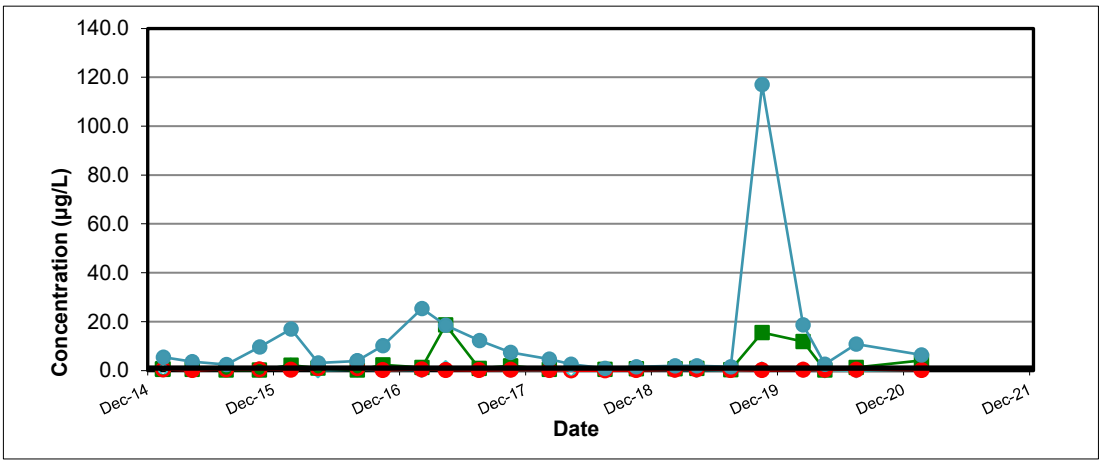


Arsenic



Copper

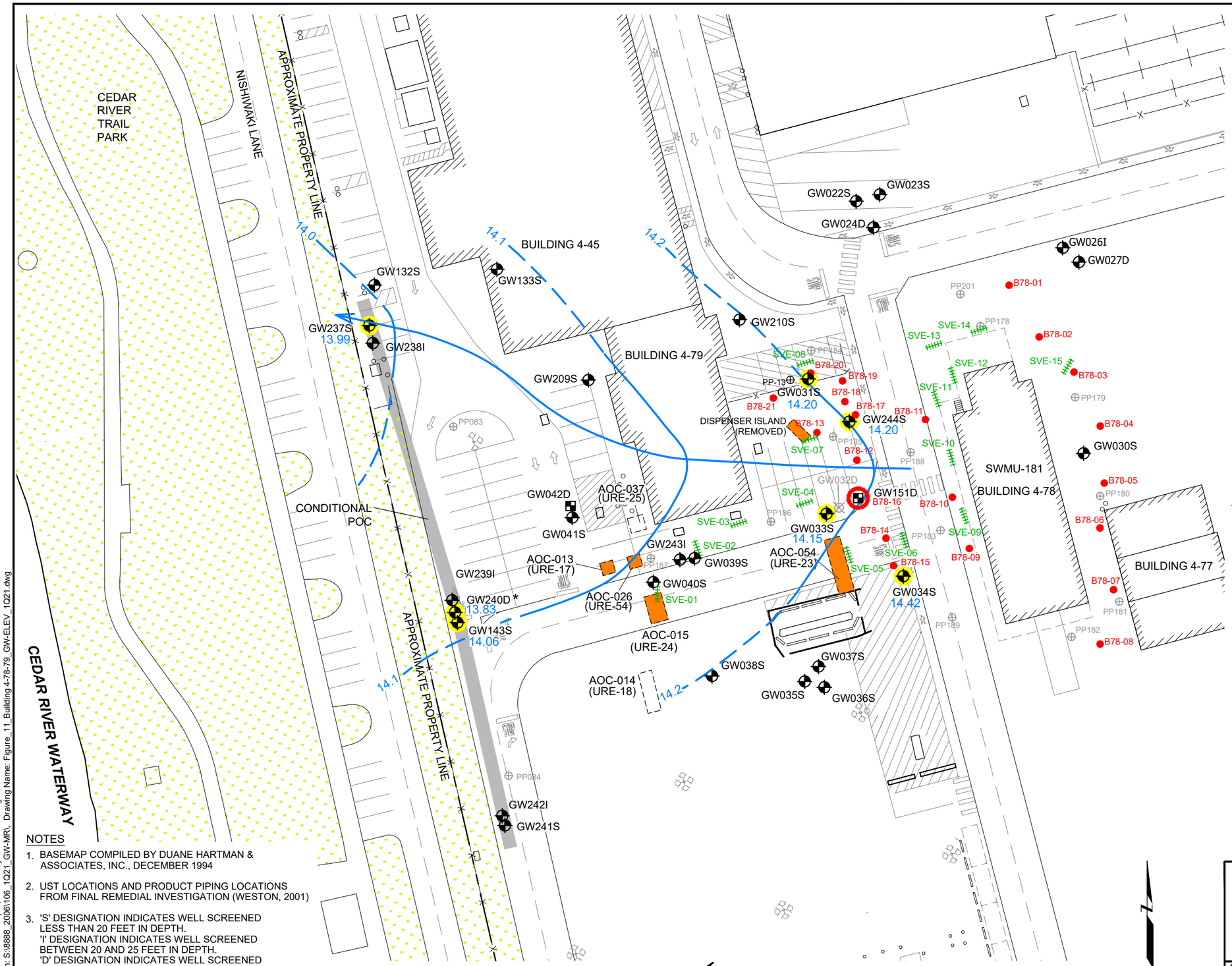


Lead

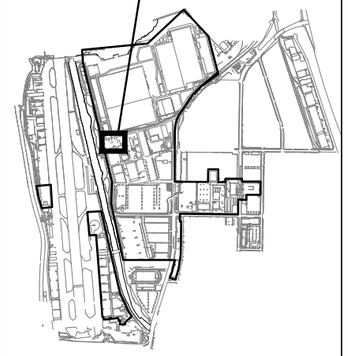
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC, COPPER AND LEAD IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 10

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 5 to 10_ SWMU_172-174.xlsx



4-78/79 SWMU/AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW033S 14.15 — 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.
- 14.1 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL GROUNDWATER FLOW DIRECTION
- 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.
4. THE GROUNDWATER FLOW DIRECTION SHOWN IS BASED ON HISTORICAL GROUNDWATER DATA.

N

0 25 50

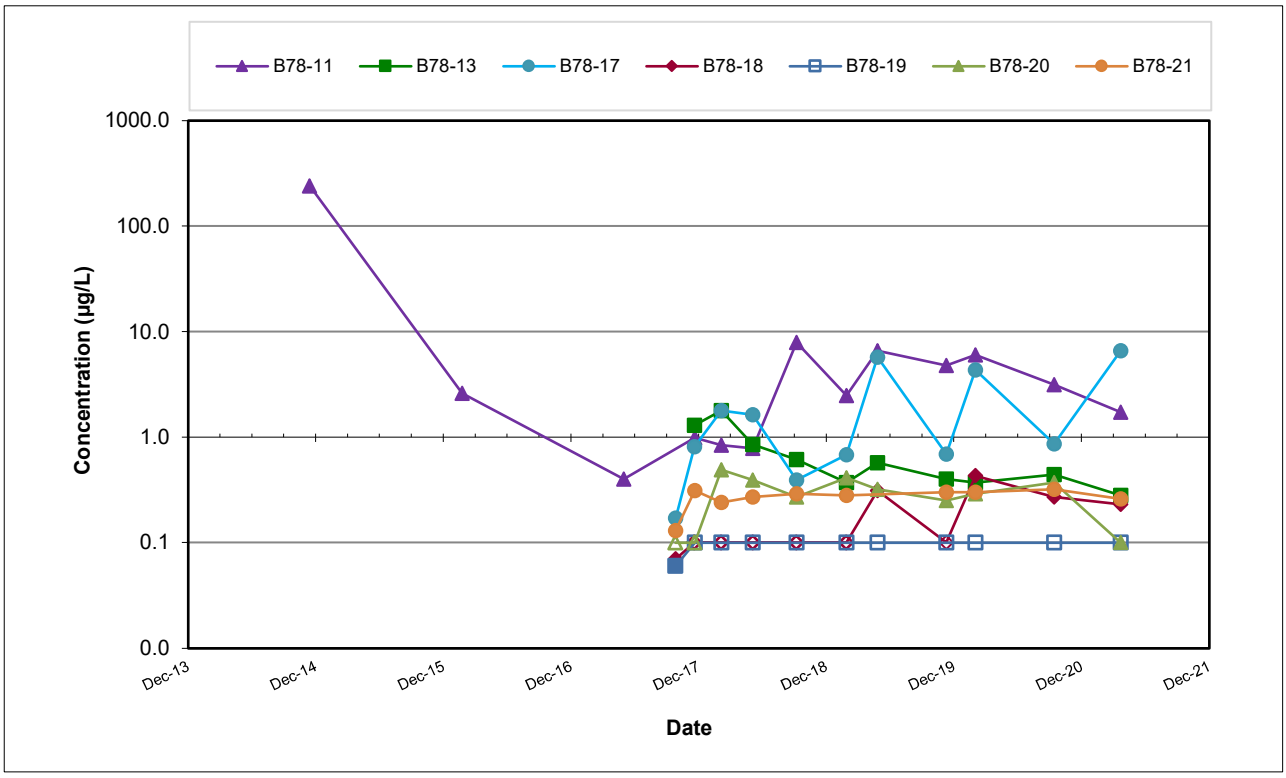
APPROXIMATE SCALE IN FEET

BOEING

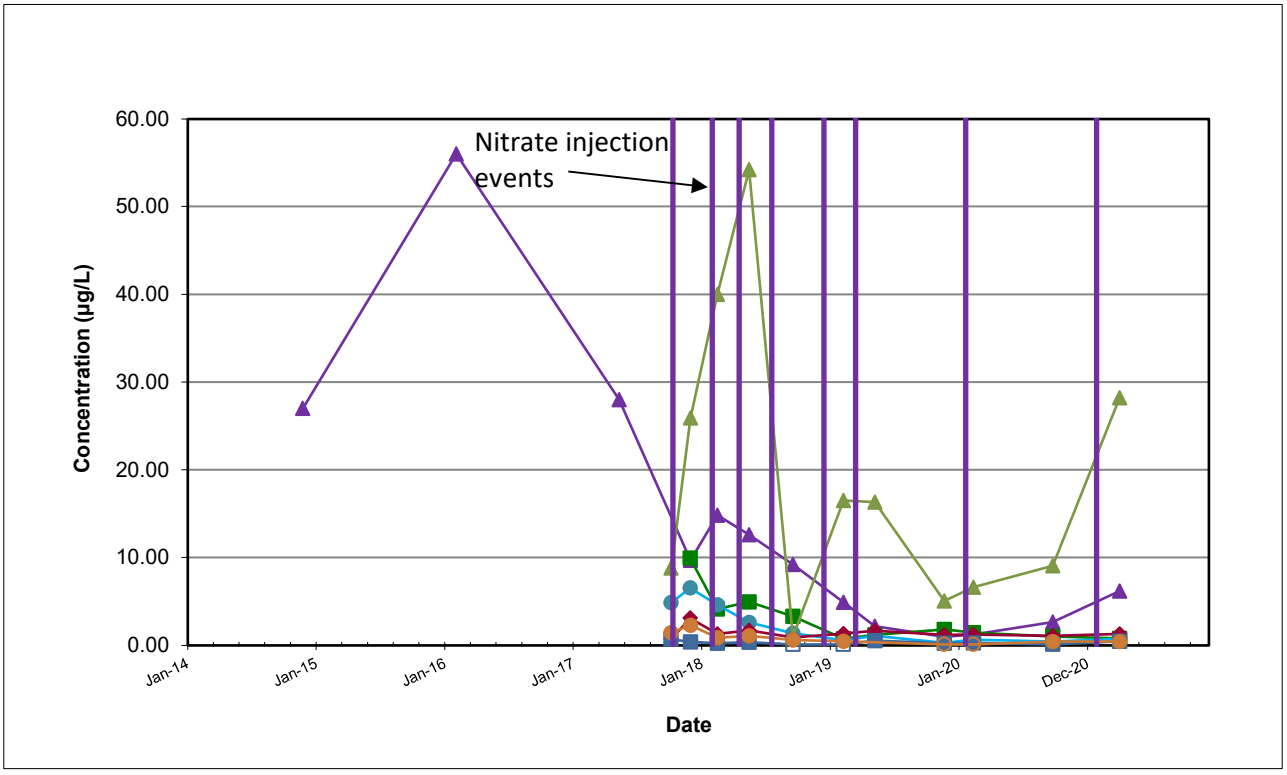
BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS FEBRUARY 15 & 16, 2021 Boeing Renton Facility Renton, Washington

By: APS	Date: 03/18/21	Project No. PS20203450
wood.		Figure 11

Plot Date: 03/18/21 - 1:36pm Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\106_1Q21_GW-MR_Drawing Name: Figure_11_Building 4-78-79_GW-ELEV_1Q21.dwg



cis-1,2-Dichloroethene

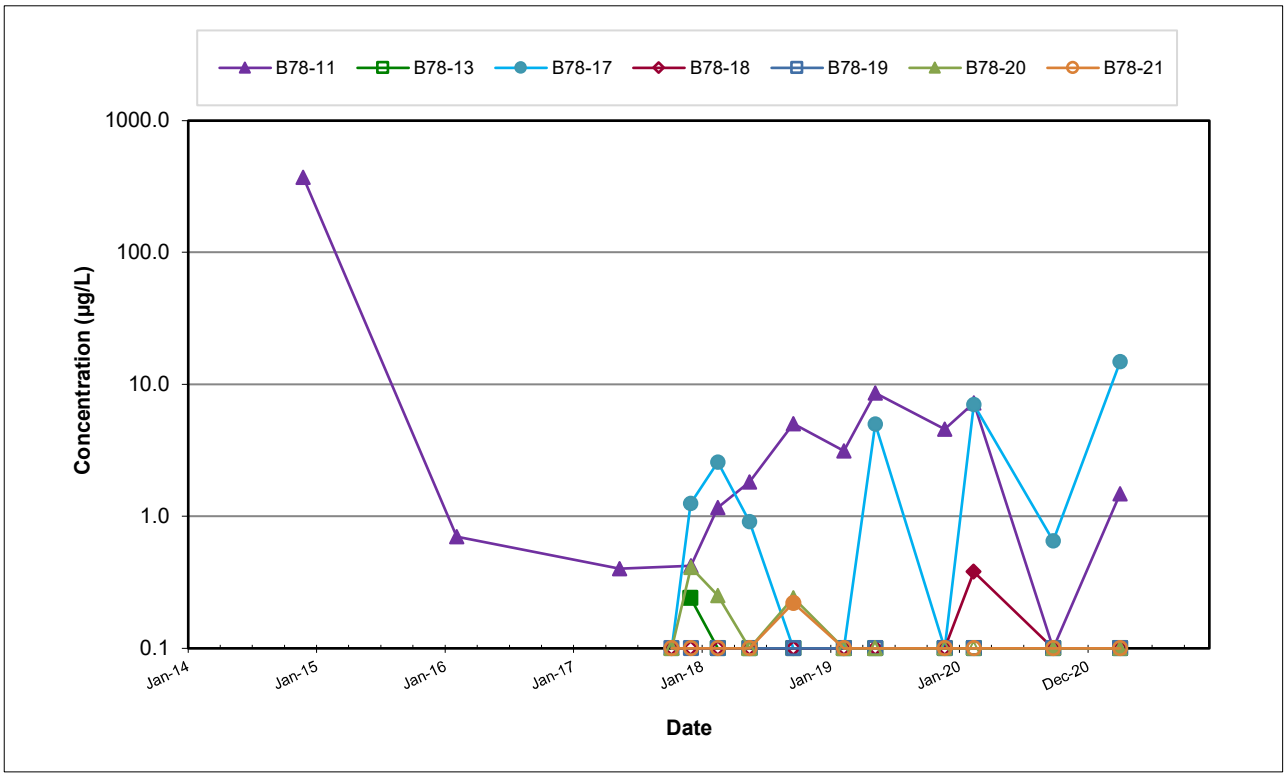


Benzene

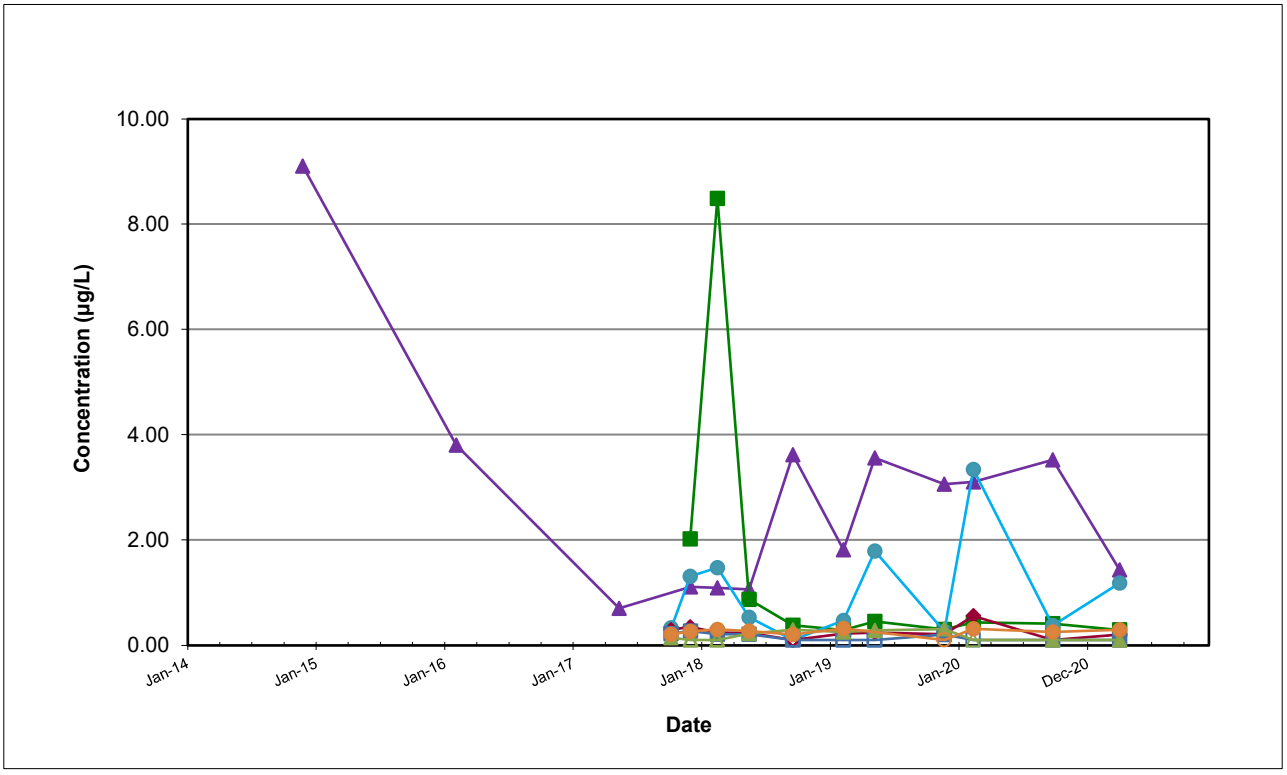
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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. PS20203450 Figure 12

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 12 to 18_ Bldg 4-78-79.xlsx



Trichloroethene

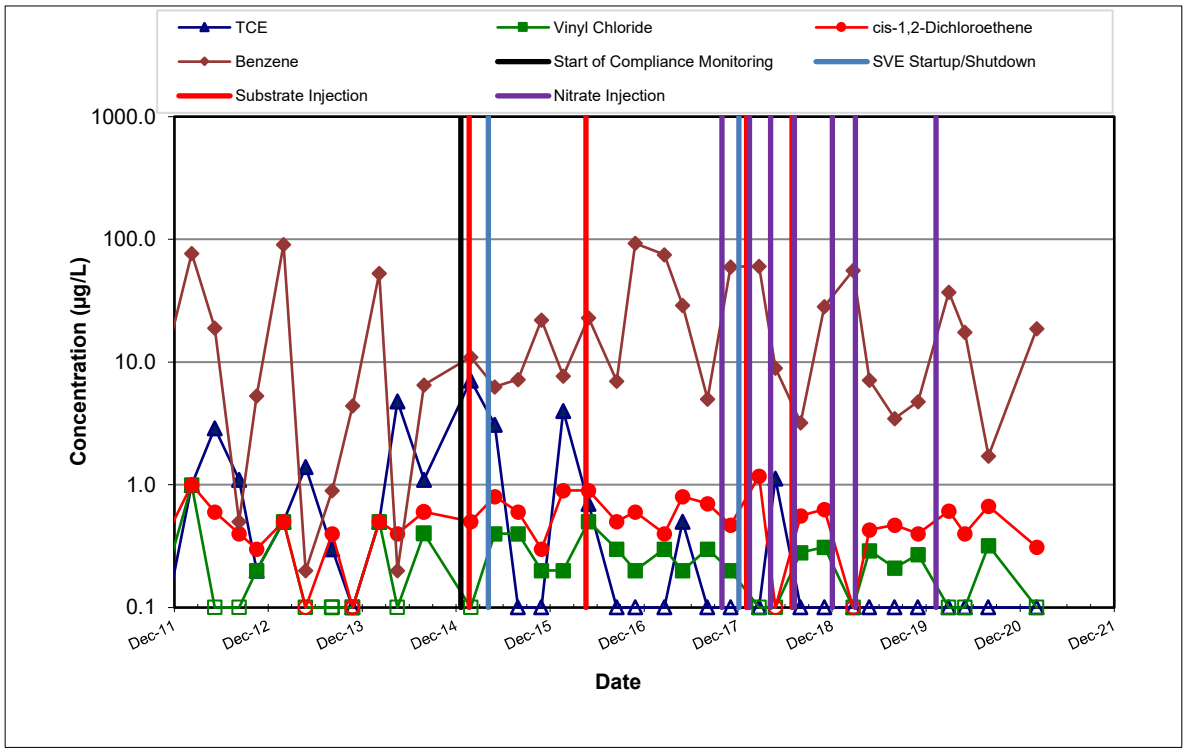


Vinyl Chloride

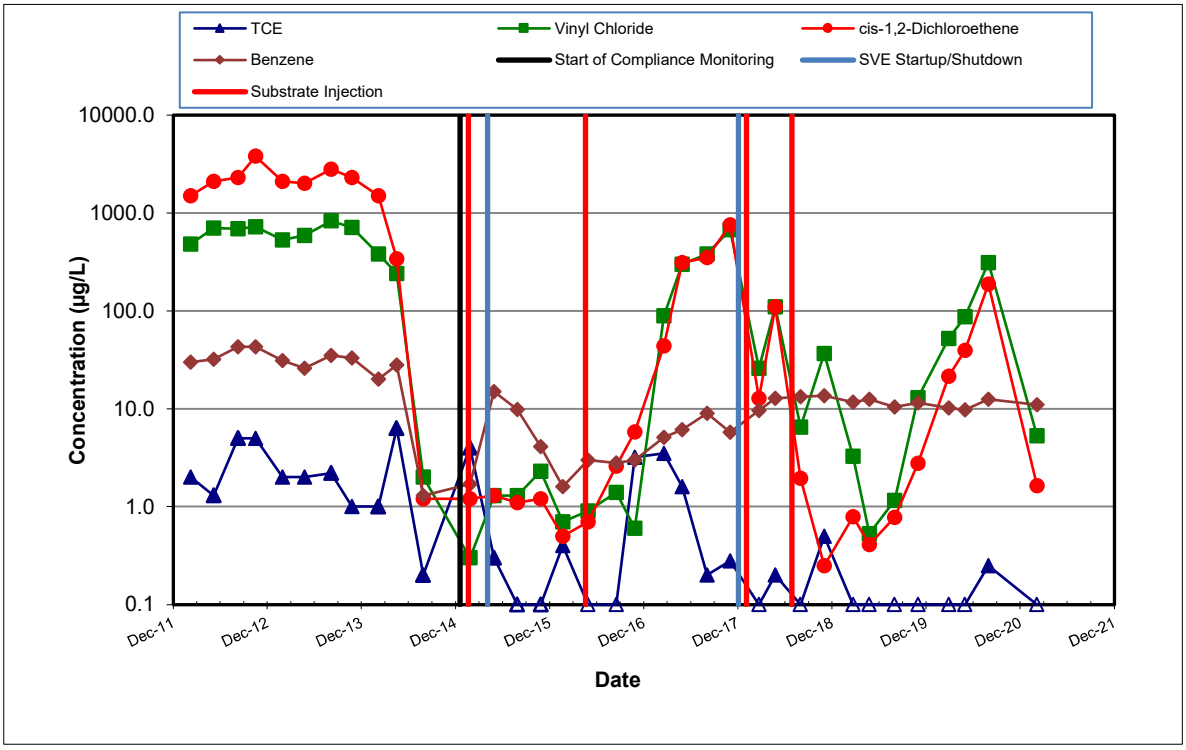
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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. PS20203450 Figure 13

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 12 to 18_ Bldg 4-78-79.xlsx



SOURCE AREA WELL GW031S

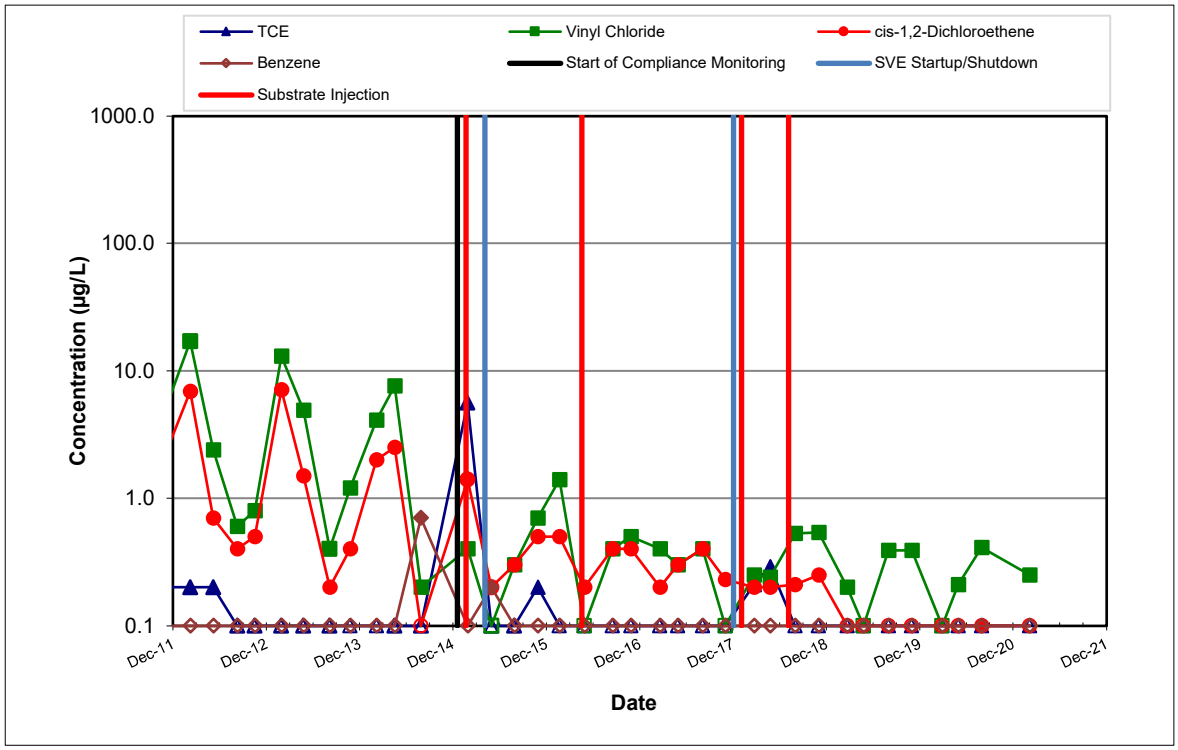


SOURCE AREA WELL GW033S

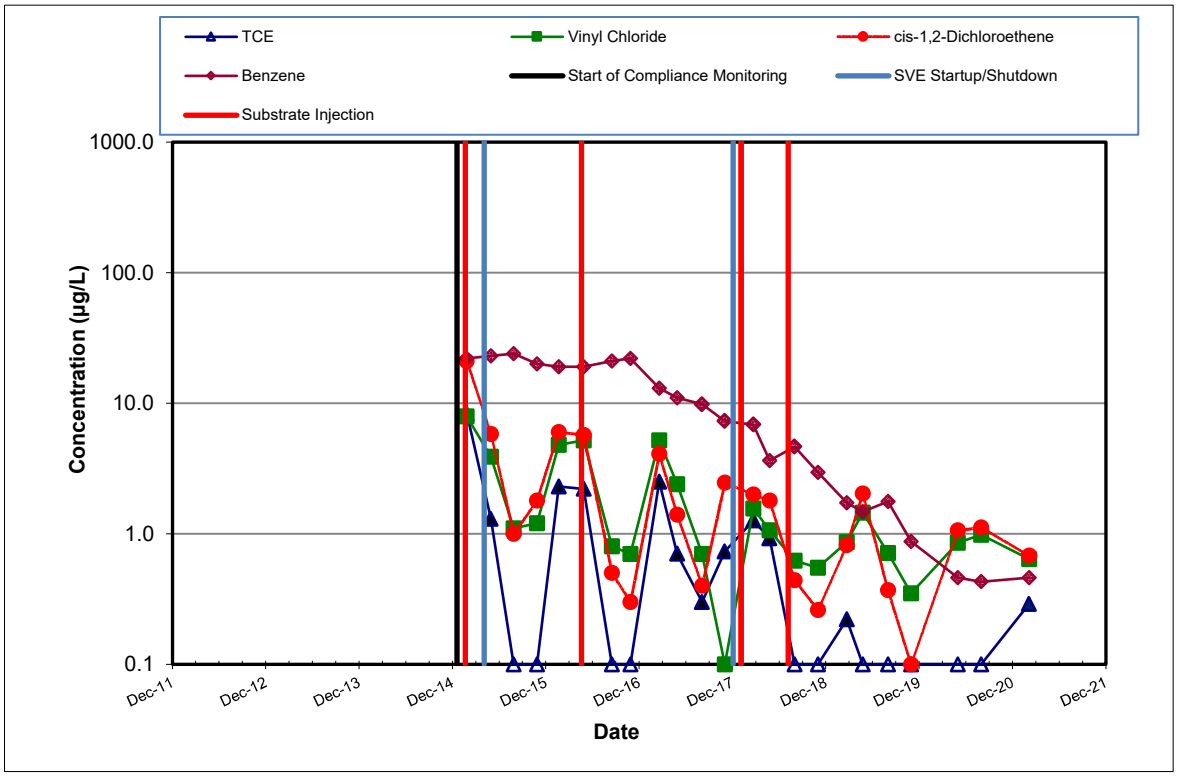
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELLS GW031S AND GW033S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 14

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 12 to 18_ Bldg 4-78-79.xlsx



SOURCE AREA WELL GW034S

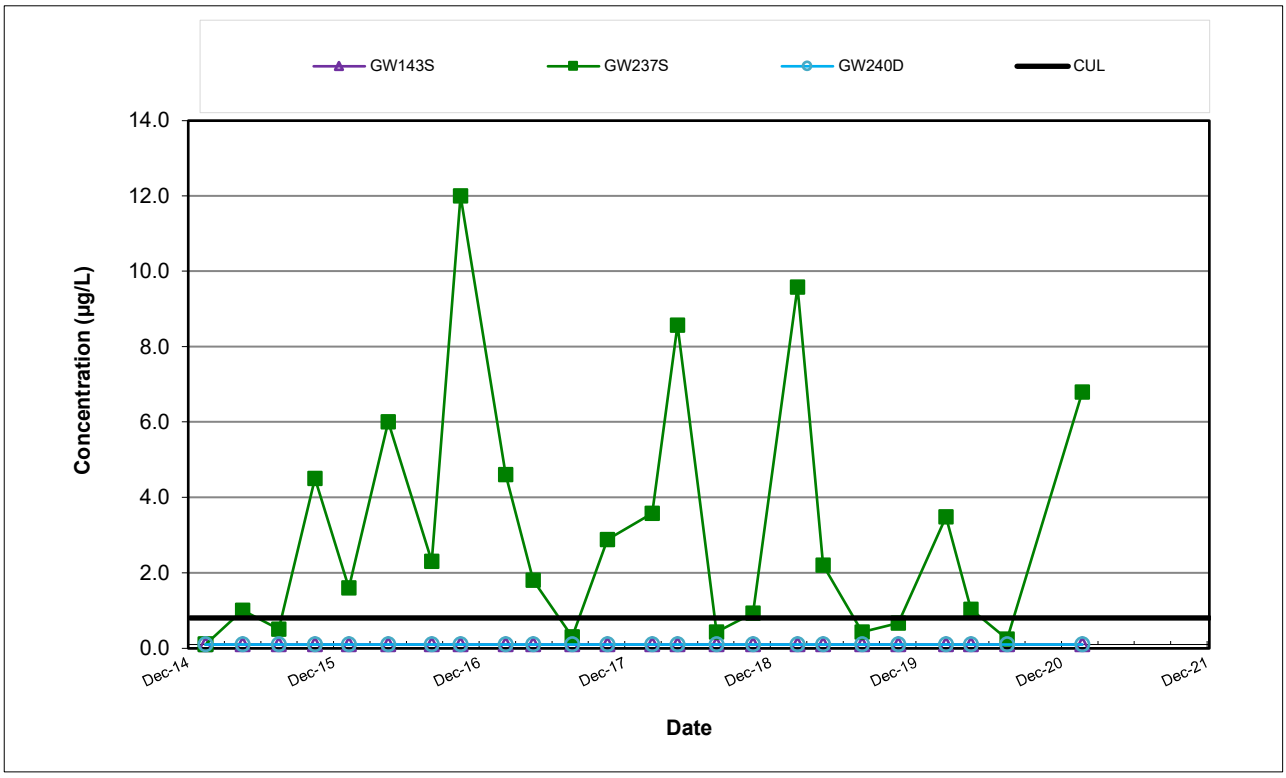


SOURCE AREA WELL GW244S

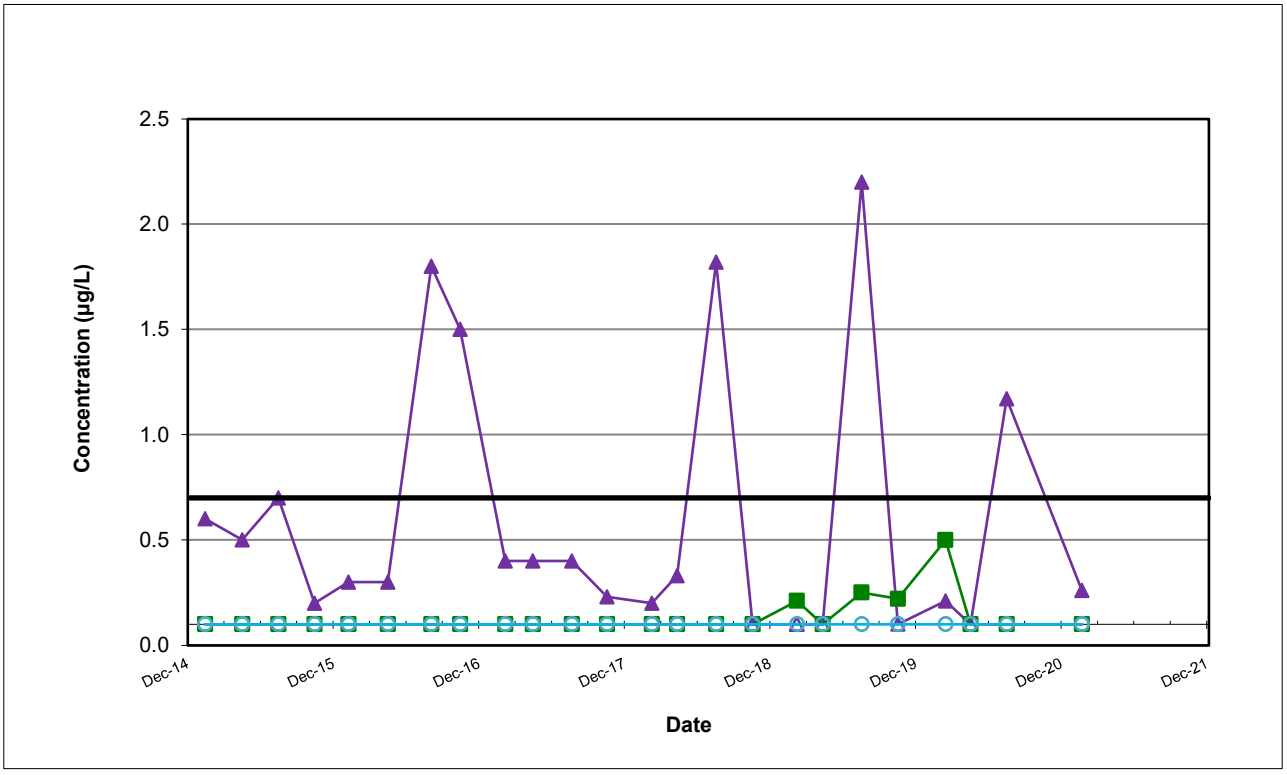
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

wood.	BLDG 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELLS GW034S AND GW244S Boeing Renton Facility	Project No. PS20203450 Figure 15

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 12 to 18_ Bldg 4-78-79.xlsx



Benzene

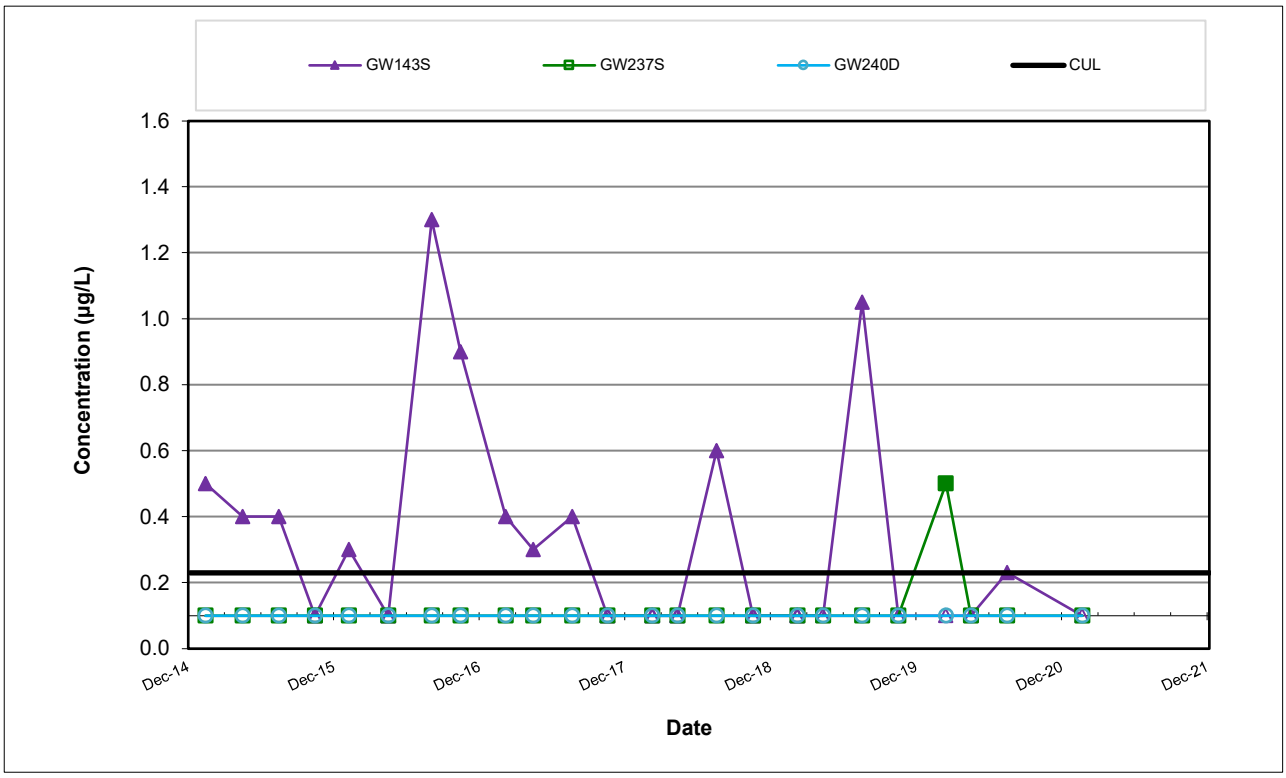


cis-1,2-Dichloroethene

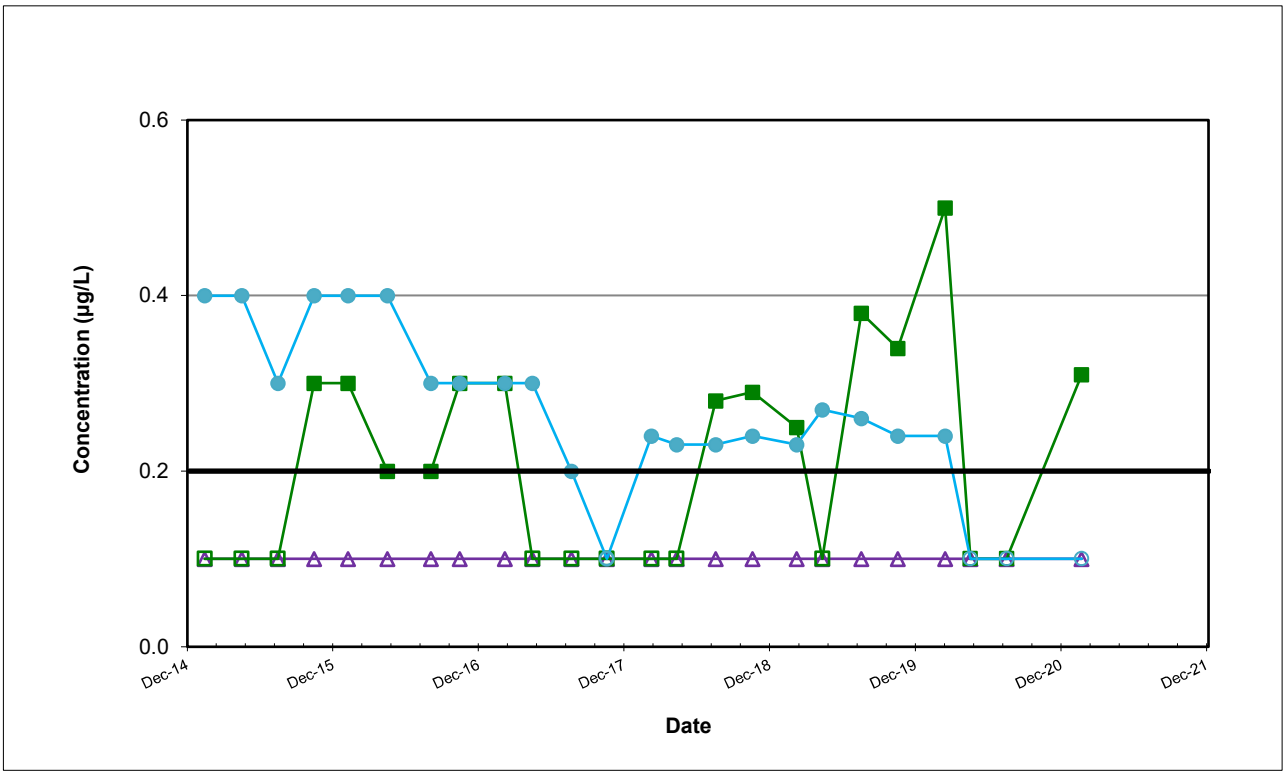
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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. PS20203450 Figure 16

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 12 to 18_ Bldg 4-78-79.xlsx



Trichloroethene

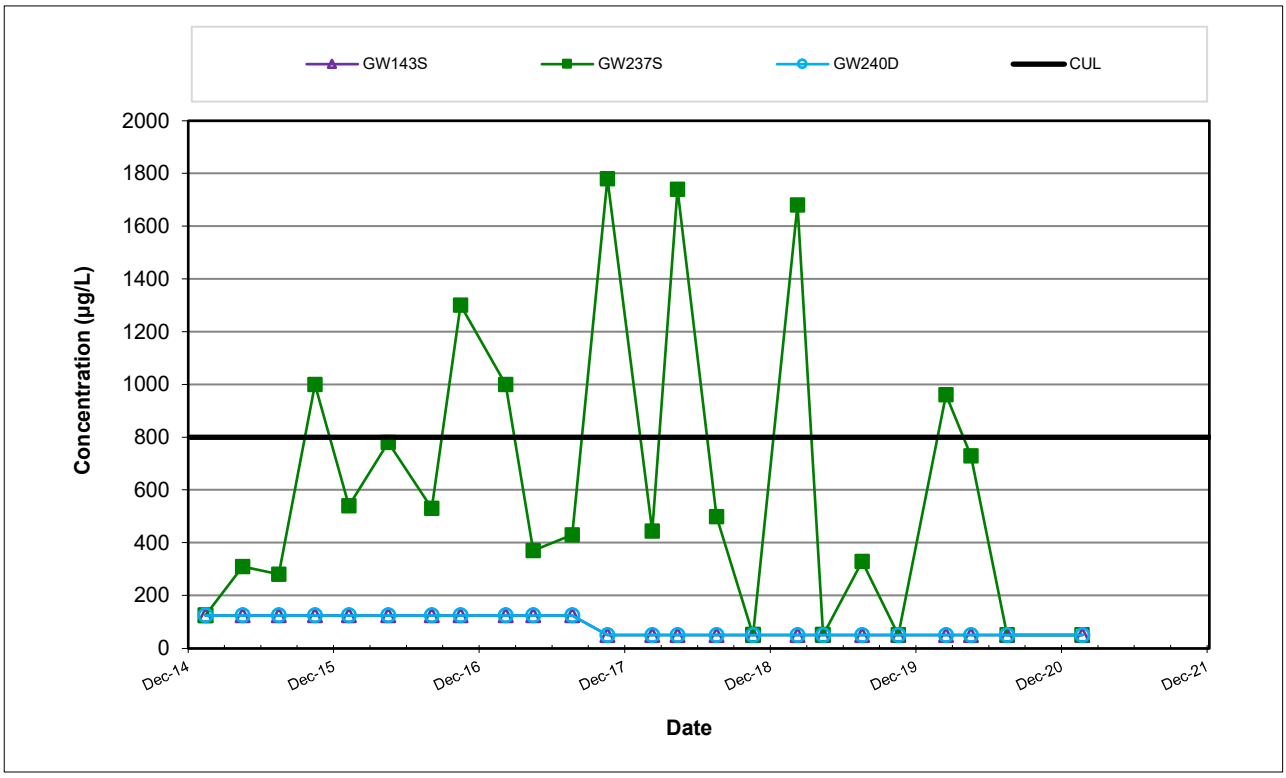


Vinyl Chloride

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

wood.	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR TRICHLOROETHENE AND VINYL CHLORIDE IN CPOC AREA WELLS Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 17

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 12 to 18_ Bldg 4-78-79.xlsx

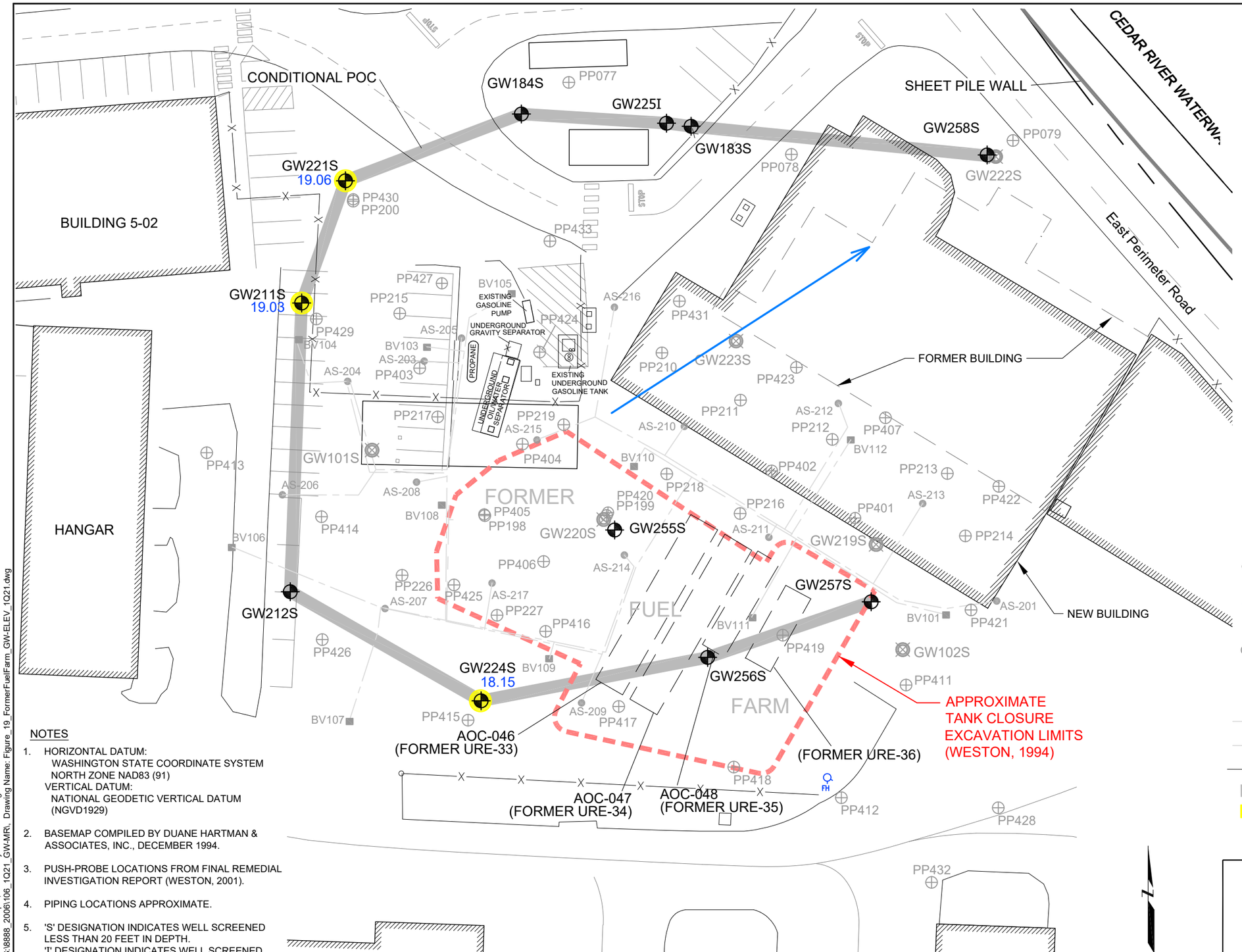


TPH as Gasoline

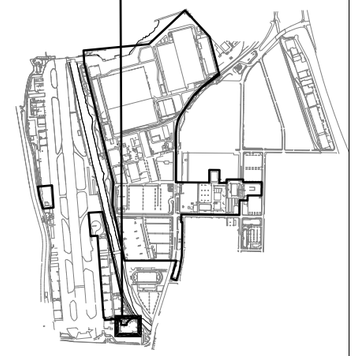
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

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. PS20203450 Figure 18

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 12 to 18_ Bldg 4-78-79.xlsx



FORMER FUEL FARM AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW224S 18.15 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- PP042 — PUSH PROBE LOCATION
- GW222S — ABANDONED GROUNDWATER MONITORING WELL
- AS-204 — FORMER UNDERGROUND AIR SPARGING WELL
- BV112 — FORMER UNDERGROUND BIOVENTING WELL
- FORMER UNDERGROUND BIOVENTING LINE
- FORMER UNDERGROUND AIR SPARGING LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

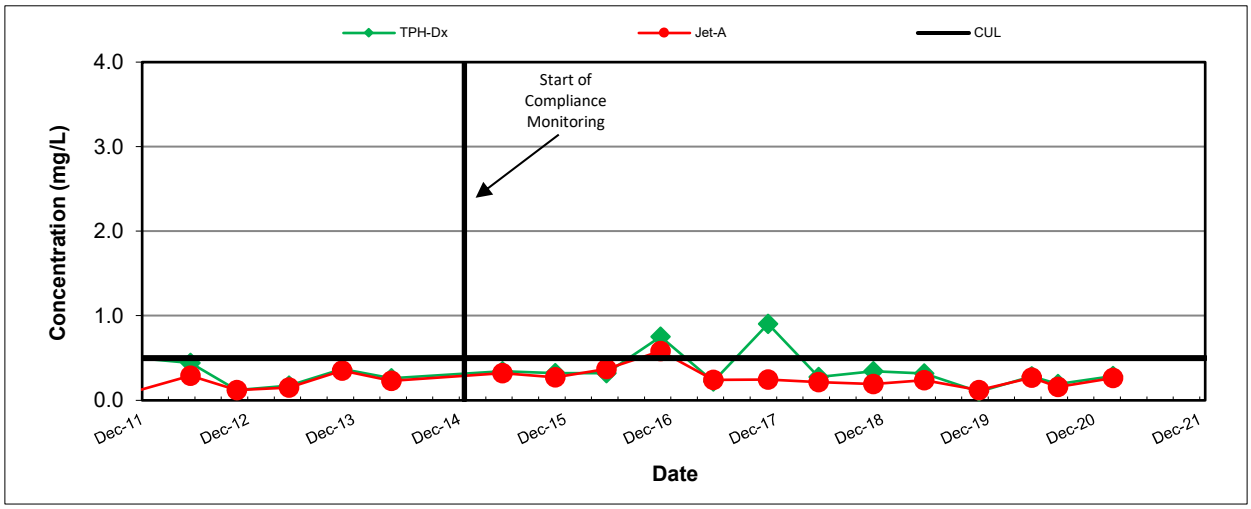
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM
   (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH-PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. PIPING LOCATIONS APPROXIMATE.
5. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED GREATER THAN 20 FEET IN DEPTH.
6. THE GROUNDWATER FLOW DIRECTION SHOWN IS BASED ON HISTORICAL GROUNDWATER DATA.

0 20 40
APPROXIMATE SCALE IN FEET

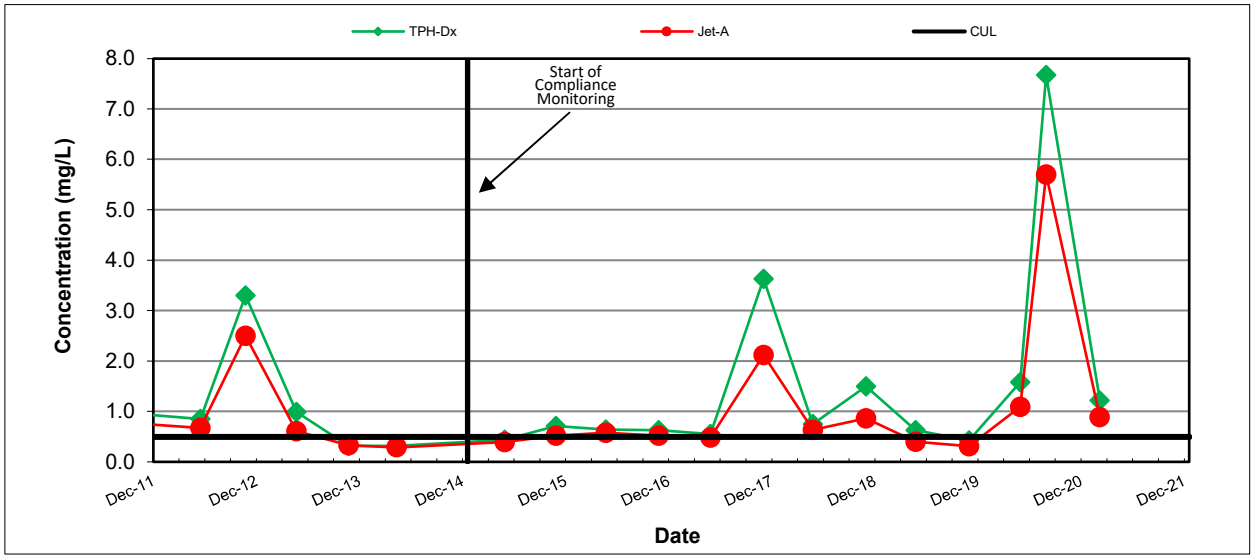
FORMER FUEL FARM AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS FEBRUARY 15, 2021 Boeing Renton Facility Renton, Washington

By: APS	Date: 05/25/21	Project No. PS20203450
wood.		Figure 19

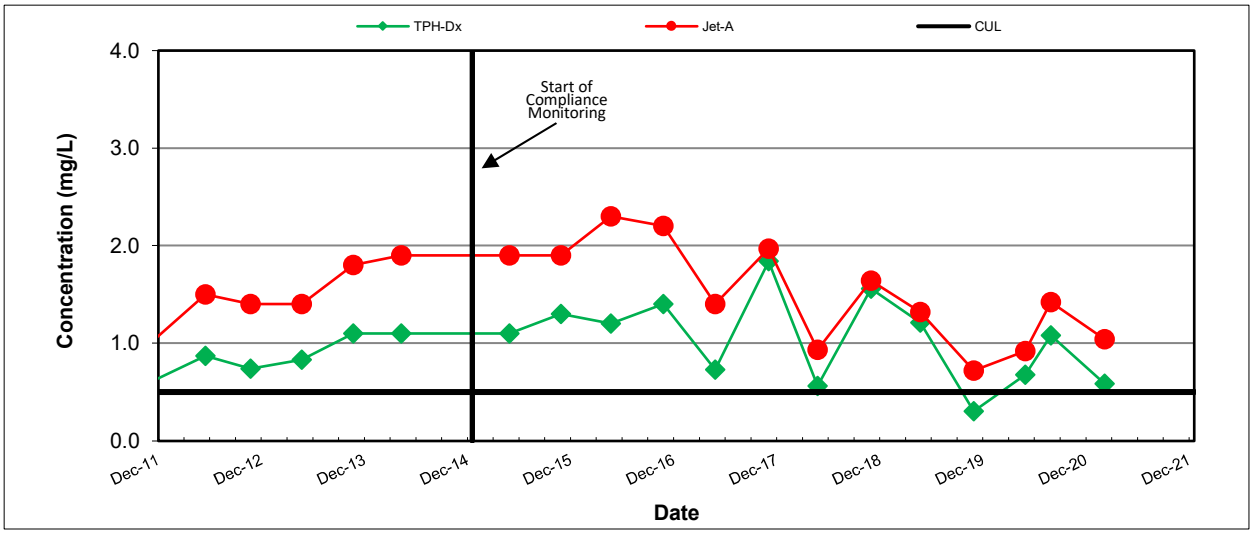
Plot Date: 05/25/21 - 12:50pm Plotted by: adam.stenberg
Drawing Path: S:\888_2006\106_1Q21_GW-MR\ Drawing Name: Figure_19_FormerFuelFarm_GW-ELEV_1Q21.dwg



CPOC WELL GW211S



CPOC WELL GW221S



CPOC WELL GW224S

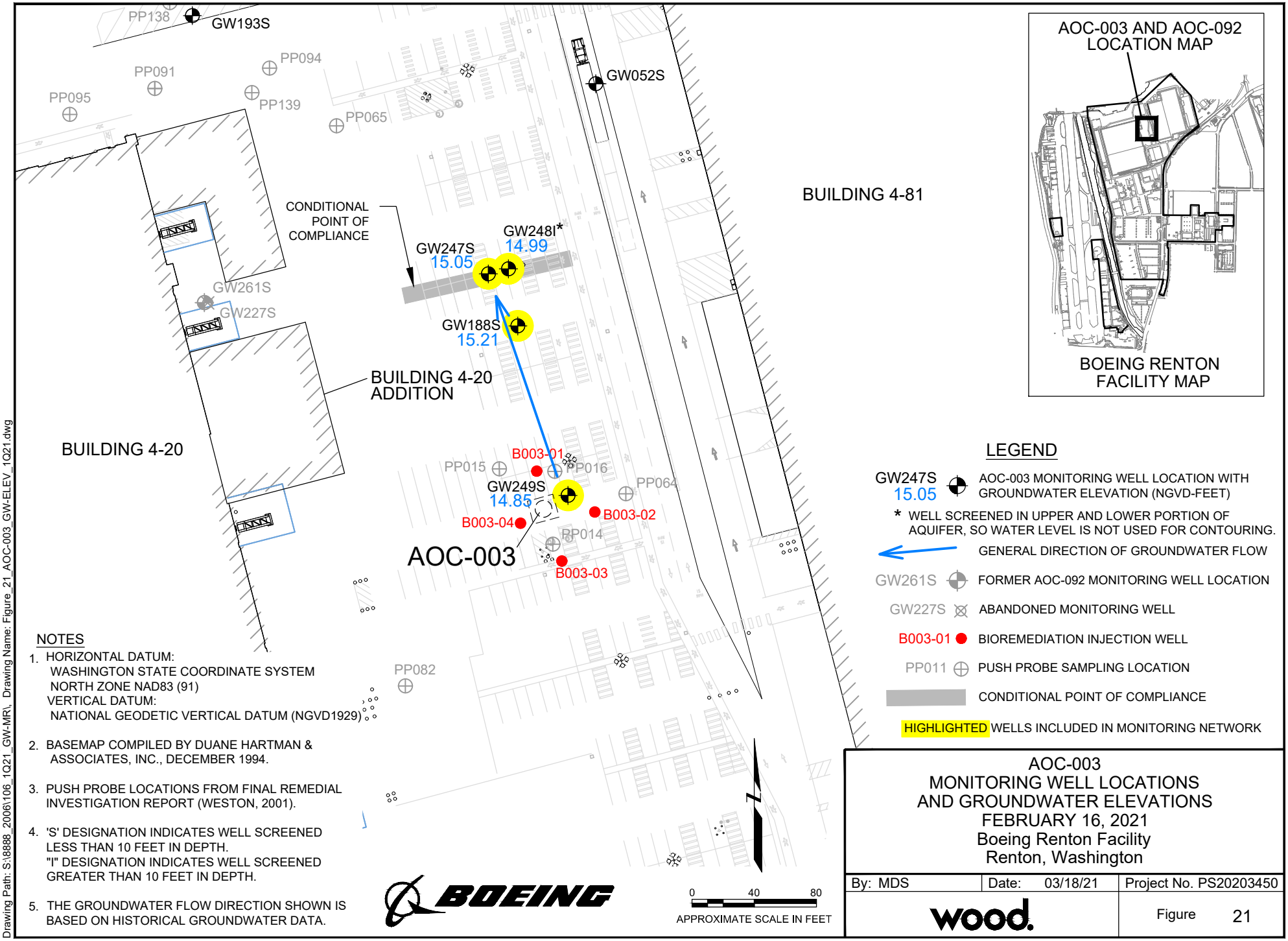
P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 20_FFF CPOC trend plot.xls

wood.

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

Project No. PS20203450

Figure 20



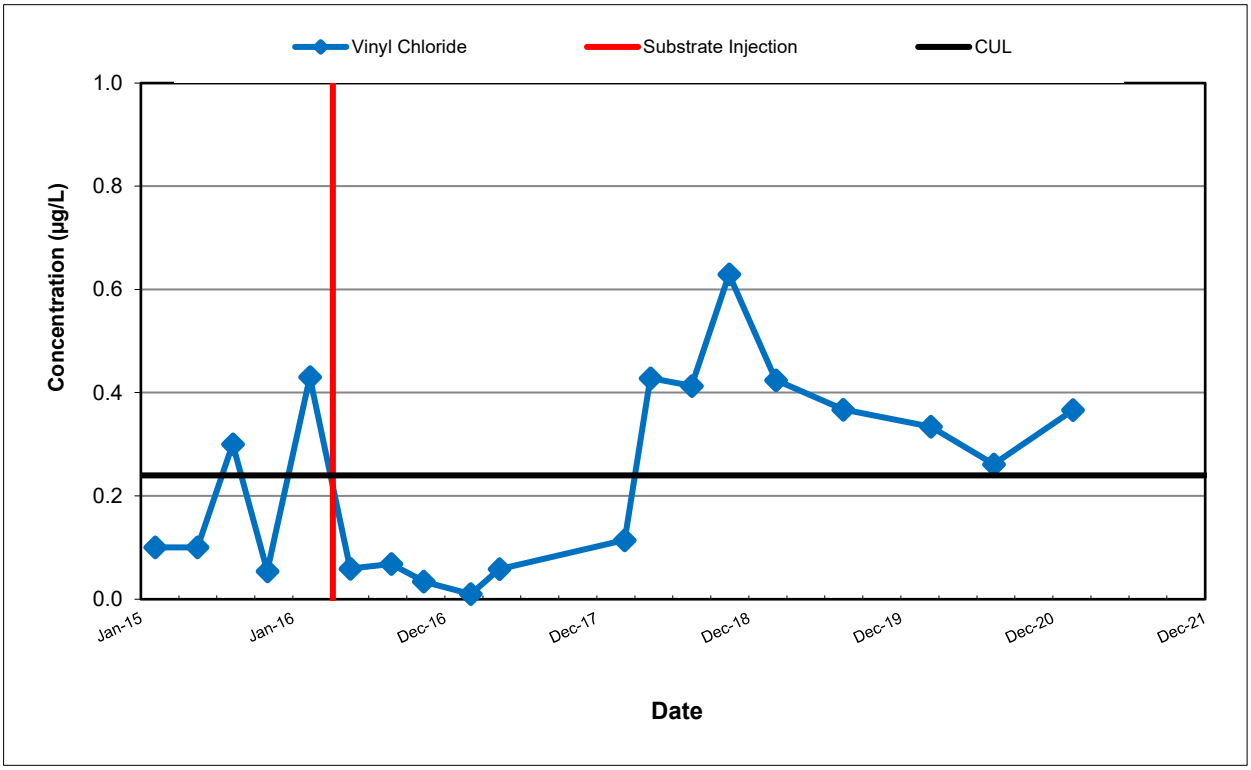
NOTES

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

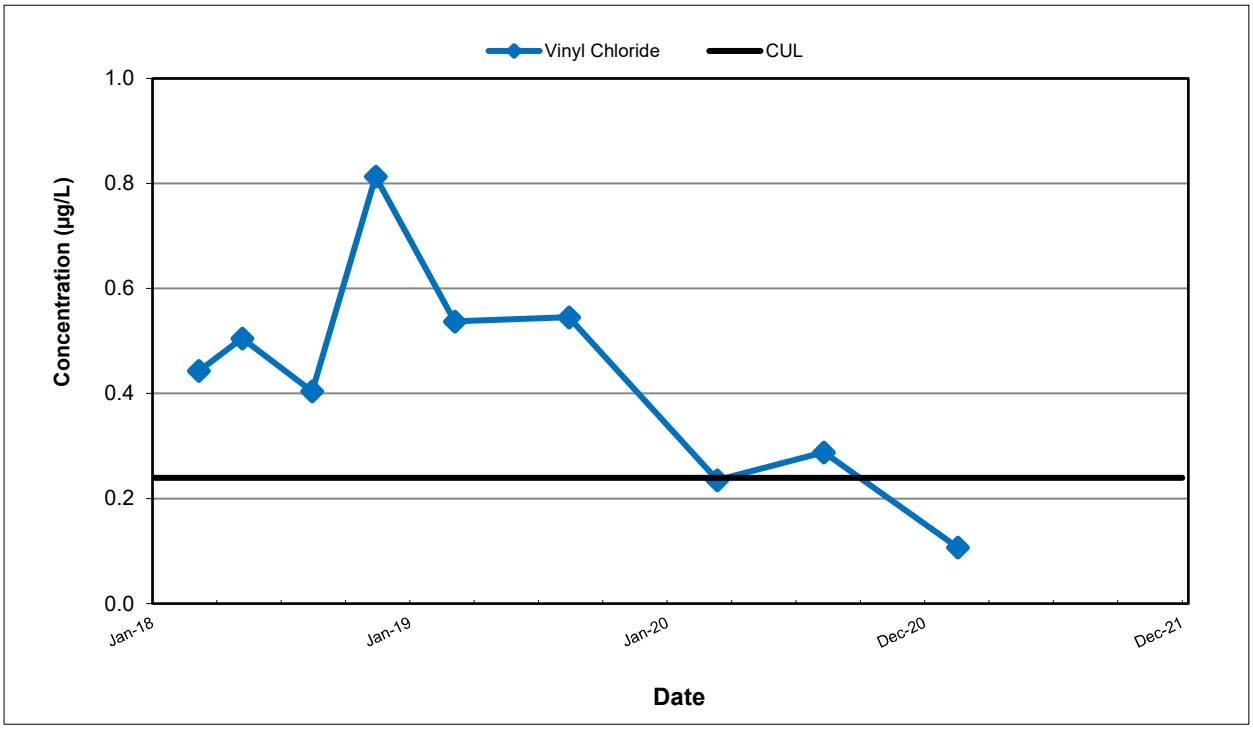
BOEING

AOC-003 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS FEBRUARY 16, 2021 Boeing Renton Facility Renton, Washington

By: MDS	Date: 03/18/21	Project No. PS20203450
wood.		Figure 21



SOURCE AREA WELL GW249S

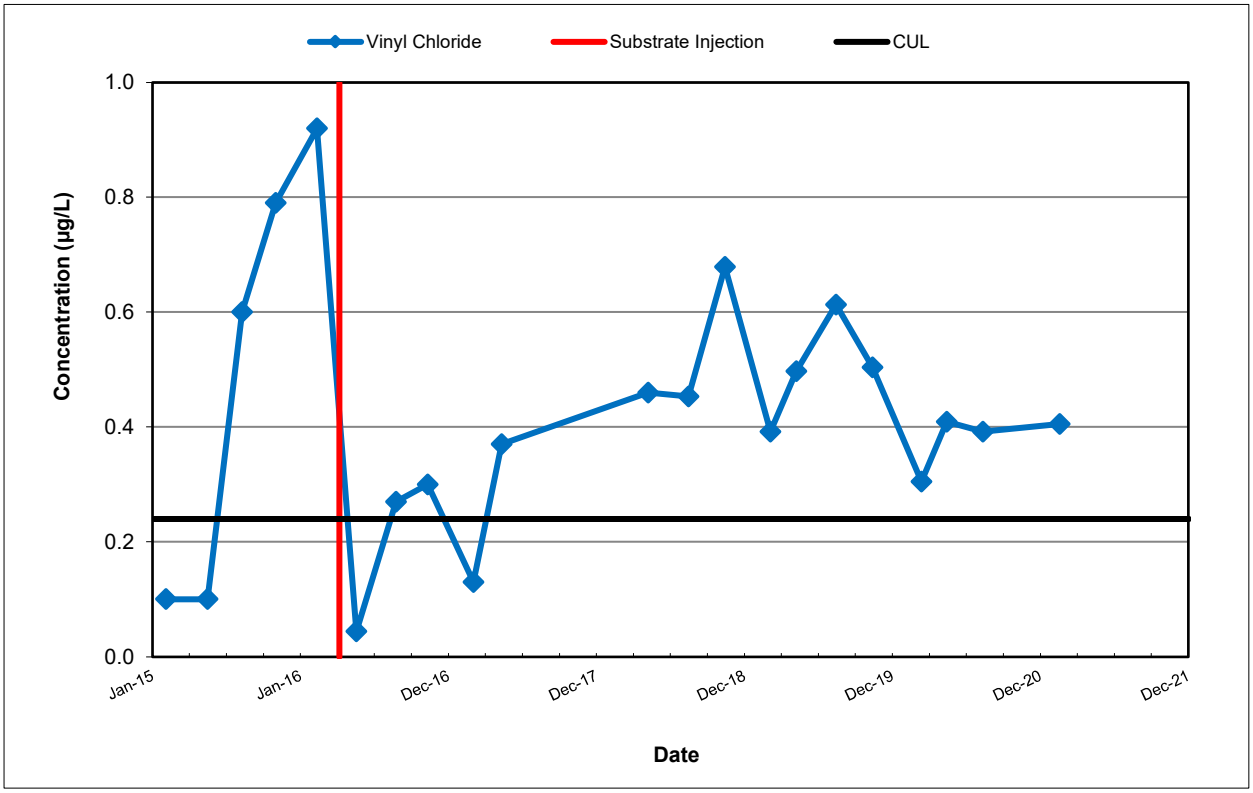


DOWNGRADIENT PLUME AREA WELL GW188S

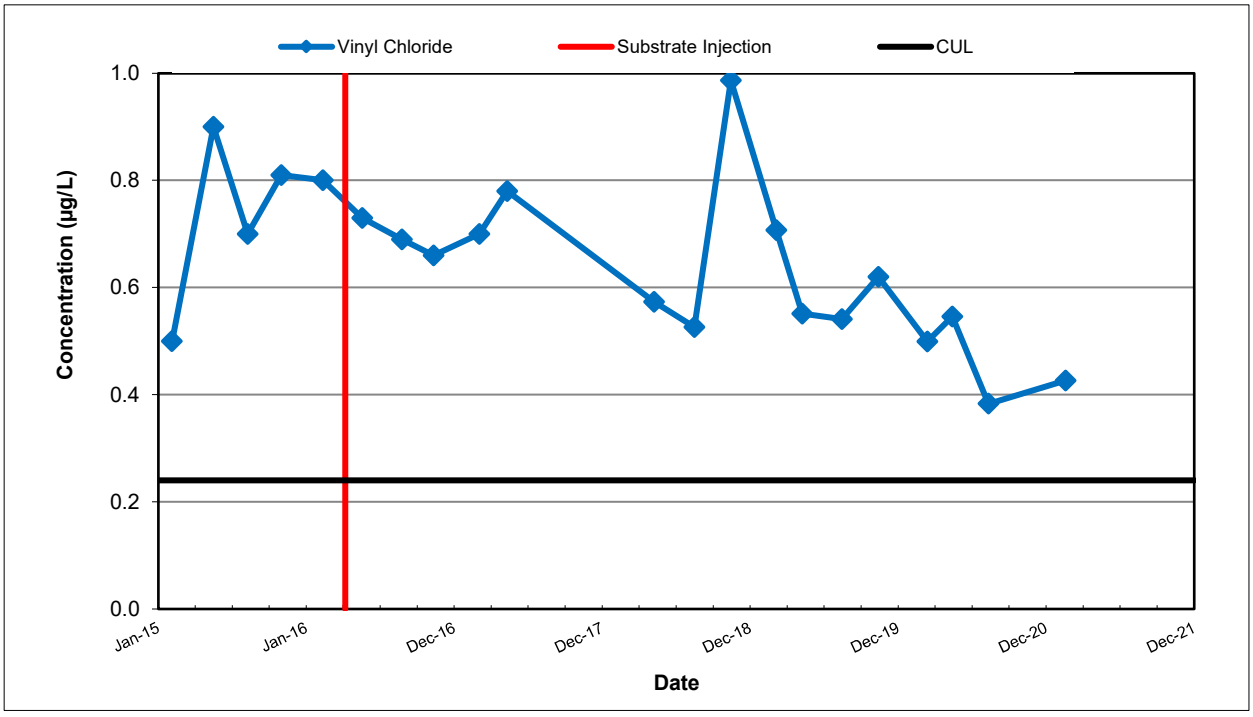
Note: non-detected values shown at one-half the reporting limit and with an open symbol

wood.	AOC-003 HISTORICAL TREND PLOTS FOR SOURCE AREA WELL GW249S AND DOWNGRADIENT PLUME AREA WELL GW188S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 22

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 22 to 24_AOC 003-4.xls



CPOC WELL GW247S

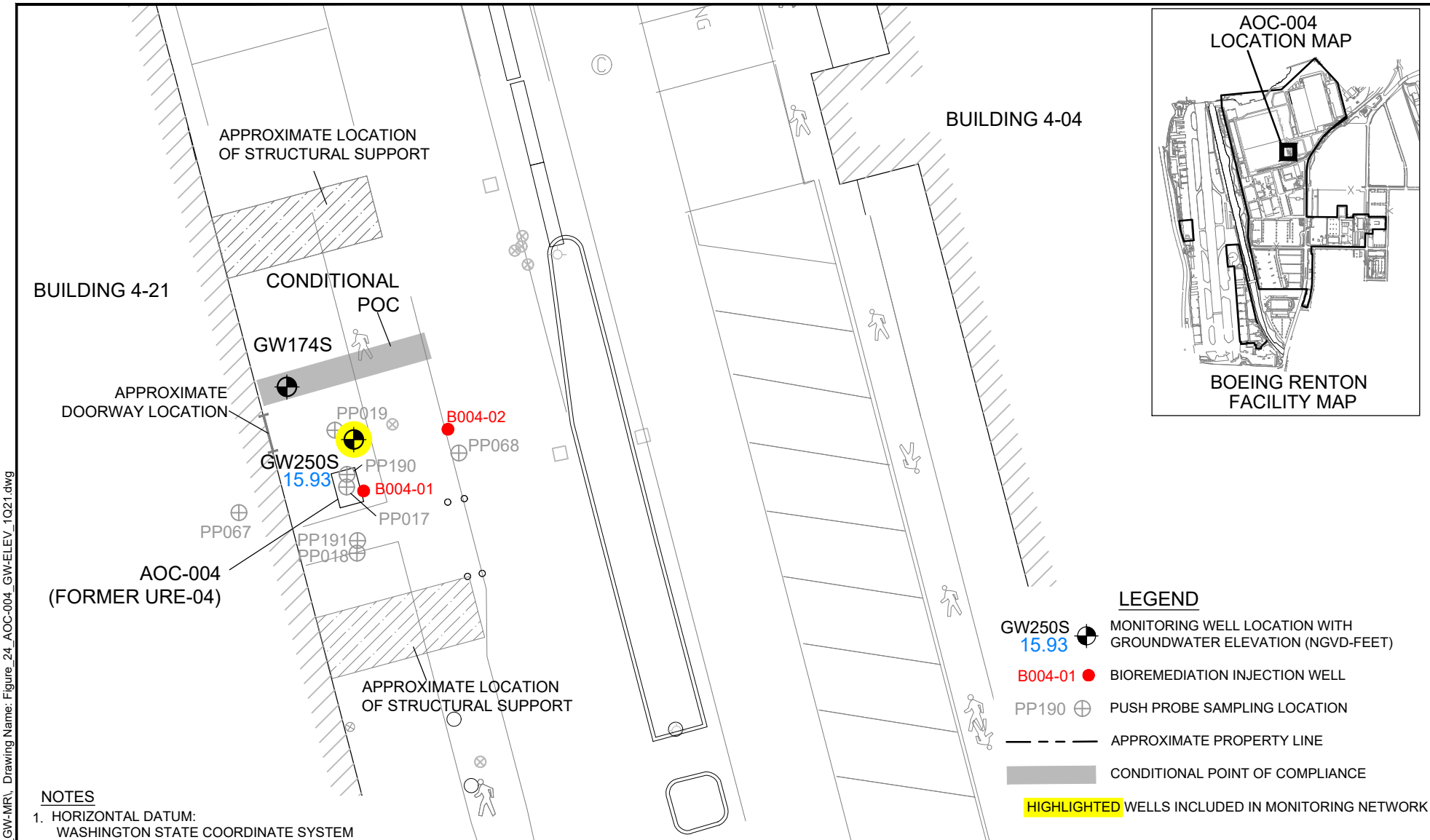


CPOC WELL GW248I

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

wood.	AOC-003 HISTORICAL TREND PLOTS FOR CPOC WELLS GW247S AND GW248I Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 23

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 22 to 24_AOC 003-4.xls



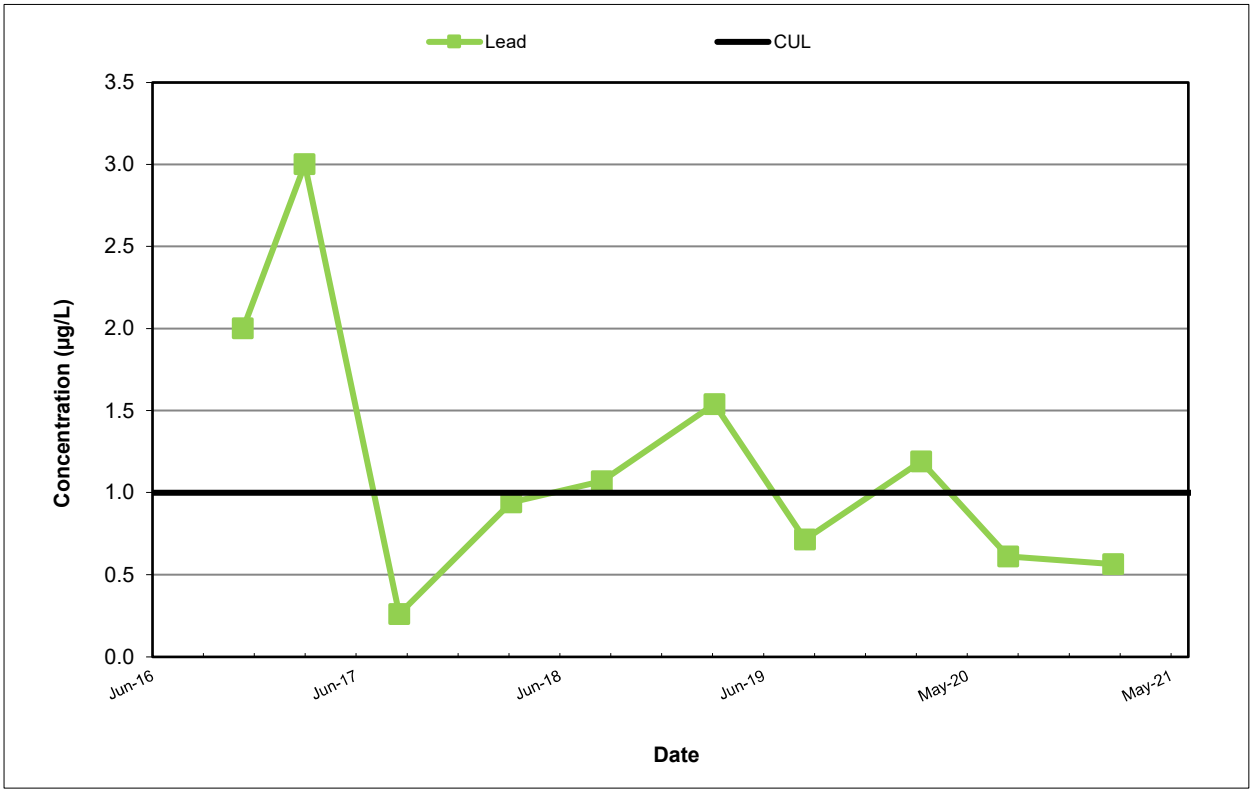
NOTES

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.

BOEING

AOC-004
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 16, 2021
Boeing Renton Facility
Renton, Washington

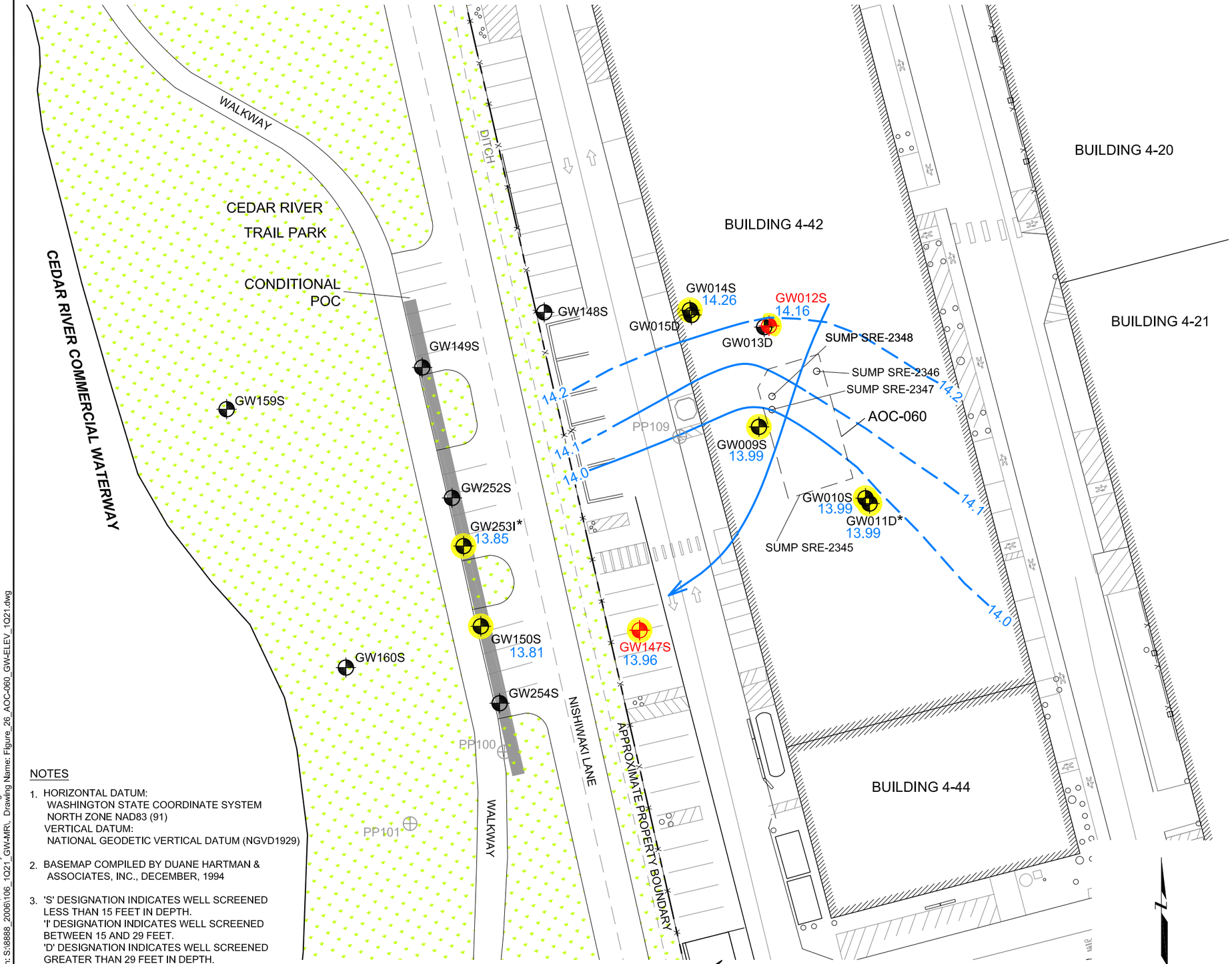
By: MDS	Date: 03/18/21	Project No. PS20203450
wood.		Figure 24

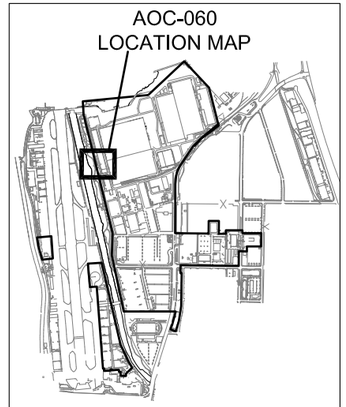


SOURCE AREA WELL GW250S

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 22 to 24_AOC 003-4.xls

wood.	AOC-004 HISTORICAL TREND PLOT FOR SOURCE AREA WELL GW250S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 25





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.
4. THE GROUNDWATER FLOW DIRECTION SHOWN IS BASED ON HISTORICAL GROUNDWATER DATA.

LEGEND

- GW150S 13.81 — 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
- 14.1 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- PP109 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- FENCE LINE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

N

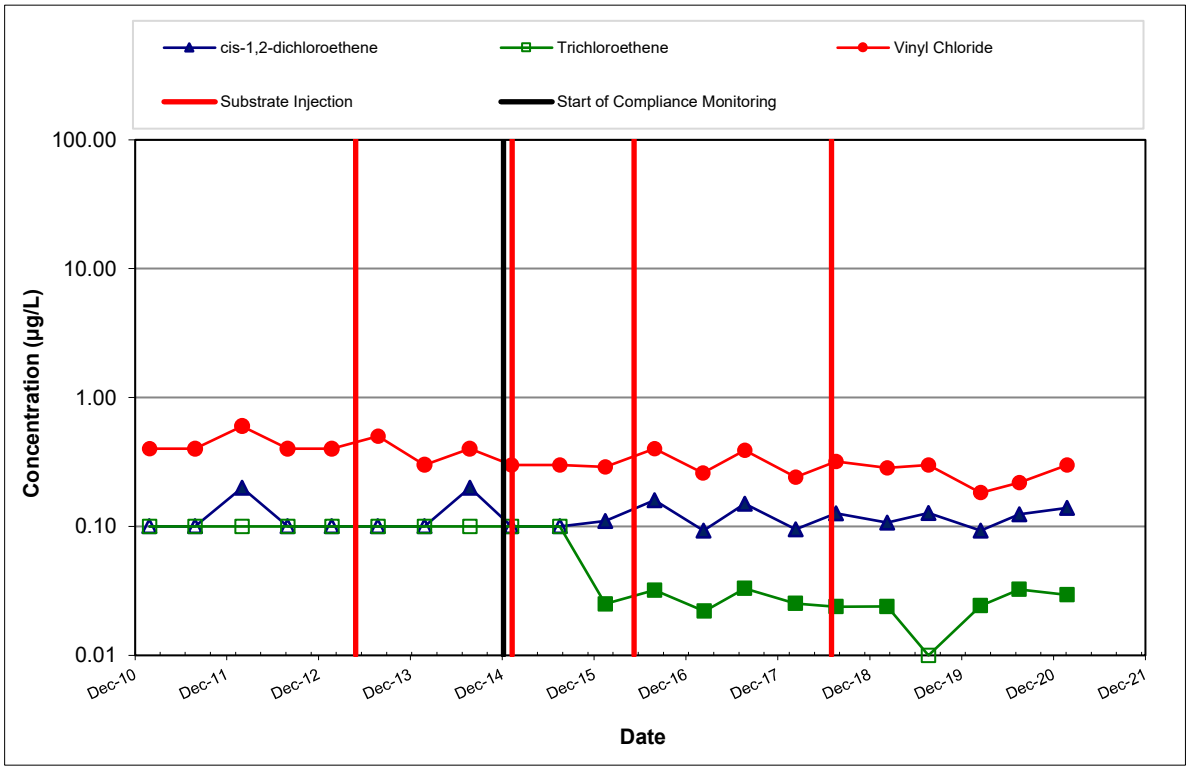
0 20 40
APPROXIMATE SCALE IN FEET

BOEING

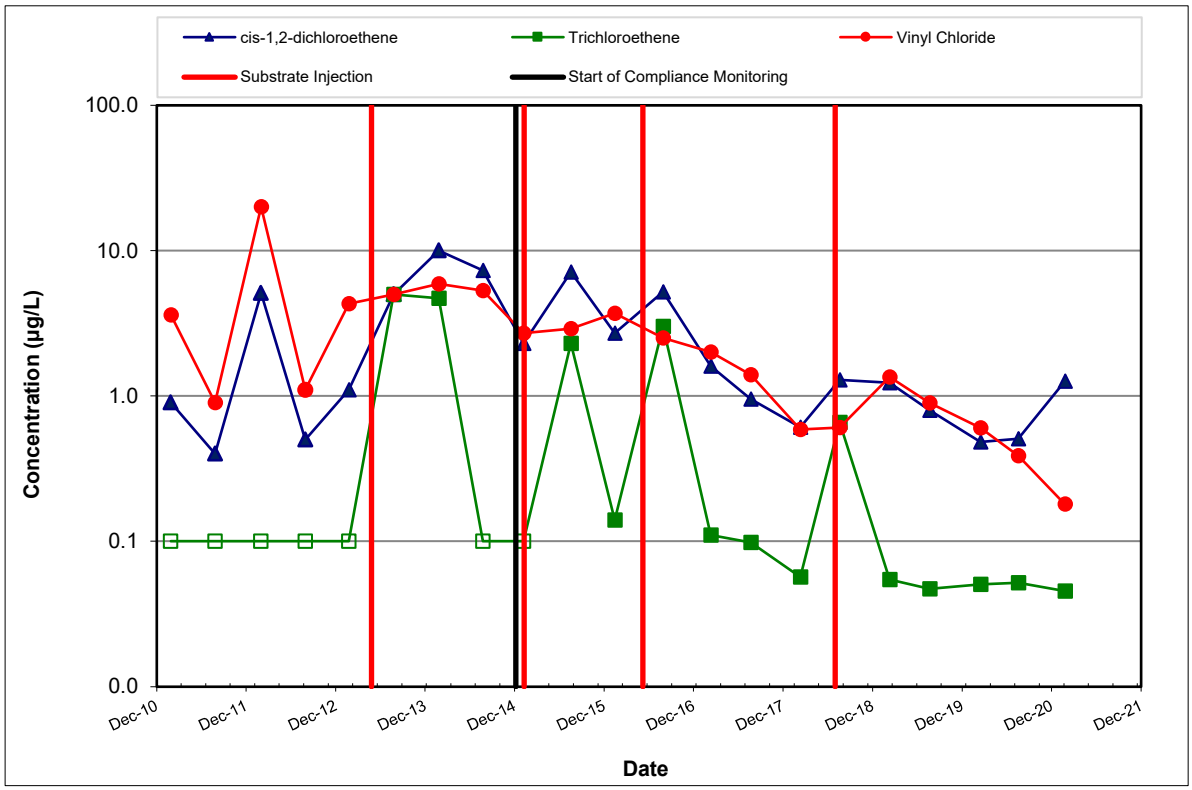
AOC-060
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 17, 2021
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/03/21	Project No. PS20203450
wood.		Figure 26

Plot Date: 05/03/21 - 9:29am, Plotted by: adam.stenberg
Drawing Path: S:\6888_2006\106_1Q21_GW-MR\, Drawing Name: Figure_26_AOC-060_GW-ELEV_1Q21.dwg



SOURCE AREA WELL GW009S

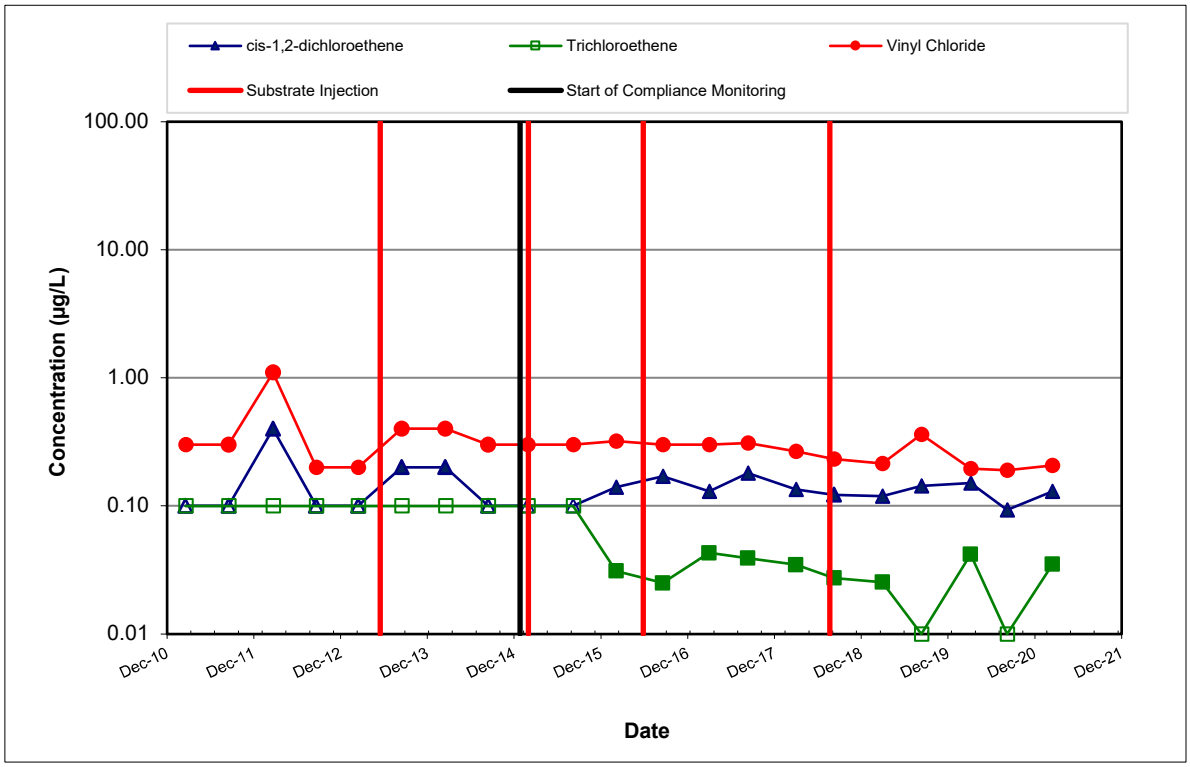


DOWNGRADIENT PLUME AREA WELL GW012S

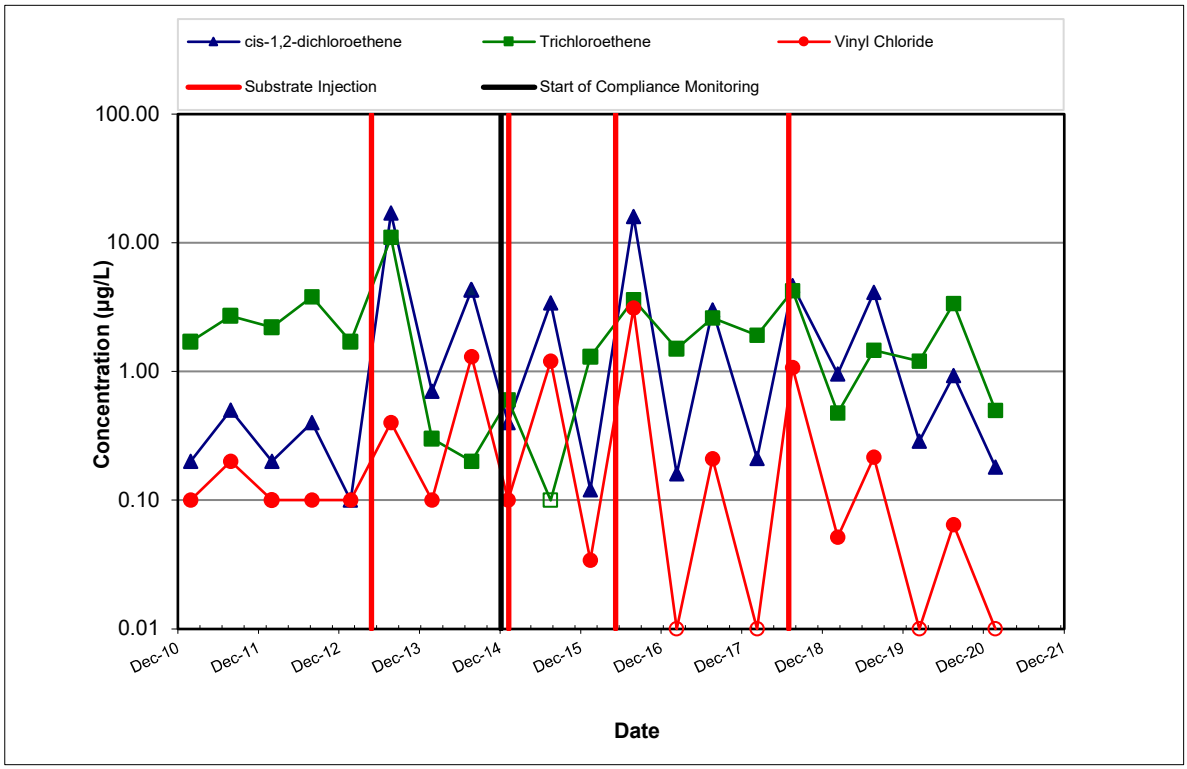
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol. August 2013 reporting limits elevated.

wood.	AOC-060 TREND PLOTS FOR SOURCE AREA WELL GW009S AND DOWNGRADIENT PLUME AREA WELL GW012S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 27

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 27 to 29 AOC 60.xlsx



DOWNGRADIENT PLUME AREA WELL GW014S

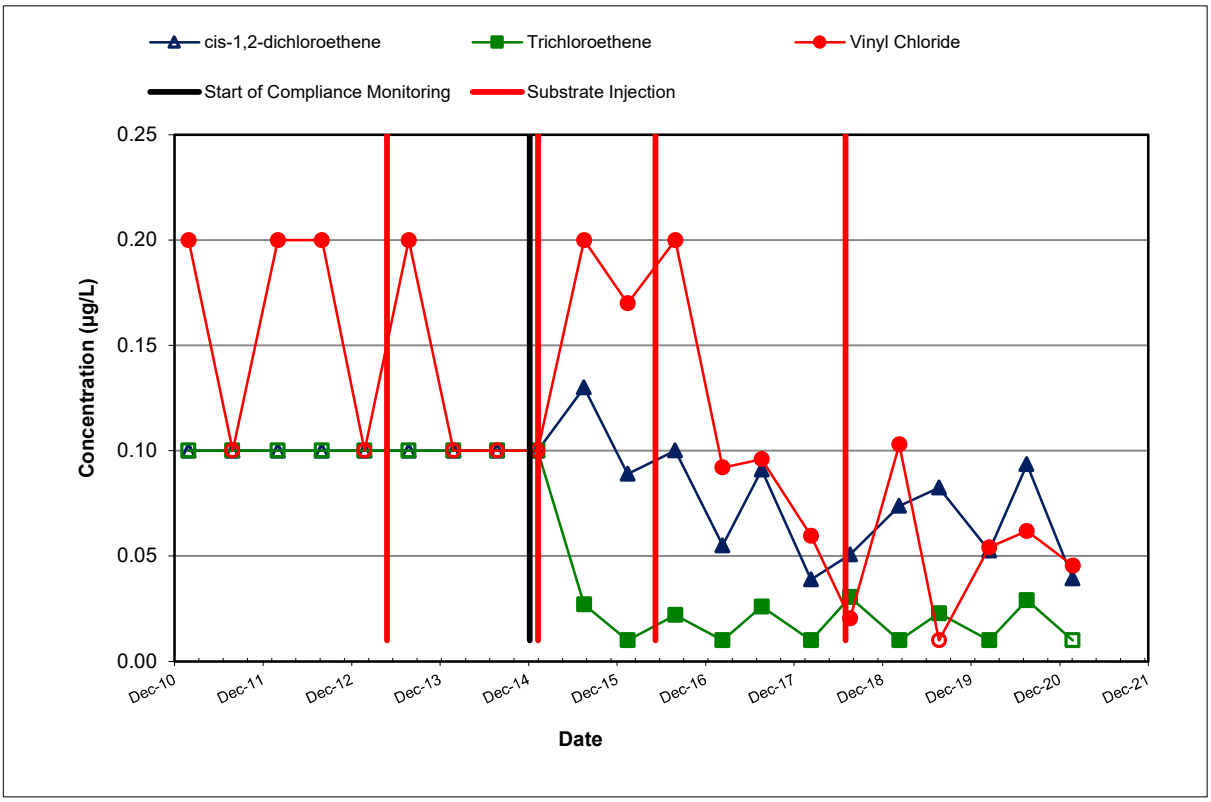


DOWNGRADIENT PLUME AREA WELL GW147S

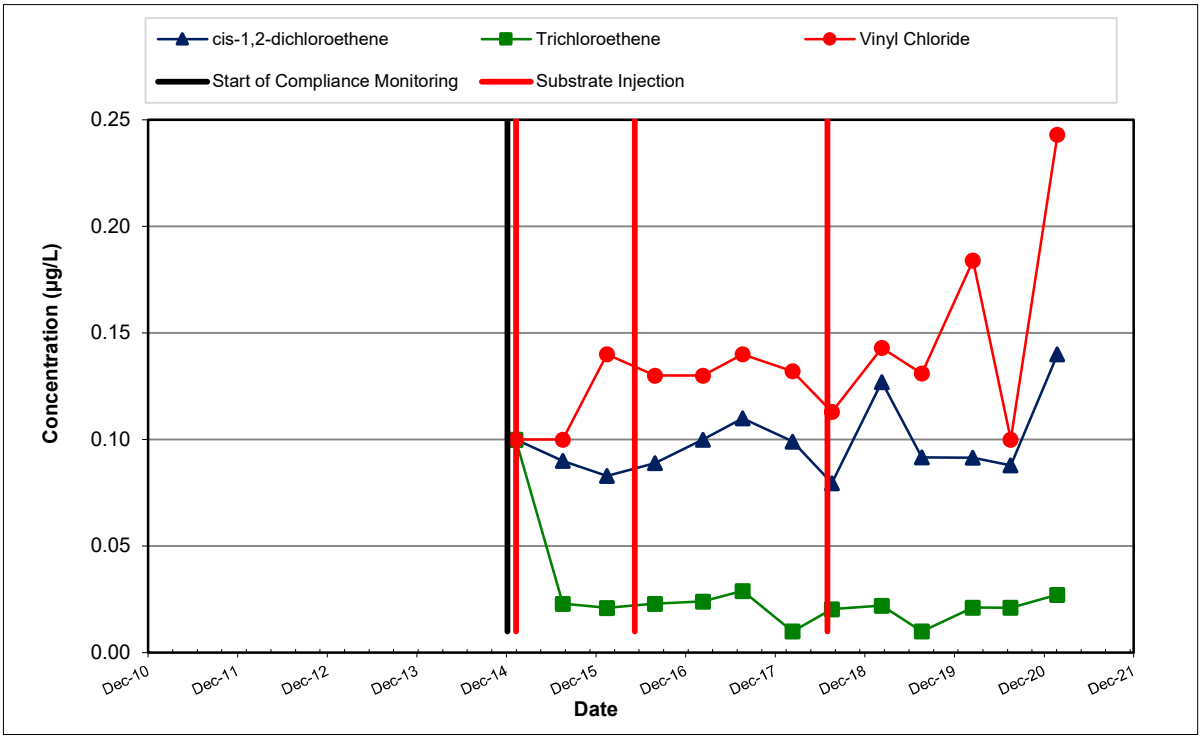
Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

wood.	AOC-060 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW014S AND GW147S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 28

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 27 to 29 AOC 60.xlsx



CPOC AREA WELL GW150S

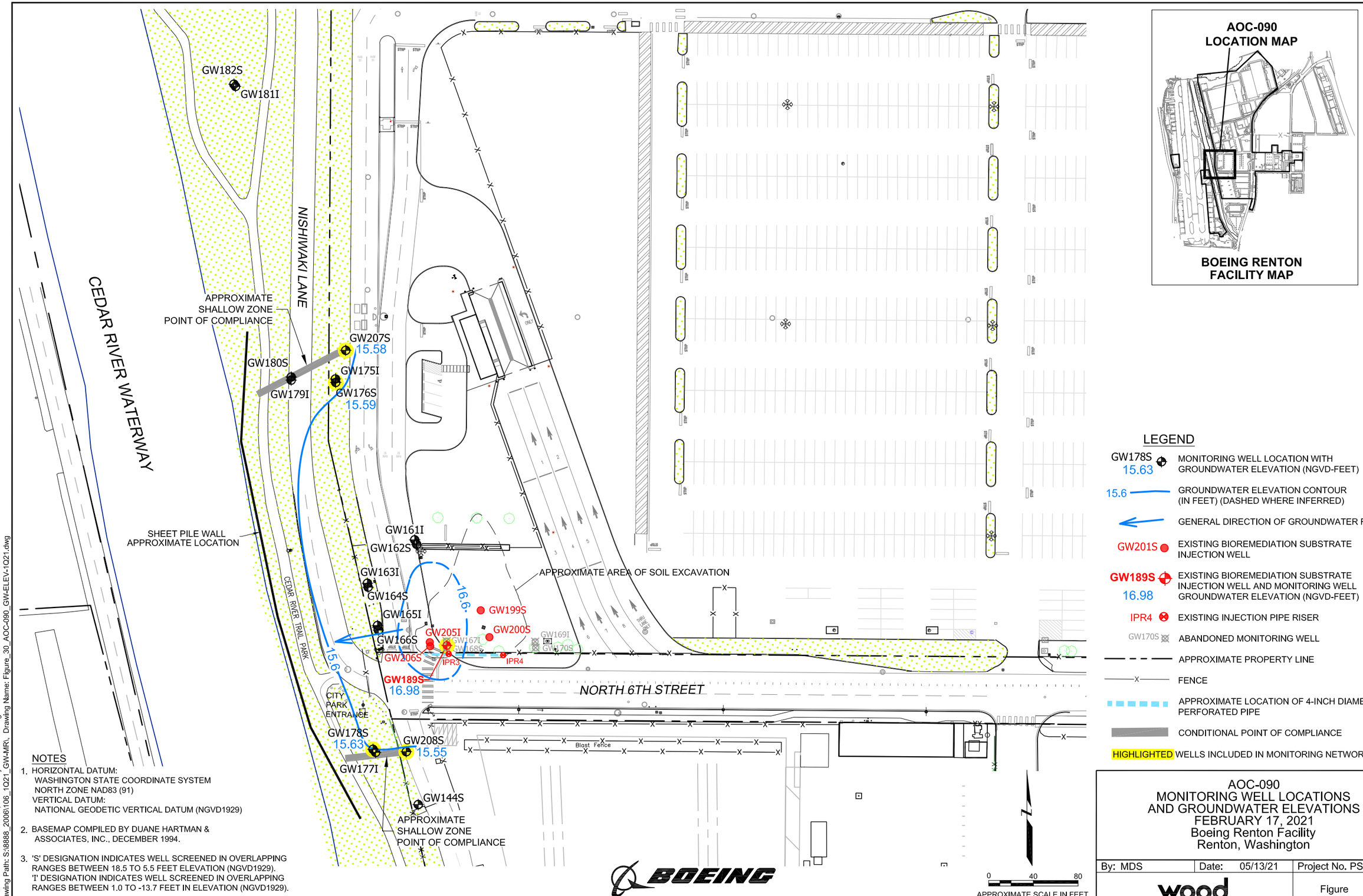


CPOC AREA WELL GW253I

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

wood.	AOC-060 TREND PLOTS FOR CPOC AREA WELLS GW150S AND GW253I Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 29

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 27 to 29 AOC 60.xlsx



AOC-090
LOCATION MAP

BOEING RENTON
FACILITY MAP

LEGEND

- GW178S 15.63 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- 15.6 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- GW201S — EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL
- GW189S 16.98 — 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

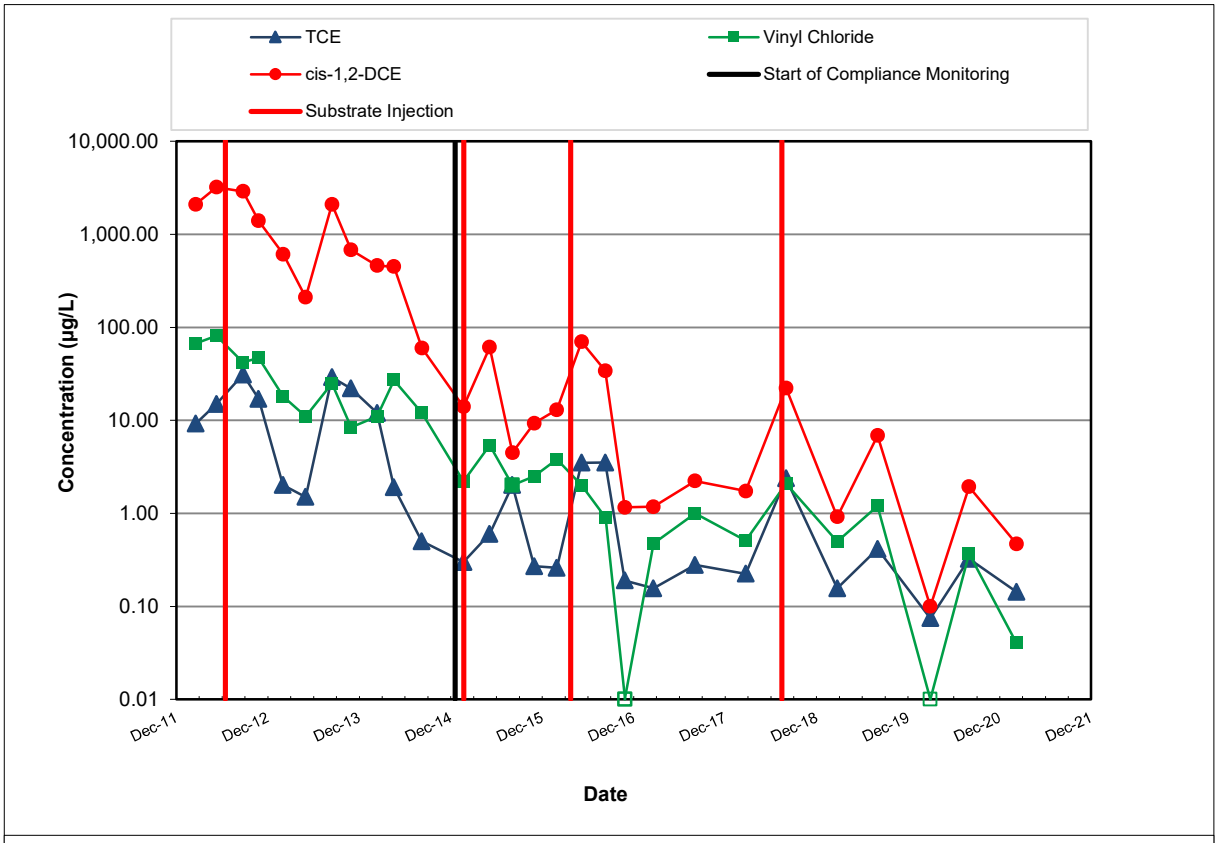
NOTES

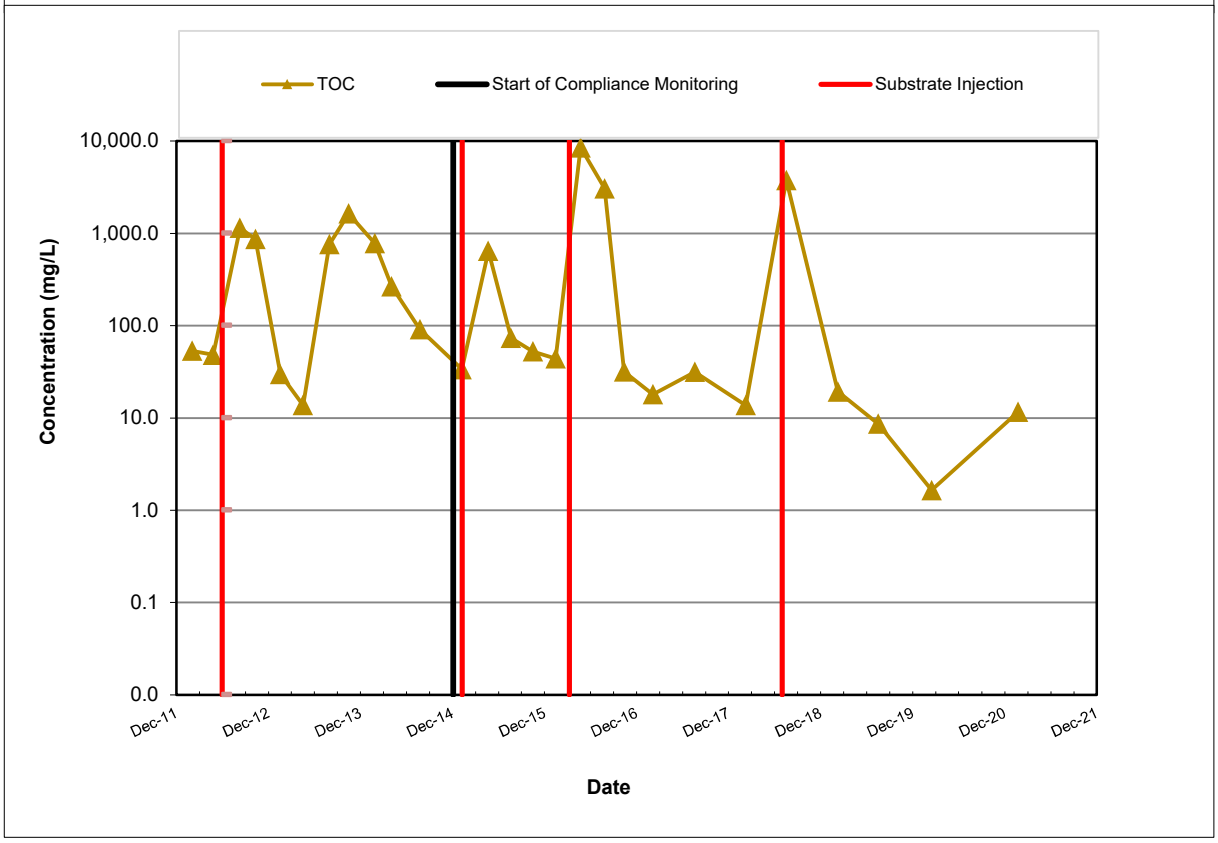
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 18.5 TO 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
FEBRUARY 17, 2021
Boeing Renton Facility
Renton, Washington

By: MDS	Date: 05/13/21	Project No. PS20203450
wood.		Figure 30

Plot Date: 05/13/21 - 9:09am, Plotted by: adam.stenberg
Drawing Path: S:\6888_2006\106_1Q21_GW-MR\, Drawing Name: Figure_30_AOC-090_GW-ELEV-1Q21.dwg



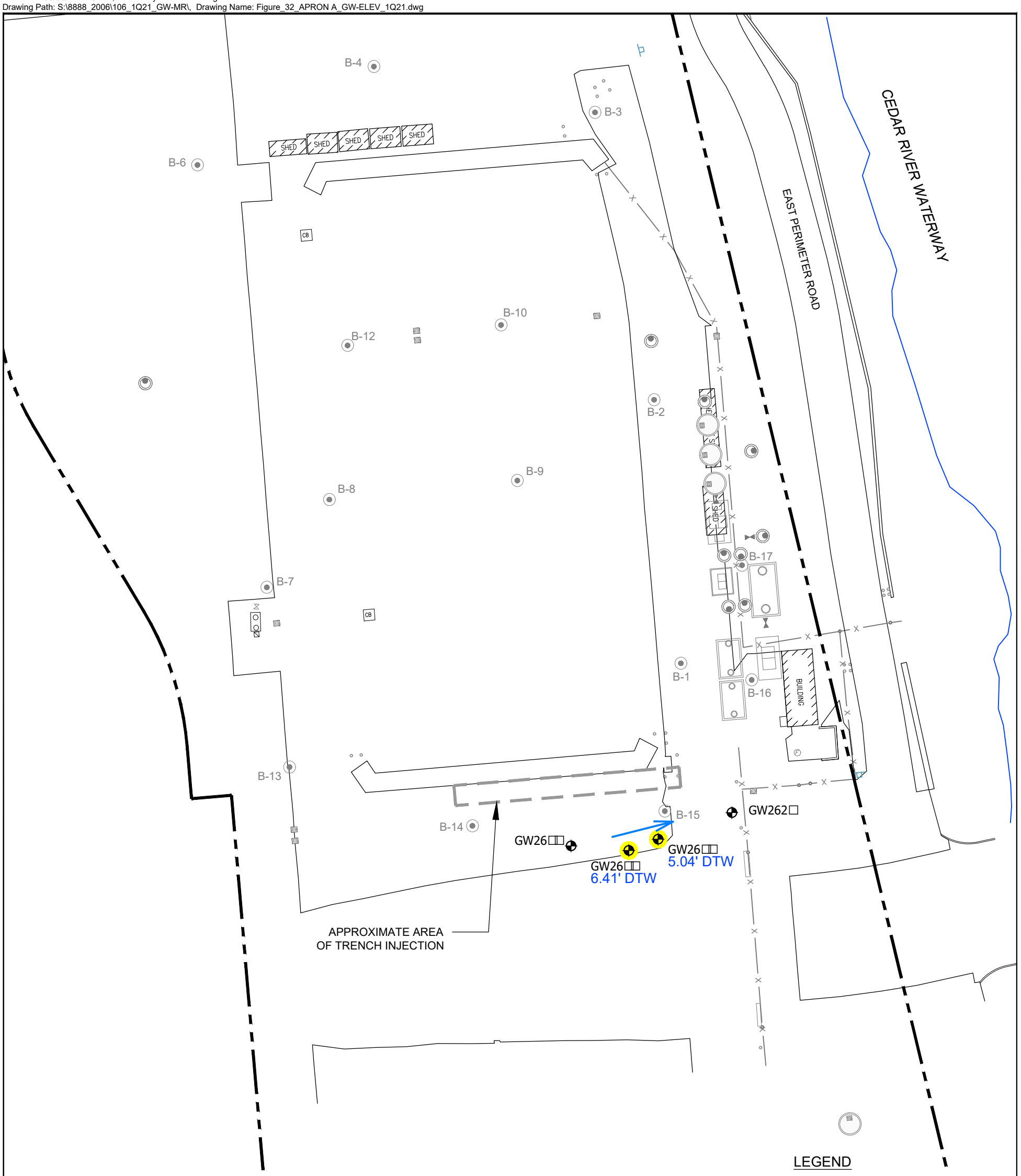


Note: non-detected values shown at one-half the reporting limit and graphed with an open symbol.

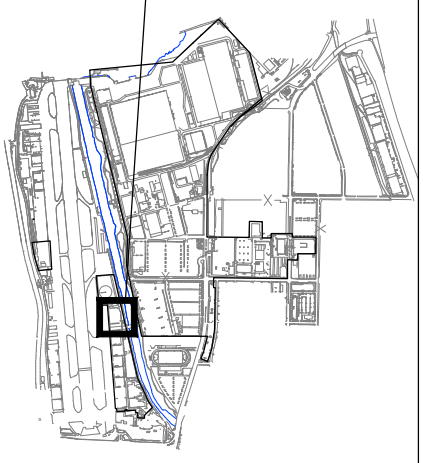
wood.	AOC-090 TREND PLOTS FOR SOURCE AREA WELL GW189S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 31

P:\8888 - Boeing Renton\02 Data Management\Grapher and Excel Figure Files\excel\Figure 31 AOC-90 Trend Plots.xls

Plot Date: 05/06/21 - 2:57□m, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\106_1Q21_GW-MR\, Drawing Name: Figure_32_APRON A_GW-ELEV_1Q21.dwg



APRON A
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

GW26□□ 5.04' DTW — MONITORING WELL LOCATION WITH DEPTH TO WATER (BGS IN FEET)

PRESUMED GENERAL DIRECTION OF GROUNDWATER FLOW

B-1 — SOIL SAMPLE LOCATION

APPROXIMATE PROPERTY LINE

FENCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 10 FEET IN DEPTH.
2. THE GROUNDWATER FLOW DIRECTION SHOWN IS BASED ON HISTORICAL GROUNDWATER DATA.

N

0 20 40
APPROXIMATE SCALE IN FEET

BOEING

APRON A AREA
MONITORING WELL LOCATIONS AND DEPTH TO GROUNDWATER
FEBRUARY 15, 2021
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/06/21	Project No. PS20203450
wood.		Figure 32

Tables

TABLE 1: SWMU-168 GROUNDWATER ELEVATION DATA
FEBRUARY 15, 2021
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]
GW230I	4 to 14	24.86	5.99	18.87

Notes:
1. 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 PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2] CPOC Area GW230I
Temperature (degrees C)	7.6
Specific Conductivity (µS/cm)	220.4
Dissolved Oxygen (mg/L)	0.57
pH (standard units)	6.25
Oxidation/Reduction Potential (mV)	-0.9

Notes:
1. Primary geochemical indicators are measured in the field.
2. 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
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Analyte		Cleanup Level [2]	Well ID [1] / CPOC Area / GW230I
Volatile Organic Compounds (µg/L)			
Vinyl Chloride		0.11	0.0764

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

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

TABLE 4: SWMU-172 AND SWMU-174 GROUP GROUNDWATER ELEVATION DATA
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[3]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[3]
GW152S	5 to 20[2]	26.98	8.03	18.95
GW153S	5 to 20[2]	27.47	8.41	19.06
GW172S	8 to 18[2]	26.44	8.53	17.91
GW173S	8 to 18[2]	26.51	8.51	18.00
GW226S	5 to 20[2]	26.86	8.12	18.74
GW232S	4 to 14	24.45	6.59	17.86
GW234S	3 to 13	24.95	6.53	18.42
GW235I	15 to 25	24.9	6.06	18.84
GW236S	5 to 15	24.36	6.78	17.58

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 PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]									
	Source Area						CPOC Area			
	GW152S	GW152S (field dup.)	GW153S	GW172S	GW173S	GW226S	GW232S	GW234S	GW235I	GW236S
Temperature (degrees C)	7.1	NA	9.6	7.0	8.0	13.1	8.6	4.3	6.6	3.9
Specific Conductivity (µS/cm)	151.5	NA	194.8	278.8	228.6	228.7	342.2	104.6	133.7	209.7
Dissolved Oxygen (mg/L)	4.62	NA	0.73	1.11	0.71	0.44	1.31	6.37	1.29	2.80
pH (standard units)	6.03	NA	6.52	6.83	6.46	6.58	6.37	6.51	6.62	6.24
Oxidation/Reduction Potential (mV)	21.3	NA	-92.1	-92.9	-79.2	-101.7	-85.5	-1.1	-46.4	36.4
Total Organic Carbon (mg/L)	9.10 J	4.94 J	12.78	6.16	5.08	7.09	7.78	12.97	0.96	2.08

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
NA = not analyzed
SWMU = solid waste management unit

TABLE 6: SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1,2]
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [4]	Well ID [3]									
		Source Area			Downgradient Plume Area			CPOC Area			
		GW152S	GW152S (field dup.)	GW153S	GW172S	GW173S	GW226S	GW232S	GW234S	GW235I	GW236S
Volatile Organic Compounds (µg/L)											
cis -1,2-Dichloroethene	0.03	**0.144**	**0.116**	**0.077**	**0.108**	**0.0505**	0.020 U	**0.219**	0.020 U	**0.128**	0.020 U
Tetrachloroethene	0.02	**0.081**	**0.0666**	0.020 U	**0.0624**	0.020 U	0.020 U	0.020 U	0.020 U	**0.0292**	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	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.11	0.0378	0.0409	**0.220**	**0.219**	**0.183**	0.0519	**0.263**	0.020 U	0.020 U	0.020 U
Total Metals (µg/L)											
Arsenic	1.0	**7.67**	**6.90**	**32.8**	**10.8**	**9.94**	**8.12**	**4.78**	**6.29**	0.200 U	**2.89**
Copper	3.5	**17.2 J**	**12.6 J**	**33.9**	**3.89**	3.11	**3.92**	2.09	**11.4**	0.727	**9.70**
Lead	1.0	**12.5 J**	**9.16 J**	**5.80**	**1.98**	0.850	0.513	0.318	**4.13**	0.174	**6.31**

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

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

TABLE 7: BUILDING 4-78/79 SWMU/AOC GROUP GROUNDWATER ELEVATION DATA
FEBRUARY 15 & 16, 2021
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	5.24	14.20
GW033S	5 to 25	19.49	5.34	14.15
GW034S	5 to 25	19.65	5.46	14.42
GW143S	10 to 15	19.81	5.75	14.06
GW237S	5 to 15	18.85	4.86	13.99
GW240D	22 to 27	19.81	5.98	13.83
GW244S	5 to 15	19.53	5.33	14.20

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

Abbreviations:
AOC = area of concern
bgs = below ground surface
SWMU = solid waste management unit
TOC = top of casing

TABLE 8: BUILDING 4-78/79 SWMU/AOC GROUP PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 15 & 16, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]							
	Source Area					CPOC Area		
	GW031S	GW031S (field dup.)	GW033S	GW034S	GW244S	GW143S	GW237S	GW240D
Temperature (degrees C)	9.3	NA	10.2	8.4	9.4	12.1	9.0	10.4
Specific Conductivity (µS/cm)	376.5	NA	373.3	266.6	380.9	248.9	140.8	215.6
Dissolved Oxygen (mg/L)	1.01	NA	0.57	0.39	1.15	0.38	0.91	0.45
pH (standard units)	6.45	NA	6.14	6.34	6.15	6.41	6.39	6.4
Oxidation/Reduction Potential (mV)	-91.8	NA	-2.8	-21.5	-68.0	-89.9	8.7	-83.1
Total Organic Carbon (mg/L)	13.52	13.78	34.55	8.67	25.58	9.73	10.97	5.79

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.

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
SWMU = solid waste management unit

TABLE 9: BUILDING 4-78/79 SWMU/AOC GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
FEBRUARY 15 & 16, 2021
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [4]	Well ID [3]							
		Source Area					CPOC Area		
		GW031S	GW031S (field dup.)	GW033S	GW034S	GW244S	GW143S	GW237S	GW240D
Volatile Organic Compounds (µg/L)									
Benzene	0.80	**18.8 J**	**18.8 J**	**11.0**	0.20 U	0.46	0.20 U	**6.79 J**	0.20 U
cis -1,2-Dichloroethene	0.70	0.31 J	0.30 J	**1.64**	0.20 U	0.68	0.26	0.20 UJ	0.20 U
Trichloroethene	0.23	0.20 UJ	0.20 UJ	0.20 U	0.20 U	**0.29**	0.20 U	0.20 UJ	0.20 U
Vinyl Chloride	0.20	0.20 UJ	0.20 UJ	**5.31**	**0.25**	**0.64**	0.20 U	**0.31 J**	0.20 U
Total Petroleum Hydrocarbons (µg/L)									
TPH-G (C7-C12)	800	**2,340**	**2,380**	323	100 U	100 U	100 U	100 UJ	100 U

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

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 in gasoline range

TABLE 10: FORMER FUEL FARM GROUNDWATER ELEVATION DATA
FEBRUARY 15, 2021
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]
GW211S	4.8 to 14.7	27.77	8.74	19.03
GW221S	5 to 15	27.93	8.87	19.06
GW224S	5 to 15	27.98	9.83	18.15

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 11: FORMER FUEL FARM PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]			
	CPOC Area			
	GW211S	GW221S	GW224S	GW224S (field dup.)
Temperature (degrees C)	6.2	6.8	8.4	NA
Specific Conductivity (µS/cm)	208.9	172.2	125.8	NA
Dissolved Oxygen (mg/L)	0.34	0.78	0.46	NA
pH (standard units)	6.30	6.18	6.03	NA
Oxidation/Reduction Potential (mV)	-30.8	3.9	0.9	NA

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

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

TABLE 12: FORMER FUEL FARM CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [4]	Well ID[3]			
		CPOC Area			
		GW211S	GW221S	GW224S	GW224S (field dup.)
Total Petroleum Hydrocarbons (mg/L)					
TPH-D (C12-C24)	0.5	0.284	**1.22**	**0.584**	**0.609**
TPH-O (C24-C38)	NC	0.225 U	0.215 U	0.200 U	0.217 U
Jet A (C10-C18)	0.5	0.262	**0.889**	**1.04**	**1.05**

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 Table 2 of the Cleanup Action Plan.

Abbreviations
CPOC = conditional point of compliance
field dup. = field duplicate
mg/L = milligrams per liter
NC = No cleanup level established
TPH-D = total petroleum hydrocarbons as diesel
TPH-O = total petroleum hydrocarbons as motor oil

TABLE 13: AOC-003 GROUNDWATER ELEVATION DATA
FEBRUARY 16, 2021
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	3.57	15.21
GW247S	4 to 14	18.91	3.86	15.05
GW248I	10 to 20	18.78	3.79	14.99
GW249S	4 to 14	18.85	3.69	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 PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 16, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]			
	Source Area	Downgradient Plume Area	CPOC Area	
	RGW249S	RGW188S	GW247S	GW248I
Temperature (degrees C)	9.4	8.5	8.0	8.3
Specific Conductivity (µS/cm)	339.3	285.9	313.2	375.6
Dissolved Oxygen (mg/L)	0.47	0.63	0.67	0.53
pH (standard units)	6.24	6.31	6.34	6.33
Oxidation/Reduction Potential (mV)	-12.1	-7.5	-15.2	-13.7
Total Organic Carbon (mg/L)	19.48	5.83	9.82	12.37

Notes
1. Primary geochemical indicators are measured in the field.
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]
FEBRUARY 16, 2021
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [3]	Well ID [2]			
		Source Area	Downgradient Plume Area	CPOC Area	
		GW249S	GW188S	GW247S	GW248I
Volatile Organic Compounds (µg/L)					
Vinyl Chloride	0.24	**0.366**	**0.107**	**0.405**	**0.426**

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

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

TABLE 16: AOC-004 GROUNDWATER ELEVATION DATA
FEBRUARY 16, 2021
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]
GW250S	4 to 14	19.31	3.38	15.93

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 PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 16, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2] / Source Area / GW250S
Temperature (degrees C)	8.5
Specific Conductivity (µS/cm)	99.2
Dissolved Oxygen (mg/L)	1.55
pH (standard units)	6.90
Oxidation/Reduction Potential (mV)	-16.8

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

Abbreviations:
µS/cm = microsiemens per centimeter
AOC = area of concern
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 18: AOC-004 CONCENTRATIONS OF CONSTITUENTS OF CONCERN
FEBRUARY 16, 2021
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [2]	Well ID [1] / Source Area / GW250S
Metals (mg/L)		
Lead	0.001	0.000564

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

Abbreviations:
AOC = area of concern
mg/L = milligrams per liter

TABLE 19: AOC-060 GROUNDWATER ELEVATION DATA
FEBRUARY 17, 2021
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	5.37	13.99
GW010S	4.5 to 14.5	19.47	5.48	13.99
GW011D	29 to 39	19.49	5.5	13.99
GW012S	4.5 to 14.5	19.11	4.95	14.16
GW014S	4.5 to 14.5	19.24	4.98	14.26
GW147S	5 to 15	18.73	4.77	13.96
GW150S	5 to 15	19.1	5.29	13.81
GW253I	10 to 20	19.02	5.17	13.85

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

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

TABLE 20: AOC-060 PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 17, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]						
	Source Area	Downgradient Plume Area				CPOC Area	
	GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW150S	GW253I
Temperature (degrees C)	19.8	20.3	18.2	NA	9.5	9.4	9.2
Specific Conductivity (µS/cm)	374.0	1859	571	NA	194.1	136.5	255.9
Dissolved Oxygen (mg/L)	1.12	1.59	0.95	NA	0.57	1.38	1.27
pH (standard units)	6.36	6.17	6.27	NA	4.91	6.87	6.54
Oxidation/Reduction Potential (mV)	-26.3	-95.1	-20.0	NA	-77.8	-71.9	-76.9
Total Organic Carbon (mg/L)	5.97	653.1	2.92	2.72	30.18	2.52	4.37

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
NA = not analyzed

TABLE 21: AOC-060 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
FEBRUARY 17, 2021
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Levels [4]	Well ID [3]						
		Source Area	Downgradient Plume Area				CPOC Area	
		GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW150S	GW253I
Volatile Organic Compounds (µg/L)								
cis -1,2-Dichloroethene	0.08	**0.139**	**1.260**	**0.130**	**0.162**	**0.180**	0.0393	**0.140**
Trichloroethene	0.02	**0.0294**	**0.0454**	**0.035**	**0.0411**	**0.498**	0.020 U	**0.0272**
Vinyl Chloride	0.26	**0.300**	0.180	0.207	**0.264**	0.020 U	0.0455	0.243

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

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

TABLE 22: AOC-090 GROUNDWATER ELEVATION DATA
FEBRUARY 17, 2021
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]
GW176S	10 to 14.3	20.15	4.56	15.59
GW178S	11.2 to 15.5	22.73	7.1	**15.63**
GW189S	4 to 14	22.01	5.03	**16.98**
GW207S	7.3 to 12	21.12	5.54	**15.58**
GW208S	6.3 to 11	22.45	6.9	**15.55**

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 23: AOC-090 PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 17, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]				
	Source Area	Downgradient Plume Area	Shallow Zone CPOC Area		
	GW189S [3]	GW176S	GW178S	GW207S	GW208S
Temperature (degrees C)	10.8	9.8	10.0	9.6	10.2
Specific Conductivity (µS/cm)	311.3	324.3	348.8	216.2	430.2
Dissolved Oxygen (mg/L)	0.56	0.75	0.64	0.48	0.44
pH (standard units)	6.09	6.28	6.23	6.51	6.24
Oxidation/Reduction Potential (mV)	-6.4	-76.6	-8.8	-77.7	-6.6
Total Organic Carbon (mg/L)	11.66	NA	NA	NA	NA

Notes:
1. Primary geochemical indicators are measured in the field.
2. S = shallow 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
mg/L = milligrams per liter
mV = millivolts
NA = Not analyzed

TABLE 24: AOC-090 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
FEBRUARY 17, 2021
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Levels [4]	Well ID [3]				
		Source Area	Downgradient Plume Area	Shallow Zone CPOC Area		
		GW189S [5]	GW176S	GW178S	GW207S	GW208S
Volatile Organic Compounds (µg/L)						
1,1,2,2-Tetrachloroethane	0.17	0.020 U	NA	NA	NA	NA
1,1,2-Trichloroethane	0.2	0.20 U	NA	NA	NA	NA
1,1-Dichloroethene	0.057	0.020 U	NA	NA	NA	NA
Acetone	300	10.6 J	NA	NA	NA	NA
Benzene	0.8	0.20 U	NA	NA	NA	NA
Carbon Tetrachloride	0.23	0.20 U	NA	NA	NA	NA
Chloroform	2	0.20 U	NA	NA	NA	NA
cis-1,2-Dichloroethene	2.4	0.47	NA	NA	NA	NA
Methylene Chloride	2	1.00 U	NA	NA	NA	NA
Tetrachloroethene	0.05	0.0283	NA	NA	NA	NA
Toluene	75	5.21	NA	NA	NA	NA
trans-1,2-Dichloroethene	53.9	0.20 U	NA	NA	NA	NA
Trichloroethene	0.08	**0.143**	NA	NA	NA	NA
Vinyl Chloride	0.13	0.0405	**0.138**	**0.224**	0.066	**0.349**
Total Petroleum Hydrocarbons (µg/L)						
TPH-G (C7-C12)	800	507	NA	NA	NA	NA
TPH-D (C12-C24)	500	**2160**	NA	NA	NA	NA
TPH-O (C24-C40)	500	**3990**	NA	NA	NA	NA

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

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
NA = not analyzed
TPH-D = total petroleum hydrocarbons in diesel range
TPH-G = total petroleum hydrocarbons in the gasoline range
TPH-O = total petroleum hydrocarbons in the motor oil range

TABLE 25: APRON A GROUNDWATER ELEVATION DATA
FEBRUARY 15, 2021
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]
GW263S	8 to 18	NA	6.41	NA
GW264S	8 to 18	NA	5.04	NA

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

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

TABLE 26: APRON A PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]
	Source Area
	GW264S
Temperature (degrees C)	11.4
Specific Conductivity (µS/cm)	747.0
Dissolved Oxygen (mg/L)	3.08
pH (standard units)	5.98
Oxidation/Reduction Potential (mV)	-45.2
Total Organic Carbon (mg/L)	29.27

Notes

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

Abbreviations
µS/cm = microsiemens per centimeter
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE 27: APRON A CONCENTRATIONS
OF CONSTITUENTS OF CONCERN[1]
FEBRUARY 15, 2021
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Levels	Well ID[2] GW264S
Volatile Organic Compounds (µg/L)		
cis- 1,2-Dichloroethene	NE	0.20 U
Vinyl Chloride	NE	1.49

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

Abbreviations
µg/L = micrograms per liter
NE = not established

Appendix A

TABLE A-1: GROUNDWATER COMPLIANCE MONITORING SCHEDULE

Boeing Renton Facility, Renton, Washington

Cleanup Action Area	Monitoring Wells[1, 2]				Constituents of Concern[4]	Analyses[5]
	Source Area Wells	Downgradient Plume Wells	CPOC Wells	Additional Water Level Monitoring Wells[3]		
SWMU-168	NA	NA	GW230I	NA	VC	SW8260D SIM
SWMU-172/SWMU-174	GW152S and GW153S	GW172S, GW173S, and GW226S	GW232S, GW234S, GW235I, and GW236S	NA	*cis* -1,2-DCE, PCE, TCE, VC	SW8260D SIM[8]
					Arsenic, copper, and lead	EPA 6020A
Building 4-78/79 SWMU/AOC Group	GW031S, GW033S, GW034S, and GW244S	NA	GW143S, GW237S, and GW240D	NA	VC, TCE, *cis* -1,2-DCE, benzene	SW8260D
					TPH-gasoline	NWTPH-Gx
Former Fuel Farm SWMU/AOC Group	NA	NA	GW211S, GW221S, and GW224S	NA	TPH-jet fuel, TPH-diesel	NWTPH-Dx
AOC-001/AOC-002[6, 7]	All wells closed with the start of Apron R construction.				Benzene	SW8260D
					TCE, *cis* -1,2-DCE, 1,1-dichloroethene, VC	SW8260D SIM[8]
AOC-003	GW249S	GW188S	GW247S and GW248I	NA	VC	SW8260D
AOC-004	GW250S	NA	NA	NA	Lead	EPA 6020A
AOC-060	GW009S	GW012S, GW014S, and GW147S	GW150S and GW253I	GW010S and GW011D	VC, TCE, cis-1,2-DCE	SW8260D SIM[8]
AOC-090[9]	GW189S	GW176S	GW178S, GW207S, and GW208S	NA	1,1,2-Trichloroethane, acetone, benzene, toluene, carbon tetrachloride, chloroform, *cis* -1,2-DCE, *trans* -1,2-DCE, methylene chloride	SW8260D
					1,1-Dichloroethene, 1,1,2,2-tetrachloroethane, VC, PCE, TCE	SW8260D SIM[8]
					TPH-gasoline	NWPTH-Gx
					TPH-diesel, TPH-motor oil	NWTPH-Dx
Apron A	GW264S	NA	NA	GW263S	*cis* -1,2-DCE and VC	SW8260D

Notes:

1. The EDR presents the groundwater monitoring frequency for each SWMU/AOC. All sites are monitored on a semi-annual basis with sampling events occurring in February and August.
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. 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.
8. 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.
9. GW189S will be sampled for CVOCs and TPH, all other wells will only be sampled for VC.

Abbreviations:

AOC = area of concern
cis -1,2-DCE = *cis* -1,2 dichloroethene
COCs = constituents of concern
CPOC = conditional point of compliance
CVOCs = chlorinated volatile organic compounds
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

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

Boeing Renton Facility, Renton, Washington

Cleanup Action Area	Groundwater Monitoring Wells				Primary Geochemical Parameters[1, 2]
	Cross-Gradient Wells	Source Area Wells	Downgradient Plume Wells	CPOC Wells	Indicators
SWMU-168	NA	NA	NA	GW230I	Dissolved oxygen, pH, ORP, temperature, specific conductance
SWMU-172/SWMU-174	NA	GW152S and GW153S	GW172S, GW173S, and GW226S	GW232S, GW234S, GW235I, and GW236S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC
Building 4-78/79 SWMU/AOC Group	NA	GW031S, GW033S, GW034S, and GW244S	NA	GW143S, GW237S, and GW240D	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC
Former Fuel Farm SWMU/AOC Group	NA	NA	NA	GW211S, GW221S, and GW224S	Dissolved oxygen, pH, ORP, temperature, specific conductance
AOC-001/AOC-002[3, 4]	NA	All wells closed with the start of Apron R construction.			
AOC-003	NA	GW249S	GW188S	GW247S and GW248I	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC
AOC-004	NA	GW250S	NA	NA	Dissolved oxygen, pH, ORP, temperature, specific conductance
AOC-060	GW012S and GW014S	GW009S	GW147S	GW150S and GW253I	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC
AOC-090	NA	GW189S	GW176S	GW178S, GW207S, and GW208S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC[5]
Apron A	NA	GW264S	NA	NA	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC

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.
   All MNA parameters are measured semiannually in all wells on a wet season/dry season basis.
3. Monitoring wells were abandoned on 11/25/2019 prior to Apron R construction and will be replaced upon completion of construction.
4. Groundwater monitoring and sampling will be suspended until completion of construction.
5. TOC will only be analyzed in the groundwater from the source area well (GW189S).

Abbreviations:

AOC = area of concern
COCs = constituents of concern
CPOC = conditional point of compliance
MNA = monitored natural attenuation
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: Feb. 2021 | Date/Time: 2/ 17 /2021@ 910

Sample Number: RGW009S- 210217 | Weather: INDOIR

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.37 Time: 843 Flow through cell vol. GW Meter No.(s SLOPE8

Begin Purge: Date/Time: 2/ 17 /2021 845 End Purge: Date/Time: 2/ 17 /2021 @ 907 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**	
848	19.4	395.2	0.17	6.32	-14.8		5.38		
851	19.3	387.5	0.20	6.33	-16.5		5.37		
854	19.3	390.6	0.41	6.35	-18.9		5.37		
857	19.4	388.7	0.63	6.34	-20.8				
900	19.5	381.8	0.81	6.35	-22.5				
903	19.7	374.9	1.02	6.36	-24.8				
906	19.8	374.0	1.12	6.36	-26.3				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESE, 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	19.8	373.7	1.15	6.36	-26.4				
2	19.8	372.9	1.16	6.36	-26.9				
3	19.9	373.3	1.17	6.36	-27.0				
4	19.9	373.0	1.18	6.36	-27.1				
Average:	19.9	373.2	1.17	6.36	-26.9				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 17 /2021@

Sample Number: RGW010S- 210217 | Weather: INDOORS

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.48 Time: 923 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ /2021 @ N/A End Purge: Date/Time: 2/ /2021 @ N/A Gallons Purged: N/A

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (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) (Silic		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 17 /2021@

Sample Number: RGW011D-210217 | Weather: INDOORS

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.5 Time: 921 Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 2/ /2021 @ N/A End Purge: Date/Time: 2/ /2021 @ N/A Gallons Purged: N/A

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 17 /2021@ 1005

Sample Number: RGW012S- 210217 | Weather: INDOORS

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.95 Time: 940 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 17 /2021 942 End Purge: Date/Time: 2/ 17 /2021 @ 1004 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**		
945	20.8	1773	0.27	6.11	-78.5		5.03		
948	20.5	1809	0.73	6.13	-88.9		5.07		
951	20.5	1809	1.01	6.13	-91.2		5.10		
954	20.4	1833	1.53	6.15	-95.1				
957	20.3	1850	1.59	6.16	-95.1				
1000	20.3	1859	1.59	6.17	-95.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, SLIGHT YELOIW TINT, VERY EFFERVESCENT, SOME LIGHT SOLIDS NO SHEEN, SLIGHT BAD 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	20.4	1873	1.58	6.17	-94.8				
2	20.4	1883	1.59	6.17	-94.9				
3	20.5	1882	1.57	6.17	-94.8				
4	20.5	1885	1.57	6.17	-94.8				
Average:	20.5	1881	1.58	6.17	-94.8				

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

Duplicate Sample No(s):

Comments: HARD TO GET A CONSISTENT DTW, PULLED WATER LEVEL METER UP, LOTS OF SMALL PIECES OF PLASTIC ON PROBE (CLE

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 17 /2021@ 1050

Sample Number: RGW014S- 210217 | Weather: INDOORS

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.98 Time: 1022 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 17 /2021 1023 End Purge: Date/Time: 2/ 17 /2021 @ 1045 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**		
1026	18.9	603	0.80	6.18	-5.3		5.10		
1029	18.7	592	0.73	6.21	-10.5		5.12		
1032	18.5	581	0.75	6.22	-13.5		5.13		
1035	18.3	572	0.80	6.22	-15.4				
1038	18.3	571	0.85	6.25	-17.5				
1041	18.2	570	0.90	6.26	-18.7				
1044	18.2	571	0.95	6.27	-20.0				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO 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	18.2	571	0.96	6.28	-20.2				
2	18.2	572	0.99	6.28	-20.4				
3	18.2	572	0.99	6.28	-20.7				
4	18.1	572	0.99	6.28	-20.9				
Average:	18.2	572	0.98	6.28	-20.6				

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

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

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 17 /2021@ 1130

Sample Number: RGWDUP4 210217 | Weather: INDOORS

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.98 Time: 1022 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 17 /2021 1023 End Purge: Date/Time: 2/ 17 /2021 @ 1045 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 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 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	18.2	572	0.97	6.28	-20.4				
2	18.2	572	0.99	6.28	-20.5				
3	18.1	572	0.98	6.28	-20.9				
4	18.2	572	0.98	6.28	-21.1				
Average:	18.2	572	0.98	6.28	-20.7				

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

Duplicate Sample No(s): Duplicate to RGW014S

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1521

Sample Number: RGW031S- 210215 | Weather: CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.24 Time: 1455 Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ 1457 End Purge: Date/Time: 2/15/2021 @ 1514 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		
1500	11.7	454.6	0.86	6.63	-89.3		5.27		
1503	10.6	424.5	0.93	6.61	-98.2		5.27		
1506	9.6	389.4	1.00	6.55	-97.5		5.27		
1509	9.4	381.0	0.97	6.49	-94.3				
1512	9.3	376.5	1.01	6.45	-91.8				
1515									
1517									

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	9.3	376.4	1.01	6.45	-91.5				
2	9.3	376.2	1.01	6.44	-91.4				
3	9.3	374.9	1.01	6.44	-91.5				
4	9.3	375.2	1.02	6.44	-91.6				
Average:	9.3	375.7	1.01	6.44	-91.5	#DIV/0!			

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

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

Comments:

Signature: JAN Date: 2/15/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 910

Sample Number: RGWDUP2 210215 | Weather: CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ End Purge: Date/Time: 2/15/2021 @ 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 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, NO/NS.

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.3	375.0	1.03	6.44	-91.4				
2	9.3	374.8	1.01	6.43	-91.5				
3	9.3	374.5	1.02	6.44	-91.6				
4	9.3	374.3	1.02	6.43	-91.6				
Average:	9.3	374.7	1.02	6.44	-91.5	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW031S

Comments:

Signature: JAN Date: 2/15/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 16 /2021@ 1410

Sample Number: RGW033S- 210216 | Weather: PARTLY CLOUDY, 40S

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.34 Time: 1340 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 16 /2021 1344 End Purge: Date/Time: 2/ 16 /2021 @ 1406 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		
1347	13.4	377.9	0.15	6.09	27.0		5.38		
1350	12.3	384.0	0.31	6.10	15.2		5.38		
1353	11.6	383.4	0.34	6.11	9.9		5.36		
1356	11.1	381.8	0.39	6.09	5.6				
1359	10.7	379.4	0.47	6.12	1.0				
1402	10.4	376.1	0.51	6.12	-1.0				
1405	10.2	373.3	0.57	6.14	-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.): CLEAR, COLORLESS, NO ODOR, NO SHEEN, SOME LIGHT SMALL SOLIDS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.1	373.1	0.58	6.16	-3.1				
2	10.2	373.0	0.57	6.13	-3.3				
3	10.2	372.9	0.57	6.16	-3.5				
4	10.2	372.7	0.57	6.13	-3.6				
Average:	10.2	372.9	0.57	6.15	-3.4				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 15 /2021@ 1515

Sample Number: RGW034S- 210215 | Weather: OVERCAST, COLD, SNOW ON GROUND

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.46 Time: 1450 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 15 /2021 1451 End Purge: Date/Time: 2/ 15 /2021 @ 1513 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		
1454	12.2	276.1	0.16	6.31	16.8		5.46		
1457	10.7	278.1	0.29	6.34	-6.9		5.46		
1500	10.0	275.6	0.31	6.34	-10.9		5.46		
1503	9.2	270.2	0.40	6.34	-16.1				
1506	8.9	269.7	0.37	6.34	-17.6				
1509	8.5	267.2	0.39	6.34	-20.6				
1512	8.4	266.6	0.39	6.34	-21.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO ODOR, NO SHEEN, TRACE 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	8.4	266.6	0.40	6.34	-21.7				
2	8.4	266.5	0.40	6.34	-21.9				
3	8.3	166.3	0.42	6.35	-22.0				
4	8.3	266.2	0.41	6.34	-22.2				
Average:	8.4	241.4	0.41	6.34	-22.0				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1437

Sample Number: RGW143S- 210215 | Weather: CLOUDY WITH SNOW ON THE GROUND

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.75 Time: 1409 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 15/2021 @ 1410 End Purge: Date/Time: 2/15/2021 @ 1430 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**		
1413	13.1	261.1	0.31	6.46	-90.1		5.75		
1416	13.1	260.8	0.29	6.46	-91.1		5.75		
1419	12.5	257.9	0.36	6.44	-97.1		5.75		
1422	12.1	250.6	0.37	6.42	-92.5				
1425	11.9	249.4	0.37	6.41	-91.4				
1428	12.1	248.9	0.38	6.41	-89.9				
1430									

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 ODOR NO SHEEN RED 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	12.1	249.2	0.41	6.39	-89.9				
2	12.1	249.1	0.39	6.40	-89.9				
3	12.1	249.4	0.40	6.40	-89.9				
4	12.1	249.1	0.39	6.41	-89.9				
Average:	12.1	249.2	0.40	6.40	-89.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/19/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/17/2021@ 1047

Sample Number: RGW147S- 210217 | Weather: CLOUDY

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.77 Time: 1017 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 17 /2021 @ 1019 End Purge: Date/Time: 2/ 17/2021 @ 1039 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1022	9.8	175.1	0.67	4.38	-61.1		4.77		
1025	9.4	186.1	0.56	4.52	-67.6		4.77		
1028	9.2	192.2	0.52	4.69	-72.1		4.77		
1031	9.4	194.1	0.51	4.81	-73.5				
1034	9.5	195.2	0.51	4.86	-75.7				
1037	9.5	194.1	0.57	4.91	-77.8				
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.): NO COLOR LOW TURB, NO ODOR, NO SHEEN, SOME 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	9.6	194.3	0.56	4.92	-78.1				
2	9.6	194.2	0.59	4.93	-77.9				
3	9.6	194.4	0.56	4.94	-77.6				
4	9.6	194.5	0.56	4.94	-77.8				
Average:	9.6	194.4	0.57	4.93	-77.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments: When trying to get water levels I was having issues. Had plastic particles on the meter

Signature: AHA Date: 2/19/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/17/2021@ 907

Sample Number: RGW150S- 210217 | Weather: CLOUDY WITH SOME RAIN

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.29 Time: 843 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 17 /2021 @ 845 End Purge: Date/Time: 2/ 17/2021 @ 906 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**		
848	9.9	203.8	3.27	7.97	-60.1		5.29		
851	9.8	177.7	2.55	7.59	-59.9		5.29		
854	9.2	163.8	1.99	7.33	-62.7		5.29		
857	9.1	152.9	1.79	7.17	-64.7				
900	9.2	142.8	1.48	7.02	-65.8				
903	9.3	139.3	1.41	6.93	-68.4				
905	9.4	136.5	1.38	6.87	-71.9				

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 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	9.5	134.8	1.42	6.86	-72.2				
2	9.5	135.1	1.37	6.85	-72.9				
3	9.6	135.1	1.43	6.84	-72.9				
4	9.6	133.8	1.41	6.83	-73.6				
Average:	9.6	134.7	1.41	6.85	-72.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/19/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1246

Sample Number: RGW152S- 210215 | Weather: CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.03 Time: 1221 Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ 1223 End Purge: Date/Time: 2/15/2021 @ 1245 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1226	9.5	124.4	3.50	5.99	56.2		8.09		
1229	9.1	119.6	3.90	5.97	55.4		8.09		
1232	9.0	118.6	4.16	5.97	52.3		8.09		
1235	8.6	121.1	4.29	5.99	47.1				
1238	8.0	137.8	4.40	6.00	41.8				
1241	7.4	152.9	4.57	6.01	30.3				
1243	7.1	151.5	4.62	6.03	21.3				

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.): GREYISH, MED 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	7.1	151.3	4.62	6.03	21.3				
2	7.1	151.0	4.61	6.03	21.2				
3	7.0	149.4	4.62	6.05	20.3				
4	7.0	147.8	4.65	6.05	20.1				
Average:	7.1	149.9	4.63	6.04	20.7	#DIV/0!			

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

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

Comments:

Signature: JAN Date: 2/15/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 900

Sample Number: RGWDUP1 210215 | Weather: CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ End Purge: Date/Time: 2/15/2021 @ 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.): GREYISH, MED 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	6.9	146.8	4.62	6.05	20.2				
2	6.9	144.5	4.61	6.07	19.4				
3	7.0	144.4	4.57	6.08	18.9				
4	7.0	143.6	4.61	6.08	19.0				
Average:	7.0	144.8	4.60	6.07	19.4	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate to RGW152S

Comments:

Signature: JAN Date: 2/15/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1147

Sample Number: RGW153S- 210215 | Weather: RAINY SNOW ON GROUND

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.41 Time: 1118 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 15/2021 @ 1122 End Purge: Date/Time: 2/ 15/2021 @ 1144 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (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		
1125	11.9	202.2	1.56	6.57	-92.9		8.41		
1128	12.0	212.2	0.68	6.57	-95.6		8.41		
1131	12.0	213.3	0.54	6.57	-96.4		8.41		
1134	11.7	211.1	0.62	6.57	-96.6				
1137	10.9	204.3	0.62	6.56	-95.4				
1140	10.1	198.1	0.66	6.54	-93.6				
1142	9.6	194.8	0.73	6.52	-92.1				

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.): YELLOW BROWNISH, LOW-MED TURB, NO ODOR, NO SHEEN, PARTICLES 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	9.5	193.1	0.72	6.51	-91.5				
2	9.5	192.6	0.71	6.50	-90.8				
3	9.4	191.3	0.72	6.50	-90.3				
4	9.3	190.6	0.70	6.48	-89.4				
Average:	9.4	191.9	0.71	6.50	-90.5	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/18/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1126

Sample Number: RGW172S- 210215 | Weather: RAIN

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.53 Time: 1059 Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ 1101 End Purge: Date/Time: 2/15/2021 @ 1122 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		
1104	10.0	323.4	2.25	6.83	-62.5		8.59		
1107	8.7	341.3	2.07	6.81	-79.8		8.59		
1110	7.9	322.2	1.58	6.83	-90.2		8.59		
1113	7.5	309.5	1.37	6.84	-94.9				
1116	7.2	297.1	1.19	6.85	-96.2				
1119	7.0	283.1	1.14	6.84	-93.9				
1121	7.0	278.8	1.11	6.83	-92.9				

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.): TANISH, 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	279.9	1.13	6.83	-92.4				
2	7.0	280.4	1.12	6.82	-91.9				
3	7.0	281.0	1.12	6.82	-91.3				
4	7.0	277.0	1.10	6.82	-90.9				
Average:	7.0	279.6	1.12	6.82	-91.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 2/15/2021

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1317

Sample Number: RGW173S- 210215 | Weather: RAINY SNOW ON GROUND

Landau Representative:

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.51 Time: 1248 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 15/2021 @ 1251 End Purge: Date/Time: 2/ 15/2021 @ 1313 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**		
1254	10.7	258.7	0.62	6.53	-87.4		8.61		
1257	10.5	258.2	0.54	6.54	-87.9		8.61		
1300	9.3	245.7	0.59	6.55	-87.3		8.61		
1303	8.6	239.9	0.65	6.55	-86.5				
1306	8.2	232.6	0.73	6.49	-82.2				
1309	8.1	229.7	0.73	6.47	-80.3				
1311	8.0	228.6	0.71	6.46	-79.2				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, 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	8	228.6	0.68	6.46	-79.1				
2	8	228.4	0.72	6.46	-78.9				
3	8	228.5	0.70	6.46	-78.8				
4	8	228.4	0.68	6.46	-78.7				
Average:	8.0	228.5	0.70	6.46	-78.9	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
9	(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)
3	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
3	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: AHA Date: 2/18/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/17 /2021@ 1302

Sample Number: RGW176S- 210217 | Weather: CLOUDY

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.56 Time: 1235 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/17 /2021 @ 1237 End Purge: Date/Time: 2/ 17/2021 @ 1258 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**		
1240	10.9	336.9	0.69	6.27	-76.4		4.56		
1243	10.3	332.9	0.59	6.27	-76.6		4.59		
1246	9.9	327.5	0.62	6.28	-76.4		4.59		
1249	9.8	325.1	0.69	6.27	-75.2				
1252	9.7	323.8	0.72	6.27	-74.5				
1255	9.8	324.2	0.81	6.28	-74.9				
1257	9.8	324.3	0.75	6.28	-76.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.8	324.3	0.76	6.28	-76.9				
2	9.8	324.3	0.79	6.29	-76.6				
3	9.8	324.2	0.74	6.29	-76.4				
4	9.8	324.2	0.74	6.29	-76.6				
Average:	9.8	324.3	0.76	6.29	-76.6	#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)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/19/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 17 /2021@ 1250

Sample Number: RGW178S- 210217 | Weather: OVERCAST, RAIN, 40S

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.1 Time: 1225 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 17 /2021 1227 End Purge: Date/Time: 2/ 17 /2021 @ 1249 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		
1230	10.5	360.9	0.35	6.2	13.7		7.03		
1233	10.4	361.8	0.37	6.22	11.7		7.04		
1236	10.2	353.9	0.46	6.22	2.8		7.01		
1239	10.1	350.4	0.51	6.22	-1.1		7.01		
1242	10.1	350.1	0.53	6.22	-2.6				
1245	10.1	349.4	0.57	6.23	-5.6				
1248	10.0	348.8	0.64	6.23	-8.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO ODOR, NO SHEEN, LIGHT FINE SOLIDS

Replicate	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	348.7	0.65	6.23	-9.1				
2	10.0	348.4	0.65	6.23	-9.3				
3	10.0	348.3	0.66	6.23	-9.5				
4	10.0	348.3	0.67	6.23	-9.7				
Average:	10.0	348.4	0.66	6.23	-9.4				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 16 /2021@ 1120

Sample Number: RGW188S- 210216 | Weather: OVERCAST, 40S

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.57 Time: 1051 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 16 /2021 1053 End Purge: Date/Time: 2/ 16 /2021 @ 1115 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		
1056	9.4	368.6	0.47	6.23	19.8		3.58		
1059	8.5	319.2	0.44	6.23	4.7		3.58		
1102	8.3	306.6	0.45	6.24	2.1		3.58		
1105	8.2	297.3	0.49	6.25	-0.6				
1108	8.2	290.5	0.54	6.25	-3.5				
1111	8.3	288.6	0.58	6.27	-5.5				
1114	8.5	285.9	0.63	6.31	-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.): CLEAR, COLORLESS, DARK AND LIGHT FINES, 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	8.5	285.7	0.62	6.28	-7.8				
2	8.5	285.6	0.63	6.27	-7.9				
3	8.5	285.3	0.64	6.27	-7.9				
4	8.5	285.2	0.64	6.27	-7.9				
Average:	8.5	285.5	0.63	6.27	-7.9				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/17 /2021@ 1350

Sample Number: RGW189S- 210217 | Weather:

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.03 Time: 1320 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/17 /2021 @ 1323 End Purge: Date/Time: 2/ 17/2021 @ 1345 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**		
1326	10.9	398.1	0.34	5.12	42.1		5.07		
1329	10.8	376.7	0.37	5.43	22.5		5.07		
1332	10.8	351.7	0.39	5.61	18.1		5.07		
1335	10.8	337.7	0.45	5.79	7.1				
1338	10.8	324.7	0.49	5.95	0.3				
1341	10.8	313.7	0.55	6.04	-5.3				
1343	10.8	311.3	0.56	6.09	-6.4				

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 ODOR NO SHEEN LITTLE BIT OF PLASTIC IN SAMPLES

Replicate	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	308.4	0.58	6.11	-7.8				
2	10.9	308.7	0.58	6.12	-8.2				
3	10.9	306.9	0.58	6.13	-9.5				
4	10.9	307.2	0.59	6.14	-9.8				
Average:	10.9	307.8	0.58	6.13	-8.8	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
14	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
6	(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)
3	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments: plastic on water lvl meter when pulled out. Also had trouble getting a water lvl

Signature: AHA Date: 2/19/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/17 /2021@ 1227

Sample Number: RGW207S- 210217 | Weather: PARTLY CLOUDY

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.54 Time: 1144 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/17 /2021 @ 1201 End Purge: Date/Time: 2/ 17/2021 @ 1221 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**		
1204	11.9	246.5	0.31	6.52	-84.4		5.54		
1207	10.8	236.2	0.42	6.53	-84.9		5.53		
1210	9.8	222.6	0.51	6.54	-83.1		5.53		
1213	9.5	217.8	0.49	6.49	-78.8				
1216	9.5	216.1	0.48	6.49	-78.1				
1219	9.6	216.2	0.48	6.51	-77.7				
1221									

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 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	9.7	216.6	0.47	6.51	-77.7				
2	9.9	216.6	0.47	6.51	-77.9				
3	9.8	216.8	0.47	6.52	-78.2				
4	9.8	217.6	0.47	6.51	-78.1				
Average:	9.8	216.9	0.47	6.51	-78.0	#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)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/19/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 17 /2021@ 1210

Sample Number: RGW208S- 210217 | Weather: OVERCAST, 40S

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.9 Time: 1143 Flow through cell vol. GW Meter No.(s SLOOE 8

Begin Purge: Date/Time: 2/ 17 /2021 1144 End Purge: Date/Time: 2/ 17 /2021 @ 1206 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**		
1147	11.7	435.5	0.17	6.30	27.2		6.94		
1150	11.1	437.2	0.21	6.29	16.2		6.96		
1153	10.5	433.3	0.27	6.27	4.7		6.96		
1156	10.4	432.8	0.26	6.26	3.5				
1159	10.4	431.6	0.30	6.26	-0.4				
1202	10.3	431.2	0.38	6.21	-4.6				
1205	10.2	430.2	0.44	6.24	-6.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO ODOR, NO SHEEN, 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	10.2	429.8	0.45	6.25	-7.1				
2	10.2	429.6	0.45	6.25	-7.4				
3	10.2	429.5	0.47	6.24	-7.7				
4	10.2	429.5	0.47	6.25	-8.0				
Average:	10.2	429.6	0.46	6.25	-7.6				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 15 /2021@ 1045

Sample Number: RGW211S- 210215 | Weather: COLD, RAIN, SNOW ON GROUND

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.74 Time: 1018 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 15 /2021 1020 End Purge: Date/Time: 2/ 15 /2021 @ 1042 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		
1023	7.3	226.4	1.07	6.21	-2.6		8.74		
1026	6.4	247.4	0.80	6.25	-5.4		8.74		
1029	6.4	252.0	0.44	6.30	-11.3		8.74		
1032	6.3	238.6	0.32	6.30	-18.9		8.74		
1035	6.2	225.3	0.23	6.32	-25.6				
1038	6.2	215.6	0.28	6.30	-29.4				
1041	6.2	208.9	0.34	6.30	-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.): CLOUDY, YELLOW-BROWN TINT, 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	6.2	206.9	0.34	6.31	-31.4				
2	6.2	207.4	0.36	6.30	-31.4				
3	6.2	207.0	0.37	6.30	-31.8				
4	6.2	205.9	0.38	6.30	-32.0				
Average:	6.2	206.8	0.36	6.30	-31.7				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.15.21

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 15 /2021@ 1255

Sample Number: RGW221S- 210215 | Weather: RAIN, COLD, SNOW ON GROUND

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.87 Time: 1230 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 15 /2021 1231 End Purge: Date/Time: 2/ 15 /2021 @ 1253 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**		
1234	11.1	199.8	1.08	6.19	16.5		8.87		
1237	9.8	193.7	0.94	6.20	12.3		8.87		
1240	8.9	188.8	0.84	6.19	9.2		8.87		
1243	7.9	181.3	0.88	6.18	7.3				
1246	7.3	177.8	0.83	6.18	6.3				
1249	7.0	174.2	0.81	6.17	5.1				
1252	6.8	172.2	0.78	6.18	3.9				

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 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	6.7	172.4	0.79	6.18	3.8				
2	6.7	172.4	0.78	6.18	3.8				
3	6.7	172.4	0.78	6.17	3.6				
4	6.7	171.8	0.79	6.18	3.7				
Average:	6.7	172.3	0.79	6.18	3.7				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 15 /2021@ 1205

Sample Number: RGW224S- 210215 | Weather: COLD, WINDY, SNOW ON GROUND

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.83 Time: 1139 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 15 /2021 1140 End Purge: Date/Time: 2/ 15 /2021 @ 1202 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		
1143	11.3	123.1	0.97	5.93	10.1		10.00		
1146	11.0	132.9	0.29	6.06	3.0		9.94		
1149	10.6	132.7	0.32	6.07	1.0		9.86		
1152	10.0	131.8	0.35	6.05	0.4		9.84		
1155	9.2	129.0	0.40	6.04	1.2				
1158	8.6	126.3	0.43	6.04	1.3				
1201	8.4	125.8	0.46	6.03	0.9				

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 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	8.3	125.7	0.48	6.03	1.1				
2	8.3	125.7	0.48	6.03	1.1				
3	8.3	125.7	0.47	6.03	1.2				
4	8.3	125.3	0.48	6.03	0.8				
Average:	8.3	125.6	0.48	6.03	1.1				

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

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

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 15 /2021@ 1000

Sample Number: RGWDUP3 210215 | Weather: COLD, WINDY, SNOW ON GROUND

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.83 Time: 1139 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 15 /2021 1140 End Purge: Date/Time: 2/ 15 /2021 @ 1202 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 RGW224S

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 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	8.3	125.7	0.48	6.03	1.1				
2	8.3	125.7	0.47	6.03	1.1				
3	8.3	125.5	0.47	6.03	1.0				
4	8.3	125.3	0.47	6.03	0.9				
Average:	8.3	125.6	0.47	6.03	1.0				

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

Duplicate Sample No(s): Duplicate to RGW224S

Comments:

Signature: Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1057

Sample Number: RGW226S- 210215 | Weather: RAINY SNOW ON GROUND

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.12 Time: 1030 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 15/2021 @ 1032 End Purge: Date/Time: 2/ 15/2021 @ 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	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
1035	11.9	268.1	0.63	6.69	-96.8		8.19		
1038	12.2	262.3	0.53	6.68	-98.9		8.19		
1041	12.8	248.6	0.51	6.66	-102.7		8.19		
1044	13.1	240.1	0.47	6.63	-103.8				
1047	13.1	237.1	0.45	6.61	-103.6				
1050	13.1	229.6	0.45	6.59	-102.6				
1052	13.1	228.7	0.44	6.58	-101.7				

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.): YELLOWISH, LOW TURB, 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	12.9	227.1	0.45	6.57	-101.1				
2	12.8	226.3	0.45	6.57	-100.8				
3	12.7	225.8	0.45	6.56	-100.5				
4	12.7	225.3	0.46	6.56	-100.1				
Average:	12.8	226.1	0.45	6.57	-100.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/18/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 15 /2021@ 1355

Sample Number: RGW230I- 210215 | Weather: COLD, OVERCAST, SNOW ON GROUND

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.99 Time: 1329 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 15 /2021 1332 End Purge: Date/Time: 2/ 15 /2021 @ 1354 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		
1335	9.3	252.3	0.47	6.18	19.9		5.99		
1338	9.1	250.3	0.46	6.18	17.5		5.99		
1341	8.3	238.4	0.48	6.2	11.9		5.99		
1344	7.9	232.8	0.51	6.21	8.1				
1347	7.7	227.1	0.54	6.22	4.5				
1350	7.6	223.8	0.53	6.23	1.7				
1353	7.6	220.4	0.57	6.25	-0.9				

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, LIGHT FINES, 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	7.6	220.2	0.58	6.25	-1.3				
2	7.6	220.2	0.57	6.25	-1.5				
3	7.6	220.1	0.57	6.25	-1.6				
4	7.6	220.1	0.59	6.25	-1.7				
Average:	7.6	220.2	0.58	6.25	-1.5				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 957

Sample Number: RGW232S- 210215 | Weather: SNOW ON GROUND CLOUDY

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.59 Time: 918 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 15/2021 @ 934 End Purge: Date/Time: 2/ 15/2021 @ 956 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	**+/- 3%**	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**	**>/= 1 flow through cell**	
937	10.9	401.5	0.98	7.12	-82.8		6.62		
940	9.4	381.1	1.61	6.89	-89.4		6.71		
943	8.8	364.4	1.41	6.73	-91.5		6.75		
946	8.5	351.1	1.41	6.59	-90.2				
949	8.5	346.4	1.34	6.46	-87.1				
952	8.6	344.2	1.24	6.39	-85.7				
954	8.6	342.2	1.31	6.37	-85.5				

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 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	8.6	341.7	1.46	6.36	-85.4				
2	8.5	340.2	1.26	6.35	-85.5				
3	8.6	338.9	1.31	6.35	-85.4				
4	8.6	338.7	1.31	6.35	-85.5				
Average:	8.6	339.9	1.34	6.35	-85.5	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/18/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1046

Sample Number: RGW234S- 210215 | Weather: RAIN

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.53 Time: 1021 Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ 1023 End Purge: Date/Time: 2/15/2021 @ 1044 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		
1026	5.7	205.1	2.77	6.47	-16.2		6.53		
1029	5.2	189.8	2.96	6.55	-25.9		6.53		
1032	4.7	200.3	4.37	6.62	-26.2		6.53		
1035	4.6	161.2	5.52	6.65	-22.9				
1038	4.4	130.4	5.84	6.58	-13.1				
1041	4.3	112.1	6.29	6.53	-3.5				
1043	4.3	104.6	6.37	6.51	-1.1				

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 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	4.3	102.1	6.42	6.51	0.1				
2	4.4	102.0	6.40	6.51	1.2				
3	4.4	101.3	6.38	6.51	1.8				
4	4.4	100.7	6.34	6.51	1.5				
Average:	4.4	101.5	6.39	6.51	1.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 2/15/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1016

Sample Number: RGW235I- 210215 | Weather: CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.06 Time: 951 Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ 953 End Purge: Date/Time: 2/15/2021 @ 1009 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**		
956	8.4	138.9	1.32	6.77	-1.7		6.08		
959	7.3	143.9	1.36	6.75	-25.5		6.08		
1002	6.8	138.0	1.36	6.66	-40.3		6.08		
1005	6.9	136.8	1.37	6.64	42.5				
1008	6.6	133.7	1.29	6.62	-46.4				
1011									
1013									

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	6.6	133.6	1.28	6.61	-46.7				
2	6.6	133.5	1.28	6.61	-47.0				
3	6.6	132.6	1.28	6.62	-47.5				
4	6.6	132.6	1.27	6.62	-47.7				
Average:	6.6	133.1	1.28	6.62	-47.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 2/15/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 946

Sample Number: RGW236S- 210215 | Weather: MISTY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.78 Time: 916 Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ 918 End Purge: Date/Time: 2/15/2021 @ 939 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		
921	8.9	257.6	5.27	6.14	104.6		6.79		
924	6.6	248.8	4.40	6.18	82.6		6.79		
927	5.4	239.3	3.92	6.20	66.6		6.79		
930	4.4	216.7	3.27	6.22	41.9				
933	4.2	216.8	3.25	6.22	41.5				
936	4.1	212.2	2.96	6.23	37.7				
938	3.9	209.7	2.80	6.24	36.4				

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.): 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	4.0	209.5	2.76	6.24	36.4				
2	4.0	209.3	2.74	6.24	36.3				
3	3.9	208.6	2.74	6.25	35.7				
4	3.9	208.4	2.73	6.25	35.8				
Average:	4.0	209.0	2.74	6.25	36.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 2/15/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 16 /2021@ 1320

Sample Number: RGW237S- 210216 | Weather: OVERCAST, 40S

Landau Representative:

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.86 Time: 1254 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 16 /2021 1256 End Purge: Date/Time: 2/ 16 /2021 @ 1318 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		
1259	12.0	173.3	0.86	6.47	9.9		4.87		
1302	11.3	165.2	0.84	6.52	8.5		4.87		
1305	10.2	153.1	0.93	6.43	8.5		4.87		
1308	9.6	146.6	1.10	6.42	8.7		4.86		
1311	9.3	142.5	1.03	6.40	8.9				
1314	9.1	140.6	0.96	6.41	8.7				
1317	9.0	140.8	0.91	6.39	8.7				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLOUDY, YELLOW, WITH SMALL SOLIDS, 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	9.0	140.9	0.88	6.38	8.7				
2	8.9	141.2	0.88	6.39	8.8				
3	8.9	141.3	0.87	6.39	8.8				
4	8.9	141.5	0.87	6.38	8.8				
Average:	8.9	141.2	0.88	6.39	8.8				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1512

Sample Number: RGW240D-210215 | Weather: CLOUDY SNOW ON THE GROUND

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.98 Time: 1446 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 15/2021 @ 1447 End Purge: Date/Time: 2/15/2021 @ 1508 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**	
1450	11.8	238.6	0.55	6.39	-80.5		5.98		
1453	11.3	234.4	0.49	6.41	-83.9		5.98		
1456	11.1	226.7	0.42	6.40	-83.9		5.98		
1459	11.1	223.5	0.41	6.40	-83.9				
1502	10.7	218.7	0.45	6.40	-84.1				
1505	10.4	216.1	0.45	6.40	-83.2				
1507	10.4	215.6	0.45	6.40	-83.1				

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 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	10.4	215.2	0.44	6.40	-83.1				
2	10.4	214.8	0.49	6.40	-82.9				
3	10.4	214.7	0.46	6.40	-83.0				
4	10.4	214.7	0.45	6.40	-82.9				
Average:	10.4	214.9	0.46	6.40	-83.0	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/19/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/15/2021@ 1446

Sample Number: RGW244S- 210215 | Weather: CLOUDY

Landau Representative: JAN

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.33 Time: 1420 Flow through cell vol. GW Meter No.(s 11

Begin Purge: Date/Time: 2/15/2021 @ 1423 End Purge: Date/Time: 2/15/2021 @ 1439 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**		
1426	12.7	426.0	0.72	6.30	-56.6		5.35		
1429	11.0	406.3	0.94	6.28	-65.4		5.35		
1432	9.5	384.8	1.09	6.21	-68.3		5.35		
1435	9.8	390.0	1.13	6.18	-67.6				
1438	9.4	380.9	1.15	6.15	-68.0				
1441									
1443									

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	9.4	380.8	1.17	6.15	-67.8				
2	9.4	380.8	1.16	6.14	-68.1				
3	9.4	380.7	1.16	6.15	-68.2				
4	9.4	380.7	1.17	6.14	-68.1				
Average:	9.4	380.8	1.17	6.15	-68.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAN Date: 2/15/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 16 /2021@ 1040

Sample Number: RGW247S- 210216 | Weather: OVERCAST, 40S

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.86 Time: 1014 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 16 /2021 1016 End Purge: Date/Time: 2/ 16 /2021 @ 1038 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**		
1019	10.6	353.2	0.46	6.33	2.5		3.89		
1022	8.9	331.8	0.52	6.22	-4.4		3.91		
1025	8.3	323.8	0.57	6.31	-7.3		3.91		
1028	8.1	316.7	0.61	6.33	-10.9				
1031	8.0	314.8	0.63	6.33	-13.1				
1034	8.0	313.2	0.67	6.34	-15.2				

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, SLIGHT YELLOW TINT, YELLOW SOLIDS, SLIGHTLY EFFERVESCENT 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	8.0	313.1	0.67	6.34	-15.5				
2	8.0	313.0	0.67	6.33	-15.7				
3	8.0	312.5	0.69	6.31	-15.9				
4	8.0	312.5	0.70	6.33	-16.1				
Average:	8.0	312.8	0.68	6.33	-15.8				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 16 /2021@ 1005

Sample Number: RGW248I- 210216 | Weather: OVERCAST, 40S

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.79 Time: 935 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 16 /2021 937 End Purge: Date/Time: 2/ 16 /2021 @ 1000 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**		
940	10.4	402.3	0.31	6.32	18.0		3.82		
943	9.7	404.6	0.31	6.33	4.6		3.80		
946	9.3	402.0	0.35	6.33	-0.9		3.80		
949	8.4	394.3	0.47	6.31	-4.0				
953	7.9	376.6	0.56	6.32	-7.3				
956	8.1	374.2	0.52	6.33	-10.9				
959	8.3	375.6	0.53	6.33	-13.7				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, TRACE DARK FINES, ORANGE SOLIDS, SLIGHTLY EFFERVESCENT 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	8.3	375.6	0.55	6.34	-14.1				
2	8.3	375.6	0.56	6.34	-14.3				
3	8.3	375.6	0.56	6.32	-14.5				
4	8.3	375.6	0.57	6.33	-14.8				
Average:	8.3	375.6	0.56	6.33	-14.4				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 16 /2021@ 1215

Sample Number: RGW249S- 210216 | Weather: OVERCAST, 40S

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.69 Time: 1150 Flow through cell vol. GW Meter No.(SLOPE 8

Begin Purge: Date/Time: 2/ 16 /2021 1152 End Purge: Date/Time: 2/ 16 /2021 @ 1214 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		
1155	11.0	372.5	0.29	6.31	20.6		3.65		
1158	9.8	370.9	0.37	6.32	2.0		3.65		
1201	9.2	361.1	0.40	6.30	-3.2		3.65		
1204	8.7	350.4	0.38	6.28	-5.9				
1207	8.9	340.7	0.37	6.25	-9.1				
1210	9.1	338.2	0.42	6.24	-10.5				
1213	9.4	339.3	0.47	6.24	-12.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO ODOR, NO SHEEN, 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	9.4	339.5	0.48	6.23	-12.3				
2	9.4	339.6	0.49	6.24	-12.4				
3	9.4	339.7	0.50	6.25	-12.4				
4	9.4	339.5	0.50	6.23	-12.6				
Average:	9.4	339.6	0.49	6.24	-12.4				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 16 /2021@ 905

Sample Number: RGW250S- 210216 | Weather: PARTLY CLOUDY, 40S

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.38 Time: 839 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 16 /2021 842 End Purge: Date/Time: 2/ 16 /2021 @ 904 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		
845	10.1	106.8	2.92	6.56	11.1		3.42		
848	9.7	106.0	2.79	6.61	9.7		3.42		
851	8.7	101.7	2.42	6.68	5.8		3.40		
854	8.4	100.3	1.90	6.77	-0.2		3.40		
857	8.5	99.6	1.79	6.89	-10.0				
900	8.5	99.4	1.63	6.88	-11.5				
903	8.5	99.2	1.55	6.9	-16.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, YELLOW TINT, 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	8.6	99.2	1.49	6.91	-17.1				
2	8.6	99.3	1.45	6.90	-17.4				
3	8.6	99.3	1.43	6.90	-17.8				
4	8.6	99.2	1.43	6.90	-18.3				
Average:	8.6	99.3	1.45	6.90	-17.7				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/17/2021@ 947

Sample Number: RGW253I- 210217 | Weather: CLOUDY SOME RAIN

Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.17 Time: 859 Flow through cell vol. GW Meter No.(s 10

Begin Purge: Date/Time: 2/ 17 /2021 @ 922 End Purge: Date/Time: 2/ 17/2021 @ 943 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**		
925	10.2	282.4	1.01	6.58	-76.8		5.17		
928	9.4	275.1	1.03	6.62	-79.8		5.17		
931	9.2	268.1	1.08	6.61	-78.6		5.17		
934	8.9	259.9	1.36	6.56	-77.2				
937	9.1	257.1	1.47	6.54	-76.3				
940	9.2	256.6	1.29	6.54	-76.6				
942	9.2	255.9	1.27	6.54	-76.9				

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 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	9.2	255.3	1.28	6.54	-76.7				
2	9.2	255.4	1.17	6.54	-77.1				
3	9.2	255.3	1.28	6.55	-77.2				
4	9.2	254.9	1.33	6.54	-77.1				
Average:	9.2	255.2	1.27	6.54	-77.0	#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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/19/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 15 /2021@

Sample Number: RGW263S- 210215 | Weather: VERY COLD, SNOW ON GROUND, RAIN

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.41 Time: 936 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ /2021 @ N/A End Purge: Date/Time: 2/ /2021 @ N/A Gallons Purged: N/A

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (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) (Silic
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.18.2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099

Event: Feb. 2021 | Date/Time: 2/ 15 /2021@ 933

Sample Number: RGW264S- 210215 | Weather: VERY COLD, SNOW ON GROUND, RAIN

Landau Representative: BXM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.04 Time: 907 Flow through cell vol. GW Meter No.(s SLOPE 8

Begin Purge: Date/Time: 2/ 15 /2021 908 End Purge: Date/Time: 2/ 15 /2021 @ 930 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**		
911	11.2	750	1.81	5.96	-29.0		5.95		
814	11.0	747	2.77	5.97	-32.3		6.24		
917	11.1	743	3.07	5.97	-38.7		6.51		
920	11.2	745	3.06	5.97	-42.0		6.66		
923	11.4	747	3.08	5.98	-45.2		6.82		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type ALEXIS PERI

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): YELLOW TINT, SOME MATERIAL FLOATING IN WATER, EFFERVESCENT, NO ODOR, NO SI

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.5	745	3.05	5.98	-47.3				
2	11.5	743	3.04	5.98	-47.7				
3	11.5	740	3.03	5.98	-47.8				
4	11.5	739	3.00	5.98	-48.3				
Average:	11.5	742	3.03	5.98	-47.8				

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

Duplicate Sample No(s):

Comments:

Signature: BXM Date: 2.15.2021

Appendix C

Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2021
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 5, 2021		

Subject: Summary Data Quality Review
February 2021 Boeing Renton Groundwater Sampling
SWMU-168
ARI Work Order Number: 21B0214

This memo presents the summary data quality review of one primary groundwater sample and one trip blank sample collected on February 15, 2021. 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 8260D with selected ion monitoring.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW230I-210215	21B0214-01	vinyl chloride
Tripblanks-210215	21B0214-02	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 February 15, 2021. 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 21B0214 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
RGW230I-210215	none
Trip Blanks	none

References

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

U.S. Environmental Protection Agency (EPA), 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:	PS20203450.2021
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 4, 2021		

Subject: Summary Data Quality Review
February 2021 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Group Number: 21B0212

This memo presents the summary data quality review of nine primary groundwater samples, one groundwater field duplicate, and one trip blank sample collected on February 15, 2021. 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 8260D with selected ion monitoring;
- Total organic carbon (TOC) by Standard Method 5310B; 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
Tripblanks-210215	21B0212-01	VOCs
RGW236S-210215	21B0212-02	all
RGW232S-210215	21B0212-03	all
RGW235I-210215	21B0212-04	all
RGW234S-210215	21B0212-05	all
RGW226S-210215	21B0212-06	all
RGW172S-210215	21B0212-07	all
RGWDUP1-210215	21B0212-08	all
RGW152S-210215	21B0212-09	all
RGW173S-210215	21B0212-10	all
RGW153S-210215	21B0212-11	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.

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 February 15, 2021. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees 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 as noted

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW152S-210215/ RGWDUP1-210215	vinyl chloride	37.8	40.9	20	NC
	cis-1,2-dichloroethene	144	116	20	21.5
	trichloroethene	20.0 U	20.0 U	20	NC
	tetrachloroethene	81.2	66.6	20	NC

Abbreviations
NC = not calculated
ng/L = nanograms per liter
RPD = relative percent difference
U = analyte was not detected above the reporting limit

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 RPD for total arsenic was within control limits. RPDs for TOC, total copper, and total lead were above control limits; primary and duplicate results for TOC, total copper, and total lead will be flagged with a "J".

Sample ID/ Field Duplicate ID	Analyte	Primary Result	Duplicate Result	Reporting Limit	RPD (%)
RGW152S-210215/ RGWDUP1-210215	TOC	9.10 mg/L	4.94 mg/L	0.50 mg/L	59
	total arsenic	7.67 µg/L	6.90 µg/L	0.400 µg/L	11
	total copper	17.2 µg/L	12.6 µg/L	1.00 µg/L	31
	total lead	12.5 µg/L	9.16 µg/L	0.200 µg/L	31

Abbreviations:
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 work order number 21B0212 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. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Reason for Qualifier	Qualified Result
Tripblanks-210215	none	NA	NA
RGW236S-210215	none	NA	NA
RGW232S-210215	none	NA	NA
RGW235I-210215	none	NA	NA
RGW234S-210215	none	NA	NA
RGW226S-210215	none	NA	NA
RGW172S-210215	none	NA	NA
RGWDUP1-210215	TOC Total copper Total lead	Field duplicate RPD	4.94 J mg/L 12.6 J µg/L 9.16 J µg/L
RGW152S-210215	TOC Total copper Total lead	Field duplicate RPD	9.10 J mg/L 17.2 J µg/L 12.5 J µg/L
RGW173S-210215	none	NA	NA
RGW153S-210215	none	NA	NA

Abbreviations
µg/L = micrograms per liter
J = the value is an estimate
mg/L = milligram per liter
NA = not applicable
RPD = relative percent difference

References

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

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA 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:	PS20203450.2021
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 4, 2021		

Subject: Summary Data Quality Review
February 2021 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Number: 21B0213 and 21B0219

This memo presents the summary data quality review of seven primary groundwater samples, one field duplicate groundwater sample, and two trip blank sample collected on February 15 and 16, 2021. 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 8260D;
- Total petroleum hydrocarbons as gasoline (TPH-G) by Ecology Method NWTPH-G; and
- Total organic carbon (TOC) by Standard Method 5310B-00.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW244S-210215	21B0213-01	all
RGW240D-210215	21B0213-02	all
RGW034S-210215	21B0213-03	all
RGW143S-210215	21B0213-04	all
RGW031S-210215	21B0213-05	all
Tripblanks-210215	21B0213-06	VOCs and TPH-G
RGWDUP2-210215	21B0213-07	all
RGW033S-210216	21B0219-01	all
RGW237S-210216	21B0219-02	all
Tripblanks-210216	21B0219-03	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 for work order 21B0213 on February 15, 2021, and the samples for work order 21B0219 on February 16, 2021. The temperatures of the coolers were recorded upon receipt and were below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for VOCs and TPH-G. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable as noted:

   Samples RGW031S-210215 and RGWDUP2-210215 each had one surrogate above control limits in the initial VOCs analysis. The samples were re-run and the same surrogate remained above control limits. It is recommended that the initial analysis results for RGW031S-210215 and RGWDUP2-210215 be used and flagged with a "J."

   One surrogate in work order 21B0219, 4-Bromofluorobenzene, was below control limits in sample RGW237S-210216. The sample was reanalyzed with all surrogates within control limits; however, the reporting limits are above cleanup levels for the VOCs. The results from the first analysis should be reported and flagged with a "J."
4. LCS/LCSD – Acceptable as noted:

   The LCSD percent recoveries were below control limits for cis-1,2-Dichloroethene, Benzene, and Trichloroethene in the second run of sample RGW237S-210216. The data from this run will not be used for reporting due to high reporting limits.
5. MS/MSD – Acceptable

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

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate

results are summarized in the table below. The relative percent differences (RPDs) for the field duplicate are within the project-specific control limit of 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. As shown in the table below, the field duplicate results are acceptable.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW031S-210215/ RGWDUP2-210215	vinyl chloride	0.20 U	0.20 U	0.20	NC
	cis-1,2-dichloroethene	0.31	0.30	0.20	NC
	benzene	18.8	18.8	0.20	0
	trichloroethene	0.20 U	0.20 U	0.20	0
	TPH-G	2,340	2,380	100	2

Abbreviations
µg/L = micrograms per liter
NC = not calculated
RPD = relative percent difference
U = analyte was not detected above the reporting limit
TPH-G = total petroleum hydrocarbons as gasoline

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

   Chlorobeneze was detected at high levels in samples RGW033S-210216 and RGW0237S-21016, which may have inflated the gasoline detections. The data is acceptable for use.

Inorganic analyses

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

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable

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

5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   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-210215/ RGWDUP2-210215	TOC	13.52	13.78	0.50	2

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

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order numbers 21B0213 and 21B0219 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents identified in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualified Result (µg/L)	Qualifier Reason
RGW244S-210215	none	none	NA
RGW240D-210215	none	none	NA
RGW034S-210215	none	none	NA
RGW143S-210215	none	none	NA
RGW031S-210215	vinyl chloride cis-1,2-Dichloroethene benzene trichloroethene	0.20 UJ 0.31 J 18.8 J 0.20 UJ	Surrogate recovery
Tripblanks-210215	none	none	NA
RGWDUP2-210215	vinyl chloride cis-1,2-Dichloroethene benzene trichloroethene	0.20 UJ 0.30 J 18.8 J 0.20 UJ	Surrogate recovery
RGW033S-210216	none	NA	NA
RGW237S-210216	vinyl chloride cis-1,2-Dichloroethene benzene trichloroethene TPH-G	0.31 J 0.20 UJ 6.79 J 0.20 UJ 100 UJ	Surrogate recovery
Tripblanks-210216	none	NA	NA

Abbreviations:
µg/L = micrograms per liter
J = the value is an estimate
NA = not applicable
UJ = the analyte was not detected at the estimated reporting limit indicated

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:	PS20203450.2021
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 15, 2021		

Subject: Summary Data Quality Review
February 2021 Boeing Renton Groundwater Sampling
Former Fuel Farm AOC Group
ARI Work Order Number: 21B0210

This memo presents the summary data quality review of three primary groundwater samples and one field duplicate collected on February 15, 2021. The samples were submitted to Analytical Resources Inc. (ARI), a Washington State Department of Ecology (Ecology)-accredited laboratory located in Tukwila, Washington. The samples were analyzed for total petroleum hydrocarbons as diesel (TPH-D), plus motor oil (TPH-O) and Jet A (TPH-Jet A) ranges by Ecology Method NWTPH-Dx.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW211S-210215	21B0210-01	all
RGW224S-210215	21B0210-02	all
RGW221S-210215	21B0210-03	all
RGWDUP3-210215	21B0210-04	all

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

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

ARI received the samples on February 15, 2021. The temperatures of the coolers were recorded upon receipt and were less than the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

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

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

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of 5 percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The 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 control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW224S-210215/ RGWDUP3-210215	TPH-D (C12–C24)	0.584	0.609	0.100	4.2
	TPH-O (C24–C38)	ND	ND	0.200	NC
	TPH-Jet A (C10–C18)	1.04	1.05	0.100	1

Abbreviations
mg/L = milligrams per liter
NC = not calculated
ND = not detected
RPD = relative percent difference
TPH-D = total petroleum hydrocarbons as diesel
TPH-Jet A = total petroleum hydrocarbons in the Jet A range
TPH-O = total petroleum hydrocarbons as motor oil

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data review. The completeness of ARI work order number 21B0210 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents listed in the

introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGW211S-210215	none
RGW224S-210215	none
RGW221S-210215	none
RGWDUP3-210215	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 Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2021
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 5, 2021		

Subject: Summary Data Quality Review
February 2021 Boeing Renton Groundwater Sampling
AOC-003
ARI Work Order Number: 21B0218

This memo presents the summary data quality review of four primary groundwater samples and one trip blank sample collected on February 16, 2021. 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

- Vinyl chloride (a volatile organic compound) by U.S. Environmental Protection Agency (EPA) Method 8260D with selected ion monitoring; and
- Total organic carbon (TOC) by Standard Method 5310B.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW248I-210216	21B0218-01	all
RGW247S-210216	21B0218-02	all
RGW188S-210216	21B0218-03	all
RGW249S-210216	21B0218-04	all
Tripblanks-210216	21B0218-05	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 February 16, 2021. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius.

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 work order number 21B0218 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
RGW248I-210216	none
RGW247S-210216	none
RGW188S-210216	none
RGW249S-210216	none
Tripblanks-210216	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:	PS20203450.2021
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 5, 2021		

Subject: Summary Data Quality Review
February 2021 Boeing Renton Groundwater Sampling
AOC-004
ARI Work Order Number: 21B0220

This memo presents the summary data quality review of one primary groundwater sample collected on February 16, 2021. The sample was submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The sample was analyzed for total lead by U.S. Environmental Protection Agency (EPA) Method 6020A.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW250S-210216	21B0220-01	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 February 16, 2021. 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 21B0220 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte
RGW250S-210216	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:	PS20203450.2021
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 5, 2021		

Subject: Summary Data Quality Review
February 2021 Boeing Renton Groundwater Sampling
AOC-060
ARI Work Order Numbers: 21B0237

This memo presents the summary data quality review of six primary groundwater samples, one field duplicate, and one trip blank sample collected on February 17, 2021. 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 8260D with selected ion monitoring; and
- Total organic carbon (TOC) by Standard Method 5310B-00.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW009S-210217	21B0237-01	all
RGW150S-210217	21B0237-02	all
RGW253I-210217	21B0237-03	all
RGW012S-210217	21B0237-04	all
RGW147S-210217	21B0237-05	all
RGW014S-210217	21B0237-06	all
RGWDUP4-210217	21B0237-07	all
Trip Blanks-210217	21B0237-08	VOCs

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

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

Samples were received by ARI on February 17, 2021. The temperatures of the coolers were recorded upon receipt and were less than the maximum acceptable temperature of 6 degrees Celsius (ºC), except for one cooler measuring 6.1ºC. Six hours elapsed between collection of the earliest sample and delivery to the laboratory. The sample results were not affected by this temperature variance and are not qualified for use.

Organic analyses

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

1. Preservation and Holding Times – Acceptable as noted:

   One of the vials from the sample Tripblanks-210217 had a bubble upon receipt, but since there were two vials for this sample, the analysis could be performed on the other vial and the results are not flagged for use.

2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. 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.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within the control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW014S-210217/ RGWDUP4-210217	vinyl chloride	207	264	20.0	24
	cis-1,2-dichloroethene	130	162	20.0	22
	trichloroethene	35.0	41.1	20.0	NC

Abbreviations
ng/L = nanograms per liter
NC = not calculated
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

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

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/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. 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-210217/ RGWDUP4-210217	TOC	2.92	2.72	0.50	7

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

7. Reporting Limits – Acceptable as noted:

   The sample RGW012S-210217 is flagged for a dilution in the TOC analysis. The sample was diluted at a factor of 10.57 due to higher levels of carbon present in the sample and the results are not flagged for use.

Overall assessment of data

A summary of the data assessment is presented in the table below. The completeness of work order number 21B0237 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
RGW009S-210217	none
RGW150S-210217	none
RGW253I-210217	none
RGW012S-210217	none
RGW147S-210217	none
RGW014S-210217	none
RGWDUP4-210217	none
Trip Blanks-210217	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:	PS20203450.2021
From:	Chelsea Foster	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	March 12, 2021		

Subject: Summary Data Quality Review
February 2021 Boeing Renton Groundwater Sampling
AOC-090
ARI Work Order Number: 21B0238

This memo summarizes the data quality review of five primary groundwater samples and a trip blank sample collected on February 17, 2021. 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 8260D;
- VOCs (vinyl chloride, 1,1-dichloroethene, trichloroethene, tetrachloroethene, and 1,1,2,2-tetrachloroethane) by EPA Method 8260D 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)
- Total organic carbon (TOC) by Standard Method (SM) 5310B.

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

Sample ID	Laboratory Sample ID	Requested Analyses
RGW208S-210217	21B0238-01	Vinyl chloride w/ SIM
RGW207S-210217	21B0238-02	Vinyl chloride w/ SIM
RGW178S-210217	21B0238-03	Vinyl chloride w/ SIM
RGW176S-210217	21B0238-04	Vinyl chloride w/ SIM
RGW189S-210217	21B0238-05	All
TripBlanks-210217	21B0238-06	VOCs and TPH

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 February 17, 2021. The temperatures of the coolers were recorded upon receipt and were less than the maximum acceptable temperature of 6 degrees Celsius (ºC), except for one cooler measuring 6.1 ºC. Three hours elapsed between collection of the earliest sample and delivery to the laboratory. The sample results were not affected by this temperature variance and are not qualified for use.

Organic analyses

Samples were analyzed for VOCs and TPH. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable except as noted:
5. MS/MSD – Acceptable except as noted:

   The percent recovery in the MS/MSD sample was out of control limits for multiple analytes in the VOC analysis, and the initial calibration exceeded the upper limit for the TPH-D analysis. The LCS/LCSD samples were within control limits for the same analytes, therefore the variation is likely due to matrix effect. The data is not qualified for use.
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

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

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. 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. 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 numbers 21B0238 is 100 percent. Evaluation of the usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data, as qualified, meet the project's data quality objectives.

A summary of the data quality review is presented in the table below.

Sample ID	Qualified Analyte	Qualified Result[1] (µg/L)	Qualifier Reason
RGW208S-210217	none	NA	NA
RGW207S-210217	none	NA	NA
RGW178S-210217	none	NA	NA
RGW176S-210217	none	NA	NA
RGW189S-210217	Acetone	10.6 J	Continuing calibration below control limits
TripBlanks-210217	none	NA	NA

Notes:
1. Data qualifiers are as follows:
J = The value is an estimate.
Abbreviations
µg/L = micrograms per liter
J = estimate is
NA = not applicable

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.

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

Appendix D

TABLE D-1: SWMU-168 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3]							
		CPOC Area							
		GW229S							
		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

Analyte	Current Cleanup Level[4]	Well ID[3]									
		CPOC Area									
		GW230I									
		11/7/2016	3/1/2017	8/14/2017	3/5/2018	8/13/2018	3/4/2019	8/12/2019	3/9/2020	8/10/2020	2/15/2021
Volatile Organic Compounds (µg/L)											
Vinyl Chloride	0.11	0.032	0.020 U	**0.20**	0.0873	**0.14**	0.0566	**0.336**	0.087	**0.162**	0.076

Analyte	Current Cleanup Level[4]	Well ID[3]							
		CPOC Area							
		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
Volatile Organic Compounds (µg/L)									
Vinyl Chloride	0.11	0.020 U	0.020 U	0.020 U	0.0393	0.0326	0.0327	0.026	0.020 U

Notes:

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; 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-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							
		3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.678**	**0.655**	**0.627**	**0.530**	**0.892**	**0.719**	**1.66**	**0.144**	**0.107**	**0.108**	**0.278**	**0.204**	**0.0736**	**0.0789**	**0.0551**	**0.077**
Tetrachloroethene	0.02	**0.086**	**0.0594**	**0.176**	**0.384**	**1.12**	**2.38**	**0.319**	**0.081**	0.020 U	0.020 U	**0.0544**	**0.164**	**0.024**	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	**0.152**	**0.157**	**0.203**	**0.145**	**0.278**	**0.412**	**0.579**	0.020 U	0.020 U	**0.0212**	**0.0326**	**0.131**	0.02 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.11	**0.128**	**0.173**	0.0705	0.0366	**0.15**	0.0463	**0.284**	0.0378	**0.333**	**0.242**	**0.153**	0.0859	**0.249**	**0.266**	**0.135**	**0.220**
Total Metals (µg/L)																	
Arsenic	1.0	**7.54**	**4.49**	**23.4**	**7.48**	**3.84**	**1.95**	**6.72**	**7.67**	**4.49**	**5.97**	**4.72**	**11.9**	**5.48**	**3.85**	**4.05**	**32.8**
Copper	3.5	**5.12**	2.35	**21.8**	**16.6**	**8.03**	**2.76**	**7.45 J**	**17.2 J**	2.00	1.25	1.58	**10.2**	3.09	1.73	1.68	**33.9**
Lead	1.0	**3.33**	**1.26**	**14.8**	**12.1**	**6.13**	**1.09**	**3.89**	**12.5 J**	0.352	0.198	0.351	**2.76**	0.712	0.372	0.326	**5.80**

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Downgradient Plume Area															
		GW172S								GW173S							
		3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.111**	**0.0581**	0.027	**0.0561**	**0.305**	**0.214**	**0.0561**	**0.108**	**0.0756**	**0.037**	0.022	**0.0378**	**0.0504**	**0.0488**	**0.0313**	**0.0505**
Tetrachloroethene	0.02	0.020 U	0.020 U	**0.0451**	**0.0287**	**0.976**	**0.0625**	**0.0603**	**0.0624**	**0.0842**	**0.0416**	**0.0561**	**0.0246**	**0.0224**	0.020 U	0.020 U	0.020 U
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	**0.384**	**0.028**	0.020 U	0.020 U	**0.149**	**0.0742**	**0.0256**	**0.0379**	**0.0305**	**0.0215**	**0.0239**	0.020 U
Vinyl Chloride	0.11	**0.167**	0.0808	0.0376	0.0905	**0.209**	**0.369**	0.0628	**0.219**	0.0312	0.0486	0.0613	0.072	0.144	0.126	0.0455	**0.183**
Total Metals (µg/L)																	
Arsenic	1.0	**6.52**	**7.71**	**10.6**	**20.5**	**32.8**	**7.03**	**10.8**	**10.8**	**6.72**	**7.38**	**12.2**	**15.6**	**11.8**	**6.72**	**7.00**	**9.94**
Copper	3.5	2.07	2.13	**3.86**	**9.25**	**27.6**	**2.2**	**6.12**	**3.89**	**4.38**	1.11	1.39	**4.68**	1.51	0.875	3.19	3.11
Lead	1.0	0.774	0.991	**1.02**	**7.44**	**15.1**	**1.07**	**2.58**	**1.98**	0.712	0.251	0.290	**1.36**	0.442	0.215	0.470	0.850

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Downgradient Plume Area								CPOC Area							
		GW226S								GW232S							
		3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.0387**	0.0223	0.0259	0.0235	**0.0396**	**0.0305**	0.0218	0.020 U	**0.250**	**0.319**	**0.378**	**0.659**	**0.221**	**0.352**	**0.482**	**0.219**
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.0279**	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	0.020 U	0.020 U	**0.0331**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.11	0.0432	0.0459	0.029	0.0615	0.038	0.0594	0.0415	0.0519	**0.242**	**0.348**	**0.412**	**0.860**	**0.264**	**0.337**	**0.425**	**0.263**
Total Metals (µg/L)																	
Arsenic	1.0	**5.07**	**2.97**	**2.85**	**12.0**	**4.88**	**3.33**	**4.93**	**8.12**	**5.12**	**3.96**	**6.29**	**8.09**	**2.73**	**4.71**	**3.83**	**4.78**
Copper	3.5	**4.55**	0.500 U	0.626	**15.6**	**5.00**	0.704	1.48	**3.92**	1.70	1.15	0.878	**3.85**	2.22	0.539	0.627	2.09
Lead	1.0	0.413	0.100 U	0.100 U	**2.43**	0.500	0.190	0.136	0.513	0.167	0.167	0.102	0.378	0.354	0.100 U	0.100 U	0.318

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															
		GW234S								GW235I							
		3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.0869**	**0.0630**	**0.0738**	**0.0850**	**0.0984**	**0.092**	**0.0914**	0.020 U	**0.135**	**0.109**	**0.0638**	**0.109**	**0.127**	**0.156**	**0.104**	**0.128**
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	**0.0292**
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	**0.0297**	0.020 U	0.020 U	0.020 U	**0.0353**	**0.0342**	0.020 U	**0.0287**	**0.0336**	**0.031**	**0.0227**	0.020 U
Vinyl Chloride	0.11	0.0273	0.0235	0.0252	0.0309	0.0302	0.032	0.0279	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
Total Metals (µg/L)																	
Arsenic	1.0	**2.11**	**2.22**	**1.31**	**10.1**	**27.4**	**5.31**	**3.26**	**6.29**	0.200 U	0.403	0.292	0.237	0.251	0.289	0.288	0.200 U
Copper	3.5	1.75	1.93	0.869	**33.2**	**32.9**	2.43	3.21	**11.4**	0.500 U	1.58	0.714	0.573	0.935	1.08	1.30	0.727
Lead	1.0	0.701	0.843	0.280	**15.5**	**11.8**	0.671	**1.25**	**4.13**	0.322	0.405	0.182	0.127	0.235	0.223	0.304	0.174

Analyte	Current Cleanup Level[4]	Well ID[3]							
		CPOC Area							
		GW236S							
		3/4/2019	5/6/2019	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021
Volatile Organic Compounds (µg/L)									
cis-1,2-Dichloroethene	0.03	**0.0443**	0.0281	**0.0468**	**0.108**	0.0241	**0.036**	**0.0881**	0.020 U
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	**0.0206**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vinyl Chloride	0.11	0.020 U	0.020 U	0.020 U	0.0437	0.020 U	0.020 U	0.020 U	0.020 U
Total Metals (µg/L)									
Arsenic	1.0	**2.81**	**2.10**	**3.70**	**36.5**	**6.29**	**2.10**	**10.1**	**2.89**
Copper	3.5	0.919	2.17	0.893	**66.9**	**21.2**	**4.24**	**10.8**	**9.70**
Lead	1.0	**1.94**	**1.90**	**1.53**	**117**	**18.7**	**2.61**	**10.8**	**6.31**

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							
		3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/16/2021
Volatile Organic Compounds (µg/L)																	
Benzene	0.80	**55.9**	**7.13**	**3.47**	**4.77**	**37.1**	**17.6**	**1.72 J**	**18.8 J**	**11.7**	**12.5**	**10.4**	**11.5**	**10.2**	**9.75**	**12.5**	**11.0**
cis-1,2-Dichloroethene	0.70	0.20 U	0.43	0.47	0.40	0.61	0.40 J	0.67 J	0.31 J	**0.79**	0.41	**0.78**	**2.78**	**21.4**	**39.5**	**188**	**1.64**
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.25**	0.20 U
Vinyl Chloride	0.20	0.20 U	**0.29**	**0.21**	**0.25**	0.20 U	0.20 U	**0.32 J**	0.20 UJ	**3.26**	**0.53**	**1.16**	**13.0**	**52.2**	**87.3**	**310**	**5.31**
Total Petroleum Hydrocarbons (µg/L)																	
TPH-G (C7-C12)	800	**4200**	**1020**	**1390**	**1540**	**2,980**	**1,880**	**1,160**	**2,340**	395	297	277	347	296	301	255	323

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Source Area															
		GW034S								GW244S							
		3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021
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	**1.73**	**1.47**	**1.77**	**0.87**	0.52	0.46	0.43	0.46
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	0.82	**2.03**	0.37	0.20 U	0.68	**1.06**	**1.12**	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	0.22	0.20 U	0.20 U	0.20 U	0.23	0.20 U	0.20 U	**0.29**
Vinyl Chloride	0.20	0.20	0.20 U	**0.39**	**0.39**	0.20 U	**0.21**	**0.41**	**0.25**	**0.86**	**1.45**	**0.71**	**0.35**	**0.7**	**0.85**	**0.98**	**0.64**
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

Analyte	Current Cleanup Level[4]	Well ID[3]																		
		CPOC Area																		
		GW143S											GW237S							
		5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/15/2021	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/16/2021
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	**9.58**	**2.20**	0.43	0.66	**3.48**	**1.03**	0.24	**6.79 J**
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	**1.17**	0.26	0.21	0.20 U	0.25	0.22	**1.00 U**	0.20 U	0.20 U	0.20 UJ
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	0.23	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 UJ
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	**0.25**	0.20 U	**0.38**	**0.34**	**1.00 U**	0.20 U	0.20 U	**0.31 J**
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	**1,680**	100 U	329	100 U	**961**	729	100 U	100 UJ

Analyte	Current Cleanup Level[4]	Well ID[3]										
		CPOC Area										
		GW240D										
		5/7/2018	8/14/2018	11/13/2018	3/5/2019	5/7/2019	8/13/2019	11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/15/2021
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
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
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
Vinyl Chloride	0.20	**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
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

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   UJ = The result is estimated and was not detected at the reporting limit indicated.
   J = The value is an estimate.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; D = deep well.
4. 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]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[3]	Well ID[2]															
		CPOC Area															
		GW211S								GW221S							
		11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/11/2020	8/10/2020	2/15/2021	11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/11/2020	8/10/2020	2/15/2021
Total Petroleum Hydrocarbons (mg/L)																	
TPH-D (C12-C24)	0.5	**0.903**	0.272	0.341	0.124	0.120	0.282	0.192	0.284	**3.63**	**0.746**	**1.50**	**0.630**	**1.65**	**1.58**	**7.67**	**1.22**
Jet A	0.5	0.245	0.214	0.191	0.117	0.117	0.267	0.155	0.262	**2.12**	**0.635**	**0.863**	**0.397**	**1.09**	**1.09**	**5.70**	**0.89**

Analyte	Current Cleanup Level[3]	Well ID[2]							
		CPOC Area							
		GW224S							
		11/14/2017	5/7/2018	11/12/2018	5/7/2019	11/11/2019	5/11/2020	8/10/2020	2/15/2021
Total Petroleum Hydrocarbons (mg/L)									
TPH-D (C12-C24)	0.5	**1.84**	**0.560**	**1.56**	**0.256**	**1.46**	**0.675**	**1.08**	**0.584**
Jet A	0.5	**1.97**	**0.933**	**1.64**	**0.388**	**1.80**	**0.918 J**	**1.42**	**1.04**

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
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								
		3/7/2018	5/8/2018	8/15/2018	11/13/2018	3/5/2019	8/14/2019	3/12/2020	8/10/2020	2/16/2021	3/7/2018	5/8/2018	8/15/2018	11/13/2018	3/5/2019	8/14/2019	3/12/2020	8/10/2020	2/16/2021
Volatile Organic Compounds (µg/L)																			
cis-1,2-Dichloroethene	0.78	0.102	0.0757	0.0524	0.0829	0.079	0.0526	0.0604	NA	NA	0.0606	0.0531	0.0386	0.0636	0.0493	0.0361	0.0362	NA	NA
Tetrachloroethene	0.02	0.0496	0.020 U	0.020 U	0.020 U	0.0105	0.020 U	0.020 U	NA	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.0107	0.020 U	0.0244	NA	NA
Trichloroethene	0.16	0.0475	0.0211	0.020 U	0.020 U	0.0157	0.020 U	0.020 U	NA	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.0125	0.020 U	0.020 U	NA	NA
Vinyl Chloride	0.24	0.114	**0.428**	**0.413**	**0.629**	**0.424**	**0.367**	**0.334**	**0.261**	**0.366**	**0.443**	**0.505**	**0.404**	**0.813**	**0.537**	**0.545**	**0.235**	**0.288**	**0.107**

Analyte	Current Cleanup Level[4]	Well ID [3]															
		CPOC Area															
		GW247S								GW248I							
		3/5/2019	5/8/2019	8/14/2019	11/12/2019	3/12/2020	5/13/2020	8/10/2020	2/16/2021	3/5/2019	5/8/2019	8/14/2019	11/12/2019	3/12/2020	5/13/2020	8/10/2020	2/16/2021
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.78	0.0728	0.0584	0.065	0.0635	0.039	0.584	NA	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.02 U	0.020 U	NA	NA
Tetrachloroethene	0.02	0.126	0.020 U	0.020 U	0.020 U	0.02 U	0.020 U	NA	NA	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NA	NA
Trichloroethene	0.16	0.018	0.020 U	0.020 U	0.148	0.02 U	0.020 U	NA	NA	0.020 U	0.020 U	0.020 U	0.0514	0.020 U	0.020 U	NA	NA
Vinyl Chloride	0.24	**0.392**	**0.497**	**0.613**	**0.504**	**0.305**	**0.409**	**0.392**	**0.405**	**0.707**	**0.551**	**0.541**	**0.62**	**0.499**	**0.546**	**0.383**	**0.426**

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
NA = not analyzed
SWMU = solid waste management unit

TABLE D-6: AOC-004 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[3]	Well ID[2]									
		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	8/12/2020	2/16/2021
Metals (mg/L)											
Lead	0.001	**0.0020**	**0.0030**	0.00026	0.000941	**0.00107**	**0.00154**	0.000714	**0.00119**	**0.000611**	**0.000564**

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

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	8/11/2020	2/17/2021
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**	**0.124**	**0.139**
Trichloroethene	0.02	**0.032**	**0.022**	**0.033**	**0.0252**	**0.0238**	**0.0239**	0.020 U	**0.0242**	**0.0324**	**0.0294**
Vinyl Chloride	0.26	**0.40**	0.26	**0.39**	0.241 J	**0.318**	**0.285**	**0.300**	0.183	0.219	**0.300**

Analyte	Current Cleanup Levels[4]	Well ID[3]																												
		Downgradient Plume Area																												
		GW012S									GW014S									GW147S									
		3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021
Volatile Organic Compounds (µg/L)																														
cis -1,2-Dichloroethene	0.08	**1.6**	**0.95**	**0.609**	**1.29**	**1.23**	**0.798**	**0.482**	**0.508**	**1.260**	**0.13**	**0.18**	**0.134**	**0.122**	**0.119**	**0.143**	**0.151**	**0.0932**	**0.130**	**0.16**	**3.0**	**0.211**	**4.63**	**0.955**	**4.11**	**0.287**	**0.931**	**0.180**
Trichloroethene	0.02	**0.11**	**0.098**	**0.0568**	**0.656**	**0.0546**	**0.0471**	**0.0505**	**0.0518**	**0.0454**	**0.043**	**0.039**	**0.0347**	**0.0273**	**0.0254**	0.020 U	**0.0419**	0.020 U	**0.035**	**1.5**	**2.6**	**1.91**	**4.23**	**0.475**	**1.46**	**1.20**	**3.37**	**0.498**
Vinyl Chloride	0.26	**2.0**	**1.4**	**0.586**	**0.605**	**1.35**	**0.893**	**0.603**	**0.387**	0.180	**0.30**	**0.31**	**0.266**	0.232 J	0.214	**0.365**	0.195	0.190	0.207	0.020 U	0.21	0.020 U	**1.07 J**	0.0514	0.215	0.020 U	0.0643	0.020 U

Analyte	Current Cleanup Levels[4]	Well ID[3]																		
		CPOC Area																		
		GW150S									GW253I									
		3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	3/6/2017	8/16/2017	3/6/2018	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021
Volatile Organic Compounds (µg/L)																				
cis -1,2-Dichloroethene	0.08	0.055	**0.091**	0.0388	0.0506	0.0737	**0.0824**	0.0525	**0.0935**	0.0393	**0.10**	**0.11**	**0.0991**	0.0796	**0.127**	**0.0917**	**0.0915**	**0.0879**	**0.140**
Trichloroethene	0.02	0.020 U	**0.026**	0.020 U	**0.0305**	0.020 U	**0.0228**	0.02 U	**0.0291**	0.020 U	**0.024**	**0.029**	0.020 U	**0.0204**	**0.0221**	0.020 U	**0.0212**	**0.0211**	**0.0272**
Vinyl Chloride	0.26	0.092	0.096	0.0596	0.0203	0.103	0.020 U	0.0541	0.0619	0.0455	0.13	0.14	0.132	0.113	0.143	0.131	0.184	0.100	0.243

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-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]								GW176S							
		8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021
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	0.020 U	0.020 U	NM	NM
1,1,2-Trichloroethane	0.2	0.20 U	0.20 U	**2.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0529	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM
Acetone	300	5.0 U	5.00 U	70	5.00 U	5.0 U	5.0 U	5.00 U	10.6 J	5.38	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U	NM	NM
Benzene	0.8	**1.69**	0.55	**2.42**	0.20	0.49	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
Carbon Tetrachloride	0.23	0.20 U	0.20 U	**2.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
Chloroform	2	0.20 U	0.20 U	**2.23**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
cis-1,2-Dichloroethene	2.4	2.23	1.74	**22.3**	0.92	**6.87**	0.20 U	1.93	0.47	0.34	0.26	0.27	0.25	0.27	0.25	NM	NM
Methylene Chloride	2	1.0 U	1.00 U	**10.9 UJ**	1.00 U	1.0 U	1.0 U	1.00 U	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U	NM	NM
Tetrachloroethene	0.05	0.020 U	0.020 U	**0.20 U**	0.028	0.020 U	0.0263	0.020 U	0.0283	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM
Toluene	75	2.84	6.34	21.7	4.96	3.11	0.20 U	1.05	5.21	0.20 U	0.42	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
trans-1,2-Dichloroethene	53.9	0.40	0.48	2.00 U	0.20 U	0.39	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
Trichloroethene	0.08	**0.279**	**0.224**	**2.38**	**0.156**	**0.414**	0.0745	**0.324**	**0.143**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM
Vinyl Chloride	0.13	**1.00**	**0.508 J**	**2.09 J**	**0.50**	**1.20**	0.020 U	**0.369**	0.0405	**0.286**	**0.208**	**0.230**	**0.294**	**0.301**	**0.207**	**0.232**	**0.138**
Total Petroleum Hydrocarbons (µg/L)																	
TPH-G (C7-C12)	800	**2,010**	**1,860**	**9,440**	**1,070**	**943**	189	699	507	100 U	100 U	100 U	100 U	100 U	100 U	NM	NM
TPH-D (C12-C24)	500	**689**	200	**4,120**	362	432	100 U	150	**2160**	100 U	100 U	100 U	100 UJ	100 U	100 U	NM	NM
TPH-O (C24-C40)	500	**949**	298	**2,000 U**	**522**	**853**	200 U	379	**3990**	200 U	200 U	200 U	200 UJ	200 U	200 U	NM	NM

Analyte	Current Cleanup Levels[4]	Well ID[3]																							
		Shallow Zone CPOC Area																							
		GW178S								GW207S								GW208S							
		8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/15/2017	3/5/2018	8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021
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	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	0.020 U	0.020 U	0.023	0.020 U	0.020 U	0.020 U	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM
Acetone	300	5.0 U	5.00 U	5.00 U	5.54	5.0 U	5.0 U	NM	NM	5.0 U	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U	NM	NM	5.0 U	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U	NM	NM
Benzene	0.8	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
Carbon Tetrachloride	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
Chloroform	2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
cis-1,2-Dichloroethene	2.4	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.29	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.23	0.20	0.20 U	0.21	0.20 U	0.20 U	NM	NM
Methylene Chloride	2	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	NM	NM	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	NM	NM	1.0 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U	NM	NM
Tetrachloroethene	0.05	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM
Toluene	75	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
trans-1,2-Dichloroethene	53.9	0.26	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM
Trichloroethene	0.08	0.0277	0.0214	0.0213	0.0213	0.020 U	0.021	NM	NM	0.0412	0.020 U	0.0388	0.020 U	0.0305	0.020 U	NM	NM	0.0281	0.020 U	0.0234	0.020 U	0.0293	0.020 U	NM	NM
Vinyl Chloride	0.13	**0.191**	**0.409**	**0.378**	**0.392**	**0.3840**	**0.1840**	**0.141**	**0.224**	**0.2380**	0.0300	**0.311 J**	0.0692	0.020 U	0.020 U	**0.377**	0.066	**0.330**	**0.388**	0.097	**0.437**	**0.245**	**0.419**	**0.343**	**0.349**
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	NM	NM	100 U	100 U	100 U	100 U	100 U	100 U	NM	NM	100 U	100 U	100 U	100 U	100 U	100 U	NM	NM
TPH-D (C12-C24)	500	100 U	100 U	100 U	100 UJ	100 U	100 U	NM	NM	100 U	100 U	100 U	100 UJ	100 U	100 U	NM	NM	100 U	100 U	100 U	100 UJ	100 U	100 U	NM	NM
TPH-O (C24-C40)	500	200 U	200 U	200 U	200 UJ	200 U	200 U	NM	NM	200 U	200 U	200 U	200 UJ	200 U	200 U	NM	NM	200 U	200 U	200 U	200 UJ	200 U	200 U	NM	NM

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.
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
NM = Analyte not measured
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 D-9: APRON A HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]

Boeing Renton Facility, Renton, Washington

Analyte	Well ID[2]							
	GW264S							
	11/14/2017	5/7/2018	11/13/2018	5/7/2019	11/11/2019	5/12/2020	8/10/2020	2/15/2021
Volatile Organic Compounds (µg/L)								
cis-1,2-Dichloroethene	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.52	0.20 U
Vinyl Chloride	0.97	1.63	0.55	1.39	0.38	1.48	0.20 U	1.49

Notes:

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

Abbreviations:

µg/L = micrograms per liter

Appendix E

APPENDIX E

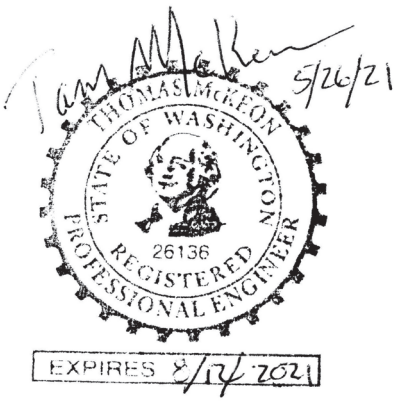
Summary of Remedial Actions at the Boeing Renton Facility October 2020 – April 2021

Boeing Renton Site
Renton, Washington

Prepared for:
The Boeing Company
EHS Remediation

Prepared by:
CALIBRE Systems, Inc.
Project No. T0014323

May 15, 2021



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Acronyms

AOC	Area of Concern
Building 4-78/79	Building 4-78/4-79 SWMU/AOC Group
CALIBRE	CALIBRE Systems, Inc.
CMP	Compliance Monitoring Plan
EDR	Engineering Design Report
ERD	Enhanced Reductive Dechlorination
GAC	granular activated carbon
mg/L	milligrams per liter
PCE	Tetrachloroethene
PID	Photoionization detector
SVE	Soil Vapor Extraction
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
Tech Memo	Technical Memorandum
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 between October 1, 2020 and April 30, 2021. 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 areas of concern (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 location of SWMU-172/174 within the Facility is shown on Figure 1-1. The locations of the other AOCs and SWMUs where groundwater treatment is ongoing are also presented 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 during the reporting period stated above. 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
Attachment B – Laboratory Data Packages

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 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 October 2020 to April 2021.

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 granular activated carbon (GAC) vessels, each filled with 1,800 pounds of 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. 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 stream and permanganate treatment is not required or providing any benefit. 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 and may be discontinued in the future.

The SWMU-172/174 SVE system operated without issue during this monitoring period. The SVE system was turned off momentarily between December 21, 2020 to January 5, 2021 for Boeing's holiday break and then on February 10 to 18, 2021 due to freezing temperatures and low land snow forecasted for the area. Both shut down periods were implemented in response to potential limited access to the site for monitoring. Routine maintenance including oil changes, drive-belt tensioning and inspection, inspection of the air filter, and inspection of the moisture separator was completed per the Operations Manual (CALIBRE, 2014). System monitoring includes regular monitoring of total organic vapor concentrations with a calibrated PID.

2.1.1 TO-15 Laboratory Analysis of Vapor Samples

A total of three samples for TO-15 analysis were collected during this operating period. The samples were collected following system restart after the Boeing Christmas break in order to monitor any rebound in VOC concentrations. Samples were collected at approximately 30 minutes, 2 hours and 2 days after restart. The 30 minute sample results (5-09-Influent-A) showed tetrachloroethene (PCE) represented approximately 85% of the total VOCs for the SWMU-172/174 SVE system influent, similar in distribution to prior monitoring events. The 2 hour sample (5-09-Influent-B) showed a significant reduction in PCE and total VOCs from the prior 30 minute sample. PCE dropped from 83 ppbv to 1.6 ppbv and total VOCs dropped from 98 ppbv to 5.2 ppbv in these first two samples. This magnitude of a concentration reduction in the 1 ½-hour time between samples is suspect and could potentially have been caused by a leak in the vacuum sampling lines or fittings. Sampling line connection points between the summa can, Teflon tubing, and sample port will be double checked for tightness for future TO-15 sampling events. The 2-day sample (5-09-Influent-C) showed PCE and other chlorinated VOCs slightly reduced from the 30 minute sample. In addition, there were a number of fuel related compounds detected in this third sample which have not historically been detected at the site. The laboratory case narrative stated the hydrocarbon profile present in this sample did not resemble that of commercial gasoline and the results were calculated using the response factor derived from gasoline calibration. It is unclear if the sample was contaminated at some point during collection however additional samples for TO-15 analysis will be collected during the next reporting period to monitor for these VOCs at the site. Table 2-1 summarizes the TO-15 detections for the SWMU-172/174 SVE system for 18 TO-15 sampling events[1] that have been implemented since system startup. The samples were analyzed by EuroFins Air Toxics and the laboratory report is included in Attachment B.

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 detectable PCE levels in soil. During subsequent reporting periods, 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 or using SVE-1 as an inlet vent well with continued extraction through SVE-2 and SVE-3. Vapor concentrations, measured with a PID, are monitored following these adjustments and additional modifications to alter the flushing pattern are made when vapor concentrations reduce to previous low-level detections.

During this reporting period, October 2020 to April 2021, the system operated with SVE-1 as an air inlet well with extraction at SVE-2 and SVE-3 for a majority of the time. SVE-1 was operated briefly in December 2020 and January 2021 however no significant vapor concentrations were observed with the PID and therefore the system was adjusted to continue to operate through SVE-2 and SVE-3. PID vapor concentrations remained low and relatively unchanged at the operating wells and system influent during this operating period. Operational changes may be completed in the following reporting period in the

[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.

event these concentrations remain at asymptotic levels. Table 2-2 shows the PID readings for the wells in the SWMU-172/174 SVE system and Table 2-3 shows an operational summary for the system. The operational logs are included in Attachment A.

2.1.3 Mass Removal Estimate

Between April 17, 2015 and May 4, 2021 the SWMU-172/174 SVE system has recovered an estimated 22.2 pounds of VOCs (primarily PCE), as shown in Table 2-3. Approximately 1.2 pounds of VOCs were removed during the current reporting period (October to April 2021) based on the PID measurements collected while the system was operating. The PID results from February 25, 2021 were unusually high at that time and, if used, would overestimate VOC mass removal. Therefore, the prior week's PID measurements were used to estimate mass removal. It is likely the PID was picking up other vapors from the paint shop in the 5-09 building; the area around the 5-09 building can at times have a noticeable paint odor. If paint odors are apparent in the area in the future then field screening at the system will be delayed. 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

Vapor concentrations measured with PID in October 2020 to April 2021 show SVE-2, SVE-3, and the system influent have remained at reduced levels similar to prior low-level concentrations. TO-15 results from January 2021 show PCE and the total CVOCs are reduced at the system influent compared to September 2020. If the PID measurements remain at asymptotic levels, the system will be modified to alternate flows between wells as has been done in the past (i.e. SVE-3 is extracting and will be changed to an inlet vent and vice versa for SVE-1). Summa can samples for TO-15 analysis will be planned for the next reporting period to monitor changes in vapor concentrations, if observed.

Additional modifications to the operation of this system should be considered to continue increased mass removal in the area between SVE-2 and SVE-3. These modifications may include opening SVE-1 and SVE-3 as an inlet vent or SVE-1 and SVE-2 as an inlet vent, to focus vapor removal in that area. It may also be beneficial to operate the SVE system in a pulsed mode in order to allow vapor concentrations to rebound followed by running the system for a period of time.

3.0 Ongoing Groundwater Treatment

Groundwater treatment is being implemented at several AOCs/SWMUs at the Renton Facility. The primary remedy being implemented is ERD of chlorinated solvents in targeted areas and continued treatment is evaluated on a semi-annual basis following review of groundwater sampling results (see Table 3-4). The ERD treatment involves substrate injection using sucrose/fructose as a carbon source to stimulate biological degradation of the chlorinated solvents. Substrate injections were completed at selected wells in January 2021 at Building 4-78/79 including wells B78-12, B78-14, B78-15, B78-16 and one down gradient monitoring well (GW-033s) was bio-augmented with microbes. The substrate used was a food-grade sucrose/fructose

mixed into eight 250-gallon totes to a target concentration of approximately 7 – 9 Brix[2] (°Bx). All substrate was filtered, mixed with a mono potassium phosphate (MKP) buffer/ pH adjustment and mixed with water prior to injection. Each well received approximately 250 gallons of chase water following substrate injections to promote transport of the substrate into the aquifer and to help prevent bio-fouling of the injection well screen. The list of wells by area including substrate volume and mass are summarized in Table 3-1.

Following substrate and chase water injections at these wells, GW-033s was bio-augmented with a TSI-DC®, a microbial culture containing species of Dehalococcoides. For the bio-augmentation process, tap water was mixed with sodium ascorbate following the manufacturer's recommendations to quench residual oxygen and chlorine in the water. Six liters (L) of TSI-DC® culture were added to the well based on a target abundance of 3 x 10^6 organisms/liter (in-situ after mixing in the aquifer).

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; the most recent injection was completed in January 2021 (ninth event) with a target concentration of 1,600 mg/L for nitrate and 800 mg/L for sulfate per well (similar to what was injected in August 2020) to provide additional nitrate and sulfate to the impacted area, see Table 3-2. Each well received approximately 100 gallons of chase water following injections to help prevent bio-fouling of the injection well screen. Performance monitoring was completed at the injection and monitoring wells at this area in April 2021 and those results are summarized in Table 3-3. The results show benzene is below baseline concentrations in seven of the nine wells monitored in this area with reductions ranging from 36% to 99%.

Site-wide groundwater sampling was conducted as part of the biannual monitoring program during this reporting period and the results are discussed in the main text of the summary report. Table 3-4 presents a summary of those groundwater monitoring results, by area, related to groundwater treatment/ERD implementation.

4.0 Conclusions and Recommendations

Asymptotic low levels of vapor concentrations were observed at the SWMU 172/174 operating SVE wells and system influent during the October 2020 to April 2021 operating period. Samples for TO-15 analysis collected in January 2021 show total CVOCs have reduced below the May 2020 rebound samples and September 2020 samples at the system influent. 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, will be evaluated if the system continues to show asymptotic low level vapor concentrations at the current operating extraction wells. If the additional modifications to altering flow patterns at extraction wells do not show elevated and sustained VOC mass

[2] °Bx (degrees Brix) One degree Brix is 1 gram of sucrose in 100 grams of solution and represents the strength of the solution as percentage by mass as measured with a field instrument (a Brix meter).

removal the SVE system may be operated in a pulsed mode in order to allow vapor concentrations to rebound followed by running the system for a period of time.

Groundwater monitoring will continue in accordance with the EDR and approved updates to the Compliance Monitoring Plan (CMP), with supplemental VOC and TOC sampling at selected wells.

Substrate injections for ERD treatment were completed at Building 4-78/79 in this reporting period. In addition, a ninth round of nitrate/sulfate injections for benzene treatment at the Building 4-78/79 area was completed at the end of January 2021 with collection of performance monitoring data in April 2021. A limited source area excavation at the Building 4-78/79 benzene treatment area is planned for Fall 2021, dependent on water table elevations (CALIBRE, 2019). Limited source area removal is planned for Fall 2021 and decisions about future injections will include review of post excavation groundwater sampling results Additional substrate and/or nitrate/sulfate injections will be considered following the review of the monitoring results from site-wide sampling and post excavation sampling.

5.0 References

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USACE 2002. Engineering and Design - Soil Vapor Extraction and Bioventing. Prepared by US Army Corps of Engineers. EM 1110-1-4001. June 2002.

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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	2-Butanone (Methyl Ethyl Ketone)	Benzene	Ethyl Benzene	Propylbenzene	Cumene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	TPH ref. to Gasoline (MW=100)	Total Chlorinated	Total VOCs
4/17/2015	1,500	130	120	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	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	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	ND	ND	ND	ND	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	ND	ND	ND	ND	ND	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	ND	ND	ND	ND	ND	ND	ND	ND	256	257
12/14/2016	100	6.2	3.8	ND	ND	ND	ND	ND	ND	ND	ND	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	ND	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	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	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	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	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	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	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	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	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	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	ND	ND	ND	ND	ND	ND	ND	ND	84	84
5/19/20 - Rebound Start	150	17	5.7	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	177	177
5/21/20 - Rebound 48 Hrs	120	230	5	ND	ND	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	358	358
9/23/2020	110	11	3.7	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	127	127
1/5/2021 (5-09-Influent A)	83	9.8	3.4	ND	ND	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	98	98
1/5/2021 (5-09-Influent B)	1.6	1.5	2.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.2	5.2
1/7/2021 ((5-09-Influent C)	75	6.0	2.3	ND	ND	1.8	ND	92	73	23	ND	8.7	ND	22	14	47	12	4.9	2.4	4.5	18	2200	85	2,607

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	2-Butanone (Methyl Ethyl Ketone)	Benzene	Ethyl Benzene	Propylbenzene	Cumene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	TPH ref. to Gasoline (MW=100)	Total Chlorinated	Total VOCs
6/20/2019	10	1.4	ND	ND	ND	ND	ND	ND	ND	ND	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	2-Butanone (Methyl Ethyl Ketone)	Benzene	Ethyl Benzene	Propylbenzene	Cumene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	TPH ref. to Gasoline (MW=100)	Total Chlorinated	Total VOCs
8/30/2018	180	14	6.1	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	200	200
2/13/2019	48	3.3	2.8	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	54	54
6/20/2019	100	9.6	5.1	ND	ND	1.4	ND	ND	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	116	118
5/19/20 - Rebound Start	28	3.8	1.4	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	35	35
5/21/20 - Rebound 48 Hrs	20	3.4	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	26	26
9/23/2020	42	6.7	5.6	ND	ND	ND	ND	ND	ND	ND	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	54	56

Table 2-1 TO-15 Analytical Results - SWMU-172/174 SVE System Project History

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	2-Butanone (Methyl Ethyl Ketone)	Benzene	Ethyl Benzene	Propylbenzene	Cumene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	TPH ref. to Gasoline (MW=100)	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	ND	ND	ND	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	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	ND	ND	ND	ND	ND	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	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	ND	ND	ND	ND	ND	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	ND	ND	ND	ND	ND	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	ND	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	ND	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	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	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	ND	ND	ND	ND	ND	ND	ND	ND	348	348
5/19/20 - Rebound Start	350	49	14	ND	ND	10	2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	425	425
5/21/20 - Rebound 48 Hrs	290	240	9.8	ND	ND	5.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	546	546
9/23/2020	410	37	11	ND	ND	6.0	ND	ND	3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	464	468

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	2-Butanone (Methyl Ethyl Ketone)	Benzene	Ethyl Benzene	Propylbenzene	Cumene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	TPH ref. to Gasoline (MW=100)	Total Chlorinated	Total VOCs
4/17/2015	5.1	ND	ND	ND	ND	ND	ND	ND	ND	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	ND	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	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	ND	ND	ND	ND	ND	ND	ND	ND	25
9/12/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12/14/2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8/16/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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 January 2021

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
10/16/2020	1,779	Vent	0	392	58			
10/27/2020	1,790	Vent	98	308	177		0	Changed blower oil, replaced oil drain plug
11/16/2020	1,810	Vent	4	384	191			
11/19/2020	1,813	Vent						
11/24/2020	1,818	Vent	73	273	206		0	
12/2/2020	1,826	Vent	83	240	185		0	Replaced air filter
12/9/2020	1,833	Vent	31	213	204			
12/14/2020	1,838	Vent	29	184	199		0	Took readings then noticed SVE-1 pipe appears to have been backed into by vehicle, plan to close SVE-3 and open SVE-1 to alternate flows as SVE-1 has been off for some time. Repair SVE-1, close SVE-3 and open SVE-1 after repair. Influent up at 1,809 ppb but likely due to PVC primer/glue from repair. Will check next week.
12/21/2020	1,845	58	93	Off	77		0	Turned system off for Boeing Xmas break
1/5/2021	1,860	94	102	Off	108			Restart system, take initial readings then at 0910 close SVE-1 and open SVE-3. Take PID readings at ~ 30 min after change and 2 hours after change collect TO-15 samples from influent.
1/5/2021	1,860	Off		303	267			0920 readings
1/5/2021	1,860	Off			309			0935 readings - Sample Influent 5-09-Influent-A
1/5/2021	1,860	Off	120	332	335			1050 readings - Sample Influent 5-09-Influent-B
1/7/2021	1,862	Vent	25	242	133			Collect TO-15 sample at influent - 5-09-Influent-C
1/13/2021	1,868	Vent	39	207	186			
1/26/2021	1,881	Vent	68	166	177			
2/10/2021	1,896	Vent	18	210	261			Turned system off due to heavy snow in forecast
2/18/2021	1,904							Turned system on
2/25/2021	1,911	Vent	303	5,258	3,461			
3/3/2021	1,917	Vent	79	307	299		0	
3/9/2021	1,923	Vent	46	411	368			
3/18/2021	1,932	Vent	25	152	150		0	
3/26/2021	1,940	Vent	71	197	185			

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
4/1/2021	1,946	Vent	62	195	191		0	Hr meter stopped working between last visit. Will order replacement. Changed oil.
4/8/2021	1,953	Vent	103	241	177		0	
4/15/2021	1,960	Vent	0	206	196		0	
5/4/2021	1,979	Vent	23	142	136		0	Installed new hour meter.

Notes:

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

Operational change was made on 12/14/20 due to reduced concentrations observed at SVE-03 and the influent, SVE-03 was opened as a vent well to promote focused flow towards SVE-01 and SVE-02. No significant increase in PID was observed therefore the system was adjusted on 1/5/21 to operate SVE-01 as a vent well and extract from 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)
10/16/2020	58	33	100	34,541	0.045	21.00
10/27/2020	177	103	100	34,800	0.065	21.07
11/16/2020	191	111	95	35,282	0.123	21.19
11/19/2020[3]	191	111	95	35,355	0.018	21.21
11/24/2020	206	120	95	35,469	0.032	21.24
12/2/2020	185	107	95	35,661	0.048	21.29
12/9/2020	204	119	98	35,832	0.048	21.34
12/14/2020	199	116	98	35,948	0.032	21.37
12/21/2020	77	44	85	36,116	0.015	21.38
1/5/2021	108	63	77	36,117	0.000	21.38
1/5/2021	267	155	100	36,117	0.000	21.38
1/5/2021	309	179	100	36,117	0.000	21.38
1/5/2021	335	195	100	36,117	0.000	21.38
1/7/2021	133	77	105	36,171	0.011	21.39
1/13/2021	186	108	105	36,308	0.038	21.43
1/26/2021	177	103	105	36,625	0.083	21.51
2/10/2021	261	152	105	36,984	0.139	21.65
2/18/2021[3]	261	152	105	36,984	0.000	21.65
2/25/2021[4]	261	152	100	37,148	0.060	21.71
3/3/2021	299	173	105	37,291	0.063	21.78
3/9/2021	368	213	105	37,436	0.079	21.86
3/18/2021	150	87	105	37,650	0.048	21.90
3/26/2021	185	107	105	37,845	0.053	21.96
4/1/2021	191	111	105	37,989	0.041	22.00
4/8/2021	177	103	105	38,157	0.044	22.04
4/15/2021	196	114	105	38,325	0.049	22.09
5/4/2021	136	79	105	38,781	0.092	22.18

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)

Notes:

PID = photoionization detector

ppbv = parts per billion by volume

cfm = cubic feet per minute

lbs = pounds

[1] A correction factor of 0.58 has been applied to the PID vapor measurement for VOCs based on the mixture of analytes detected in the TO-15 analysis at the influent sample point from 1/5/21. 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] Previous weeks influent PID reading used to calculate mass removal if that reading was not collected during the site visit.

[4] The PID readings from this week are significantly higher than the laboratory results and if used, would overestimate the mass removal.

Prior week PID readings have been used instead to estimate mass removal.

Table 3-1 - January 2021 Injection Summary at Renton AOCs

Area	Injection Well	Volume of Solution - ERD (gallons)	Brix (°Bx)	Pounds Substrate in the Solution (lbs)
Building 4-78/79	B78-12	564	7.5	353
	B78-14	565	8.4	396
	B78-15	561	8.7	407
	B78-16	566	8.9	420
	Total (gal)	2,256	Total (lbs)	1,576

Notes:
°Bx (degrees brix) is a measure of the sugar content in an aqueous solution. One degree Brix is 1 gram of sucrose in 100 grams of solution and represents the strength of the solution as percantage by mass

Table 3-2 - January 2021 Injection Volumes at 4-78/79 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	9.1	4.2	5.4	1,599	803
	B78-13	513	9.1	4.2	5.4	1,559	783
	B78-17	509	9.1	4.2	5.4	1,571	789
	B78-18	500	9.1	4.2	5.4	1,599	803
	B78-19	500	9.1	4.2	5.4	1,599	803
	B78-20	500	9.1	4.2	5.4	1,599	803
	B78-21	529	9.1	4.2	5.4	1,512	759

Notes:
NaNO3 - Sodium Nitrate
MgSO4 - Magnesium Sulfate
DAP - Diammonium Phosphate

Table 3-3 - 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
B78-11-092320	9/23/2020	8	<0.2	U	3.14		3.52		2.64		0.205		<0.100	U	2.38	
B78-11-040121	**4/1/2021**	**8**	**1.48**		**1.72**		**1.43**		**6.16**		**4.20**		**0.74**	**U**	**40.6**	**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
B78-13-092320	9/23/2020	15	<0.2	U	0.44		0.41		1.00		0.396		<0.100	U	13.9	D
B78-13-040121	**4/1/2021**	**15**	**<0.2**	**U**	**0.28**		**0.29**		**0.78**		**<0.100**	**U**	**<0.100**	**U**	**1.60**	
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
B78-17-092320	9/23/2020	15	0.65		0.86		0.37		0.40		1.63		<0.100	U	44.9	D
B78-17-040121	**4/1/2021**	**15**	**14.8**		**6.59**		**1.18**		**0.74**		<0.100	U	**<0.100**	**U**	**13.2**	**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
B78-18-092320	9/23/2020	15	<0.2	U	0.27		<0.2	U	1.05		<0.100	U	<0.100	U	70.2	D
B78-18-040121	**4/1/2021**	**15**	**<0.2**	**U**	**0.23**		**0.20**		**1.28**		**<0.100**	**U**	**<0.100**	**U**	**11.7**	**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
B78-19-092320	9/23/2020	15	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.100	U	0.11		1.97	
B78-19-040121	**4/1/2021**	**15**	**<0.2**	**U**	**<0.2**	**U**	**<0.2**	**U**	**0.43**		**<0.100**	**U**	**<0.100**	**U**	**9.80**	

Table 3-3 - 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)	
B78-20-8-100617	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
B78-20-092320	9/23/2020	15	<0.2	U	0.37		<0.2	U	9.07		<0.100	U	<0.100	U	40.3	D
B78-20-040121	**4/1/2021**	**15**	**<0.2**	**U**	**<0.2**	**U**	**<0.2**	**U**	**28.2**		**<0.100**	**U**	**<0.100**	**U**	**3.99**	
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
B78-21-092320	9/23/2020	15	<0.2	U	0.32		0.25		0.39		<0.100	U	<0.100	U	26.3	D
B78-21-040121	**4/1/2021**	**15**	**<0.2**	**U**	**0.26**		**0.29**		**0.39**		**<0.100**	**U**	**<0.100**	**U**	**1.86**	
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-244S-092320	9/23/2020	13	<0.2	U	0.26		0.39		0.20		<0.100	U	<0.100	U	3.96	
GW-244S	*1/15/2021*	*13*	*0.29*		*0.68*		*0.64*		*0.46*		-		-		-	
GW-244S-040121	**4/1/2021**	**13**	**<0.2**	**U**	**0.41**		**0.55**		**<0.2**	**U**	**<0.100**	**U**	**<0.100**	**U**	**0.581**	
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*		-		-		-	

Table 3-3 - 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)	
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*		-		-		-	
GW-031S-092320	9/23/2020	23	<0.2	U	0.21		0.26		0.45		<0.100	U	<0.100	U	2.39	
Dup-01-092320	9/23/2020	23	<0.2	U	0.22		<0.2	U	0.45		<0.100	U	<0.100	U	2.52	
GW-031S	*1/15/2021*	*23*	*<0.2*	*U*	*0.31*		*<0.2*	*U*	*18.8*	*J*	-		-		-	
Dup-01	*1/15/2021*	*23*	*<0.2*	*U*	*0.30*		*<0.2*	*U*	*18.8*	*J*	-		-		-	
GW-031S-040121	**4/1/2021**	**23**	**<0.2**	**U**	**<0.2**	**U**	**<0.2**	**U**	**2.47**		**<0.100**	**U**	**<0.100**	**U**	**0.34**	
Dup-01-040121	**4/1/2021**	**23**	**<0.2**	**U**	**<0.2**	**U**	**<0.2**	**U**	**2.44**		**<0.100**	**U**	**<0.100**	**U**	**0.27**	

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 3-4 Groundwater Monitoring Results Summary February 2021 and Recommended ERD Treatment

GW Treatment Area	Source and down gradient MWs	CPOC wells	Treatment IWs	ERD Treatment Recommendation
SWMU-172/174	PCE at or less than 0.1 ug/L; TCE is nondetect (<0.02) ug/L; cisDCE less than 0.22 ug/L and VC less than 0.27 ug/L.	All detections are at or below 0.27 ug/L	*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.*	**Consider additional injections if beneficial after review of future sample results.**
Building 4-78/4-79 SWMU/AOC Group	TCE is nondetect in 4 of 5 samples, one at 0.29 ug/L, cisDCE is under 1.7 ug/L in all samples; VC is higher in GW033S (at 5.3 ug/l). Benzene remains about the same in source well GW031S (18.8). Nitrate/sulfate injections completed in January 2021, April 2021 samples show benzene under 2.5 ug/L in GW031S. TPH-G remain above criteria.	Majority of samples are ND; Northern well GW237S showed benzene at 6.8 ug/L in Febr 2021	*Prior data May 2017, 4 of 5 wells with low detections where sum of CVOCs are less than 3 ug/L*	**Additional injections likely/beneficial, pending review of next sampling results.**
AOC-001/002	*Prior data Mar 2020: 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. Site still not accessible due to construction**
AOC-003	VC less than 0.4 ug/L.	VC less than 0.50 ug/L.	*Prior data May 2017 one of four IWs sampled – VC detection less than 0.30 ug/L*	**Consider additional injections if beneficial after review of future sample results.**
Lot 20 / former 10-71	*Prior data May 2020 - All wells are ND.*	-	-	**No action at this time.**
AOC-60	Treatment MWs with total CVOCs less than 0.5 ug/L, other MWs with total CVOCs less than 1.50 ug/L (primarily as cis12 DCE).	MW's with total CVOCs less than 0.41 ug/L, primarily as cis-1,2DCE.	-	**Consider additional injections if beneficial after review of future sample results.**
AOC – 90	Source with total CVOCs less than 0.2 ug/L; down gradient well with VC at 0.14 ug/L.	VC detections less than 0.35 ug/L.	-	**Consider additional injections if beneficial after review of future sample results.**
Apron A	cis-1,2DCE is nondetect and VC is at 1.49 ug/L	-	-	**Consider additional injections if beneficial after review of future sample results.**
Building 4-70	-	*Prior data March 2020, total CVOCs less than 0.63 ug/L.*	-	**No action at this time.**

FIGURES

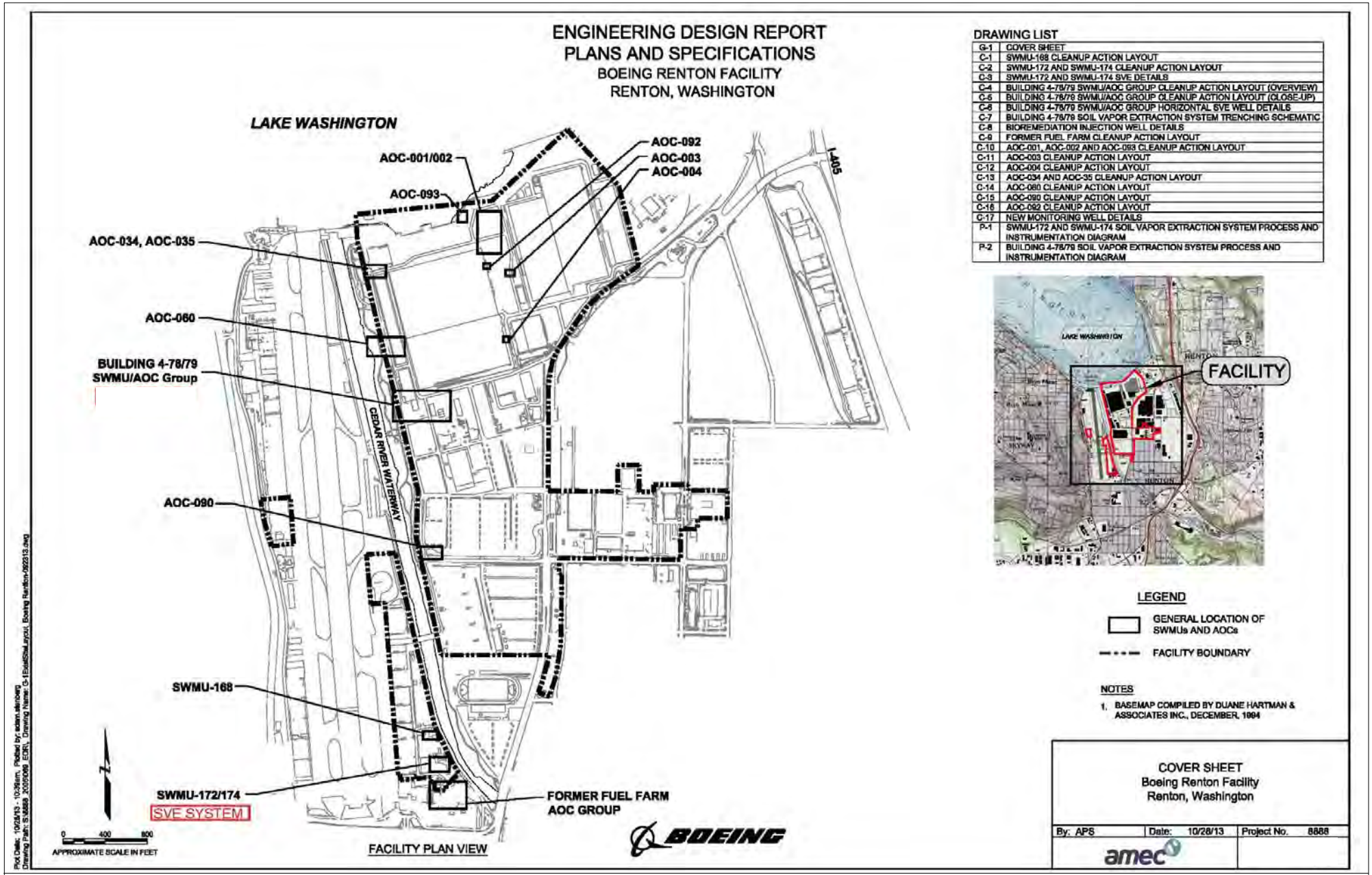

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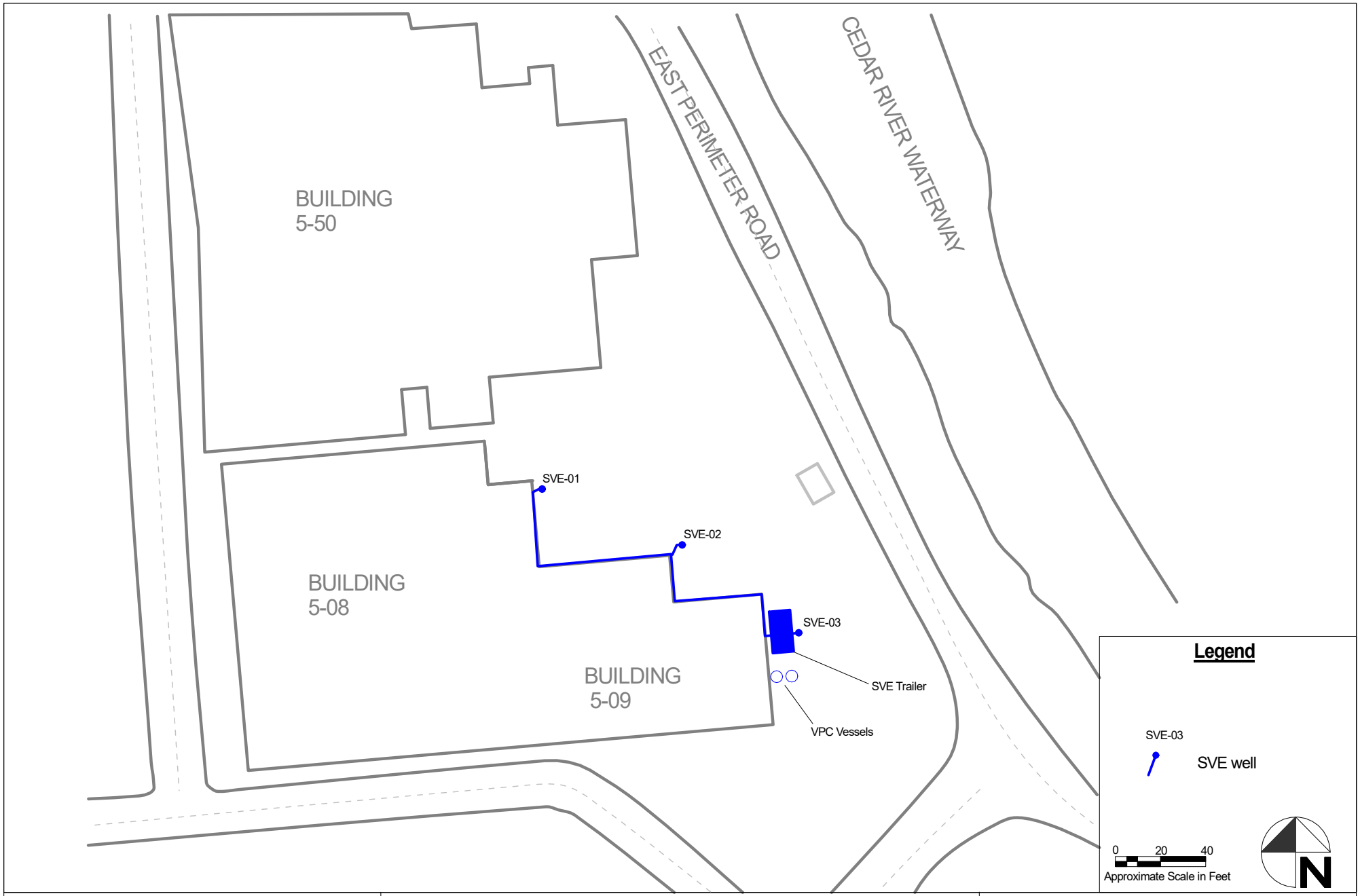
Figure 1-1 Site Location/ AOC Outlines



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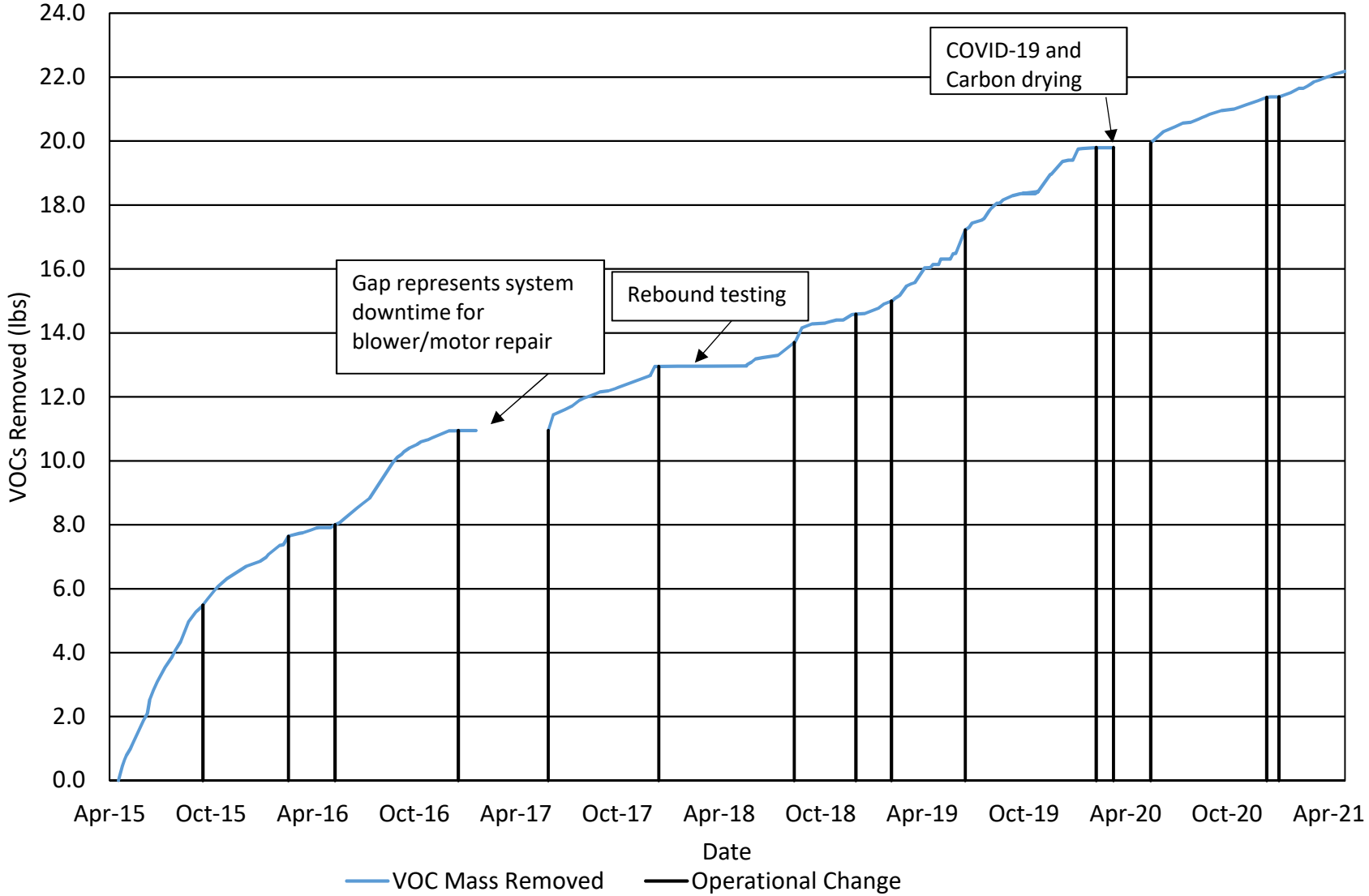
Boeing Renton
Spring 2017 SVE Quarterly Summary Report

Figure 2-1 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.
Feb 2020 - System adjusted to dry carbon with hot ambient air due to condensate
Mar 2020 to May 2020 - System shut down due to Govenors Stay at Home order related to Covid-19

Attachment A: Field Log Forms

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

Inspection Date: 10/16/20 Date of last inspection: 9/23/20

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: 1340		Motor Hours: 4073.5
Blower	**Current Value**	**Other Notes**
Vacuum gauge	47 "H2O	Drained ~ 1 gal condensate
Pressure gauge	5 "H2O	
System flow rate	100 SCFM	
Blower Temperature	137°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 / 10.04 ppm
Calibration time/ date: 10/16/20 1340	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	Vent						
SVE-02		0 ppb	0 ppb				
SVE-03		318 ppb	465 ppb				
VPC Inlet		63 ppb	52 ppb				
VPC Midpoint							
VPC Outlet							
Other vapor point ____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 10/27/20 Date of last inspection: 10/16/20

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: 0850		Motor Hours: 4332.8
Blower	**Current Value**	**Other Notes**
Vacuum gauge	55" H20	Changed blower oil. Off plug screen and threads stop. Found replacement @ motion + Flow in front
Pressure gauge	2" H20	Drained ~ 3 gal condensate
System flow rate	100 SCFM	
Blower Temperature	129°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 PPb / 10.01 ppm
Calibration time/ date: 10/27/20 0850	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		.99 ppb	96 ppb				
SVE-03		333 ppb	282 ppb				
VPC Inlet		189 ppb	165 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

10/27/20
Date

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

Inspection Date: 11/16/20 Date of last inspection: 10/27/20

Periodic systems check:

* Drained condensate on 11/12/20

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: 1330	Motor Hours: 4814.9

Blower	Current Value	Other Notes
Vacuum gauge	55" H_2O	Drained ~ 2 gal condensate Drained ~ 5 gal condensate on 11/12
Pressure gauge	3" H_2O	
System flow rate	95 SCFM	
Blower Temperature	130°F	
Temp.at lag VPC discharge		

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

PID Model: PPB RAE	Details: 0 ppb / 10.00 ppm
Calibration time/ date: 11/16/20 1330	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		8 ppb	0 ppb				
SVE-03		432 ppb	335 ppb				
VPC Inlet		202 ppb	179 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: 11/19/20 Date of last inspection: 11/16/20

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: 1348		Motor Hours: 4887.1
Blower	**Current Value**	**Other Notes**
Vacuum gauge	65" H2O	Drained 1.5 gal condensate
Pressure gauge	2" H2O	
System flow rate	95 scfm	
Blower Temperature	130° F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model:	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 _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 11/24/20 Date of last inspection: 11/19/20

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: 0815		Motor Hours: 5001.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	58" Hw	~ 1 gal condensate drained
Pressure gauge	2" Hw	
System flow rate	95 scfm	
Blower Temperature	130°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 ppb / 9,999 ppb
Calibration time/ date: 11/24/20 0815	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01		Vent					
SVE-02		77 ppb	68 ppb				
SVE-03		242 ppb	303 ppb				
VPC Inlet		207 ppb	205 ppb				
VPC Midpoint							
VPC Outlet		0 ppb	0 ppb				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

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Signature J. Neste (Printed Name) _____ (Signature) 11/24 (Date)

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

Inspection Date: 12/2/20 Date of last inspection: 11/24/20

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: 0830		Motor Hours: 5193.7
Blower	**Current Value**	**Other Notes**
Vacuum gauge	60 "H20	Drained ~ 2 gal condensate Replaced airfilter
Pressure gauge	2 "H20	
System flow rate	955 CFM	
Blower Temperature	127 °F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 / 10.00 ppm
Calibration time/ date: 12/2/20 0830	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01		Venting					
SVE-02		89 ppb	76 ppb				
SVE-03		228 ppb	251 ppb				
VPC Inlet		186 ppb	184 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

J Neste
Printed Name

Signature

12/2
Date

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

Inspection Date: 12/9/20 Date of last inspection: 12/2/20

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: 1200		Motor Hours: 5364.5
Blower	**Current Value**	**Other Notes**
Vacuum gauge	40 "H2O	~1 gal condensate drained
Pressure gauge	2 "H2O	
System flow rate	98 SCFM	
Blower Temperature	109°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 / 10.01 ppm
Calibration time/ date: 12/9 1200	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		34 ppb	28 ppb				
SVE-03		172 ppb	259 ppb				
VPC Inlet		200 ppb	202 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: 12/14/20 Date of last inspection: 12/9/20

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: 0750		Motor Hours: 5480.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	30" H20	* SVE 1 appears to have been backed into, pipe (PVC) broken below venturi flow meter. Repaired pipe & opened SVE 1 + closed SVE-3
Pressure gauge	2" H20	1150- Vac = 4) 1" H20 SVE IN - 1,809 ppb / 1,792 ppb *
System flow rate	98 SCFM	Pres = 2" H20 (These readings are suspect. SVE 1 just repaired w/ PVC primer/glue which PID Flow = 85 SCFM is responsive to.)
Blower Temperature	104°F	Temp = 108°F
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 / 10.00 ppm
Calibration time/ date: 12/14/20 0800	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		30 ppb	27 ppb				
SVE-03		178 ppb	189 ppb				
VPC Inlet		917 ppb	201 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

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Signature

Jmesta — Printed Name

Signature

12/14/20 — Date

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

Inspection Date: 12/21/20 Date of last inspection: 12/14/20

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: 0830		Motor Hours: 5648.9
Blower	**Current Value**	**Other Notes**
Vacuum gauge	42" H_2O	∅ gal condensate, dry changed blower oil Shut system down for no lidday break.
Pressure gauge	1" H_2O	
System flow rate	85 scfm	
Blower Temperature	112°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 / 10.01 ppm
Calibration time/ date:	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01		73 ppb	59 ppb				
SVE-02		94 ppb	92 ppb				
SVE-03		off					
VPC Inlet		73 ppb	80 ppb				
VPC Midpoint							
VPC Outlet		0 ppb	0 ppb				
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

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Signature

J Neste		12/21/20
Printed Name	Signature	Date

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

Inspection Date: 1/5/21 Date of last inspection: 12/21/20

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: 0820		Motor Hours: 5649.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	40 "H20	Restart System: 0910 Closed SVE 1 & opened SVE 3 Vac - 40" H20 Pres - 1" H20 Flow - 100 SCFM Temp - 98°F 0920 - SVE-3 = 291/315 ppb SVE-IN = 289/294 ppb 0935 - SVEIN = 316/301 ppb - Sample = 5-04-Influent A 1050 - SVE2 = 123/119 ppb SVE3 = 335/328 ppb SVEIN = 337/333 ppb - Sample 5-09-Influent B
Pressure gauge	1 "H20	
System flow rate	77 SCFM	
Blower Temperature	95°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0/10.01 ppm
Calibration time/ date: 1/5/21 0820	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01	0900	94 ppb	93 ppb				
SVE-02		101 ppb	103 ppb				
SVE-03		off					
VPC Inlet		109 ppb	107 ppb				
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

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Signature JNeste (Printed Name) _____ (Signature) 1/5/21 (Date)

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

Inspection Date: 1/7/21 Date of last inspection: 1/5/21

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: 1435		Motor Hours: 5703.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	30"H20	Collect TO15 Sample @ Influent SVE Influent-C
Pressure gauge	5"H20	
System flow rate	105 SCFM	
Blower Temperature	105°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		15 ppb	35 ppb				
SVE-03		231 ppb	245 ppb				
VPC Inlet		169 ppb	96 ppb				
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

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Signature _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 1/13/21 Date of last inspection: 1/7/21

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: 0750		Motor Hours: 5840.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	30" H2O	
Pressure gauge	5" H2O	
System flow rate	105 scfm	
Blower Temperature	103°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 ppb / 10.00 ppm
Calibration time/ date: 1/13/21 0750	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		39 ppb	38 ppb				
SVE-03		190 ppb	224 ppb				
VPC Inlet		184 ppb	183 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

Printed Name	Signature	Date
Jneste		1/13

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

Inspection Date: 1/20/21 Date of last inspection: 1/13/21

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: 1248		Motor Hours: 6157.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	30" H2O	5 gal condensate drained
Pressure gauge	2" H2O	
System flow rate	1055CFM	
Blower Temperature	102°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 ppb / 9,998 ppb
Calibration time/ date: 1/20/21 1250	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		79 ppb	56 ppb				
SVE-03		156 ppb	175 ppb				
VPC Inlet		186 ppb	168 ppb				
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
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Signature _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 2/10/21 Date of last inspection: 1/26/21

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: 1216		Motor Hours: 6516.7
Blower	**Current Value**	**Other Notes**
Vacuum gauge	30" H_2O	Drained 2gal condensate Shut system down due to heavy snow in forecast.
Pressure gauge	2" H_2O	
System flow rate	105 SCFM	
Blower Temperature	101°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		Vent					
SVE-02		17 ppb	18 ppb				
SVE-03		181 ppb	238 ppb				
VPC Inlet		273 ppb	249 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: 2/18/21 Date of last inspection: 2/10/21

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: 1317		Motor Hours: 6516.7
Blower	**Current Value**	**Other Notes**
Vacuum gauge	32"H20	Turned system on
Pressure gauge	5"H20	
System flow rate	105 SCFM	
Blower Temperature	71°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 _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 2/25/21 Date of last inspection: 2/18/21

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: 0913		Motor Hours: 6680.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	42 "H2O	Drained 1gal condensate
Pressure gauge	5" H2O	
System flow rate	100 SCFM	
Blower Temperature	106°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPBRAE	Details: 0 ppb / 9.92 ppm
Calibration time/ date: 2/25/21 0913	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		201 ppb	405 ppb				
SVE-03		3171 ppb	5345 ppb				
VPC Inlet		3100 ppb	3821 ppb				
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 3/3/21 Date of last inspection: 2/25/21

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: 0730		Motor Hours: 6823.2
Blower	**Current Value**	**Other Notes**
Vacuum gauge	32" H_2O	1/2 gal condensate drained
Pressure gauge	5" H_2O	
System flow rate	105 SCFM	
Blower Temperature	100°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 ppb / 9.96 ppm
Calibration time/ date: 3/3/21 0730	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		75 ppb	82 ppb				
SVE-03		312 ppb	301 ppb				
VPC Inlet		296 ppb	301 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) Justin Neste (Signature) 3/3 (Date)

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

Inspection Date: 3/9/21 Date of last inspection: 3/3/21

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: 0905		Motor Hours: 6968.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	41" H_2O	1 gal condensate
Pressure gauge	5" H_2O	
System flow rate	105 SCFM	
Blower Temperature	107°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 ppb / 10.00 ppm
Calibration time/ date: 3/9/21 0905	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	~~Vacuum~~ PID 2	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01			Vent				
SVE-02			35 ppb	57 ppb			
SVE-03			409 ppb	412 ppb			
VPC Inlet			353 ppb	382 ppb			
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 3/18/21 Date of last inspection: 3/9/21

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums

2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 0830		Motor Hours: 7182.8
Blower	**Current Value**	**Other Notes**
Vacuum gauge	33" H_2O	1/2 gal condensate drained
Pressure gauge	5" H_2O	
System flow rate	105 SCFM	
Blower Temperature	103°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE	Details: 0 ppb / 4,990 ppb
Calibration time/ date: 3/18/21 0830	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01			Vent				
SVE-02			26 ppb	24 ppb			
SVE-03			153 ppb	151 ppb			
VPC Inlet			148 ppb	151 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

J Neste		3/18
Printed Name	Signature	Date

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

Inspection Date: 3/26/21 Date of last inspection: 3/18/21

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: 1100		Motor Hours: 7377.0
Blower	**Current Value**	**Other Notes**
Vacuum gauge	33" H_2O	1/4 gal condensate drained
Pressure gauge	5" H_2O	
System flow rate	105 SCFM	
Blower Temperature	106°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 / 9996 ppb
Calibration time/ date: 3/26/21 1100	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		65 ppb	77 ppb				
SVE-03		200 ppb	194 ppb				
VPC Inlet		177 ppb	193 ppb				
VPC Midpoint							
VPC Outlet							
Other vapor point _____							

1. Flow rate calculated from the equation $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential\ pressure}$.

Questions? Call Justin Neste @ (360) 981-5606
At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 4/1/21 Date of last inspection: 3/26/21

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: 0815		Motor Hours: 7395.1
Blower	**Current Value**	**Other Notes**
Vacuum gauge	33" H_2O	1/2 gal Condensate drained Changed oil - restart @ 1400
Pressure gauge	5" H_2O	
System flow rate	~~Flow~~ 105 scfm	
Blower Temperature	105°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: 4/1/21 0815	PID check after monitoring:

Sampling Point	Time	PID Reading (1)	PID Reading (2)	Vacuum	Flow Rate (gauge)	Differential Pressure	Flow Rate Calculated[1]
SVE-01		vent					
SVE-02		73 ppb	51 ppb				
SVE-03		185 ppb	204 ppb				
VPC Inlet		190 ppb	192 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

J. Neste & R Lassen		4/1
Printed Name	Signature	Date

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

Inspection Date: 4/8/21 Date of last inspection: 4/1/21

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: 0921		Motor Hours: 7395.1 (hr meter not working - ordered replacement
Blower	**Current Value**	**Other Notes**
Vacuum gauge	33" H_2O	1/2 gal condensate drained
Pressure gauge	5" H_2O	
System flow rate	105 scfm	
Blower Temperature	107 °F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 ppb / 10.01 ppm
Calibration time/ date: 4/8/21 0921	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		98 ppb	108 ppb				
SVE-03		248 ppb	233 ppb				
VPC Inlet		176 ppb	178 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 J Neste (Printed Name) (Signature) 4/8 (Date)

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

Inspection Date: 4/15/21 Date of last inspection: 4/8/21

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: 1200		Motor Hours: 7395.1 Will Replace HR meter when replacement arrives
Blower	**Current Value**	**Other Notes**
Vacuum gauge	30" H_2O	
Pressure gauge	5" H_2O	
System flow rate	105 scfm	
Blower Temperature	115°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 ppb / 9.8 ppm
Calibration time/ date: 4/15 1200	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		0 ppb	0 ppb				
SVE-03		221 ppb	190 ppb				
VPC Inlet		229 ppb	162 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 _____ (Printed Name) _____ (Signature) _____ (Date)

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

Inspection Date: 5/4/21 Date of last inspection: 4/15/21

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: 0.0 (Installed new hr meter
Blower	**Current Value**	**Other Notes**
Vacuum gauge	31" H_2O	No condensate
Pressure gauge	3" H_2O	
System flow rate	105 SCFM	
Blower Temperature	109°F	
Temp.at lag VPC discharge		
Other notes: check oil level, drive belts, TEFC motor fan, any unusual noise/vibration		

PID Model: PPB RAE 3000	Details: 0 ppb / 9,999 ppb
Calibration time/ date: 5/4/21 0930	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		20 ppb	25 ppb				
SVE-03		136 ppb	147 ppb				
VPC Inlet		132 ppb	140 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) 5/4/21 (Date)

Attachment B: TO-15 Laboratory Data Package

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1/21/2021
Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Renton 5-09
Project #:
Workorder #: 2101105

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 1/8/2021 at Eurofins Air Toxics LLC.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics LLC. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Alexandra Winslow at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Alexandra Winslow

Project Manager

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WORK ORDER #: 2101105

Work Order Summary

CLIENT:	Mr. Justin Neste CALIBRE, Environmental Technology Solutions 20926 Pugh Rd NE Poulsbo, WA 98370	**BILL TO:**	Accounts Payable Eurofins Lancaster Laboratories Environmental, LLC 2425 New Holland Pike Lancaster, PA 17605-2425
PHONE:	360-981-5606	**P.O. #**	
FAX:		**PROJECT #**	Renton 5-09
DATE RECEIVED:	01/08/2021	**CONTACT:**	Alexandra Winslow
DATE COMPLETED:	01/21/2021		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	5-09-Influent-A	TO-15	5.7 "Hg	14.9 psi
02A	5-09-Influent-B	TO-15	4.1 "Hg	15 psi
03A	5-09-Influent-C	TO-15	3.3 "Hg	15 psi
04A	Lab Blank	TO-15	NA	NA
05A	CCV	TO-15	NA	NA
06A	LCS	TO-15	NA	NA
06AA	LCSD	TO-15	NA	NA

CERTIFIED BY:  DATE: 01/21/21

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209220, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-20-16, UT NELAP – CA009332020-12, VA NELAP - 10615, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-014, Effective date: 10/18/2020, Expiration date: 10/17/2021.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 2101105

Three 1 Liter Summa Canister samples were received on January 08, 2021. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

The hydrocarbon profile present in sample 5-09-Influent-C did not resemble that of commercial gasoline. Results were calculated using the response factor derived from the gasoline calibration.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-Influent-A

Lab ID#: 2101105-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.2	3.4	4.9	14
1,1,1-Trichloroethane	1.2	1.4	6.8	7.6
Trichloroethene	1.2	9.8	6.7	53
Tetrachloroethene	1.2	83	8.4	560

Client Sample ID: 5-09-Influent-B

Lab ID#: 2101105-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	1.2	2.1	4.6	8.4
Trichloroethene	1.2	1.5	6.3	8.0
Tetrachloroethene	1.2	1.6	7.9	11

Client Sample ID: 5-09-Influent-C

Lab ID#: 2101105-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	11	92	27	220
Hexane	1.1	22	4.0	77
2-Butanone (Methyl Ethyl Ketone)	4.5	14	13	42
cis-1,2-Dichloroethene	1.1	2.3	4.5	9.2
Benzene	1.1	47	3.6	150
Trichloroethene	1.1	6.0	6.1	32
Toluene	1.1	73	4.3	280
Tetrachloroethene	1.1	75	7.7	510
Ethyl Benzene	1.1	12	4.9	50
m,p-Xylene	1.1	23	4.9	98
o-Xylene	1.1	8.7	4.9	38
Cumene	1.1	2.4	5.6	12
Propylbenzene	1.1	4.9	5.6	24
1,3,5-Trimethylbenzene	1.1	4.5	5.6	22
1,2,4-Trimethylbenzene	1.1	18	5.6	89
TPH ref. to Gasoline (MW=100)	110	2200	460	9000

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 5-09-Influent-C

Lab ID#: 2101105-03A

Octane	4.5	8.7	21	41
Decane	4.5	33	26	190
Dodecane	11	26	79	180

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Client Sample ID: 5-09-Influent-A

Lab ID#: 2101105-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011220**	**Date of Collection:**	**1/5/21 9:39:00 AM**
Dil. Factor:	**2.48**	**Date of Analysis:**	**1/12/21 10:28 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	12	Not Detected	26	Not Detected
Vinyl Chloride	1.2	Not Detected	3.2	Not Detected
Freon 113	1.2	Not Detected	9.5	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.9	Not Detected
Acetone	12	Not Detected	29	Not Detected
Carbon Disulfide	5.0	Not Detected	15	Not Detected
Methylene Chloride	12	Not Detected	43	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.9	Not Detected
Hexane	1.2	Not Detected	4.4	Not Detected
1,1-Dichloroethane	1.2	Not Detected	5.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	1.2	3.4	4.9	14
Chloroform	1.2	Not Detected	6.0	Not Detected
1,1,1-Trichloroethane	1.2	1.4	6.8	7.6
Benzene	1.2	Not Detected	4.0	Not Detected
Trichloroethene	1.2	9.8	6.7	53
Toluene	1.2	Not Detected	4.7	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.8	Not Detected
Tetrachloroethene	1.2	83	8.4	560
Chlorobenzene	1.2	Not Detected	5.7	Not Detected
Ethyl Benzene	1.2	Not Detected	5.4	Not Detected
m,p-Xylene	1.2	Not Detected	5.4	Not Detected
o-Xylene	1.2	Not Detected	5.4	Not Detected
Styrene	1.2	Not Detected	5.3	Not Detected
Cumene	1.2	Not Detected	6.1	Not Detected
Propylbenzene	1.2	Not Detected	6.1	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	6.1	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	6.1	Not Detected
TPH ref. to Gasoline (MW=100)	120	Not Detected	510	Not Detected
Acetonitrile	12	Not Detected	21	Not Detected
Vinyl Acetate	5.0	Not Detected	17	Not Detected
Octane	5.0	Not Detected	23	Not Detected
Pentane	5.0	Not Detected	15	Not Detected
Butylbenzene	5.0	Not Detected	27	Not Detected
Decane	5.0	Not Detected	29	Not Detected
Dodecane	12	Not Detected	86	Not Detected
sec-Butylbenzene	5.0	Not Detected	27	Not Detected
p-Cymene	5.0	Not Detected	27	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-Influent-A

Lab ID#: 2101105-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011220**	**Date of Collection: 1/5/21 9:39:00 AM**	
Dil. Factor:	**2.48**	**Date of Analysis: 1/12/21 10:28 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: 5-09-Influent-B

Lab ID#: 2101105-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011221**	**Date of Collection: 1/5/21 10:56:00 AM**	
Dil. Factor:	**2.34**	**Date of Analysis: 1/12/21 10:57 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
Freon 113	1.2	Not Detected	9.0	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	Not Detected	28	Not Detected
Carbon Disulfide	4.7	Not Detected	14	Not Detected
Methylene Chloride	12	Not Detected	41	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	2.1	4.6	8.4
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Benzene	1.2	Not Detected	3.7	Not Detected
Trichloroethene	1.2	1.5	6.3	8.0
Toluene	1.2	Not Detected	4.4	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.4	Not Detected
Tetrachloroethene	1.2	1.6	7.9	11
Chlorobenzene	1.2	Not Detected	5.4	Not Detected
Ethyl Benzene	1.2	Not Detected	5.1	Not Detected
m,p-Xylene	1.2	Not Detected	5.1	Not Detected
o-Xylene	1.2	Not Detected	5.1	Not Detected
Styrene	1.2	Not Detected	5.0	Not Detected
Cumene	1.2	Not Detected	5.8	Not Detected
Propylbenzene	1.2	Not Detected	5.8	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
TPH ref. to Gasoline (MW=100)	120	Not Detected	480	Not Detected
Acetonitrile	12	Not Detected	20	Not Detected
Vinyl Acetate	4.7	Not Detected	16	Not Detected
Octane	4.7	Not Detected	22	Not Detected
Pentane	4.7	Not Detected	14	Not Detected
Butylbenzene	4.7	Not Detected	26	Not Detected
Decane	4.7	Not Detected	27	Not Detected
Dodecane	12	Not Detected	82	Not Detected
sec-Butylbenzene	4.7	Not Detected	26	Not Detected
p-Cymene	4.7	Not Detected	26	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-Influent-B

Lab ID#: 2101105-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011221**	**Date of Collection: 1/5/21 10:56:00 AM**	
Dil. Factor:	**2.34**	**Date of Analysis: 1/12/21 10:57 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: 5-09-Influent-C

Lab ID#: 2101105-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011222**	**Date of Collection:**	**1/5/21 2:56:00 PM**
Dil. Factor:	**2.27**	**Date of Analysis:**	**1/12/21 11:27 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
Freon 113	1.1	Not Detected	8.7	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Acetone	11	92	27	220
Carbon Disulfide	4.5	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	39	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	22	4.0	77
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	14	13	42
cis-1,2-Dichloroethene	1.1	2.3	4.5	9.2
Chloroform	1.1	Not Detected	5.5	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Benzene	1.1	47	3.6	150
Trichloroethene	1.1	6.0	6.1	32
Toluene	1.1	73	4.3	280
1,1,2-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Tetrachloroethene	1.1	75	7.7	510
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
Ethyl Benzene	1.1	12	4.9	50
m,p-Xylene	1.1	23	4.9	98
o-Xylene	1.1	8.7	4.9	38
Styrene	1.1	Not Detected	4.8	Not Detected
Cumene	1.1	2.4	5.6	12
Propylbenzene	1.1	4.9	5.6	24
1,3,5-Trimethylbenzene	1.1	4.5	5.6	22
1,2,4-Trimethylbenzene	1.1	18	5.6	89
TPH ref. to Gasoline (MW=100)	110	2200	460	9000
Acetonitrile	11	Not Detected	19	Not Detected
Vinyl Acetate	4.5	Not Detected	16	Not Detected
Octane	4.5	8.7	21	41
Pentane	4.5	Not Detected	13	Not Detected
Butylbenzene	4.5	Not Detected	25	Not Detected
Decane	4.5	33	26	190
Dodecane	11	26	79	180
sec-Butylbenzene	4.5	Not Detected	25	Not Detected
p-Cymene	4.5	Not Detected	25	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: 5-09-Influent-C

Lab ID#: 2101105-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011222**	**Date of Collection: 1/5/21 2:56:00 PM**	
Dil. Factor:	**2.27**	**Date of Analysis: 1/12/21 11:27 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: Lab Blank

Lab ID#: 2101105-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011206f**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/12/21 01:08 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
TPH ref. to Gasoline (MW=100)	50	Not Detected	200	Not Detected
Acetonitrile	5.0	Not Detected	8.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Octane	2.0	Not Detected	9.3	Not Detected
Pentane	2.0	Not Detected	5.9	Not Detected
Butylbenzene	2.0	Not Detected	11	Not Detected
Decane	2.0	Not Detected	12	Not Detected
Dodecane	5.0	Not Detected	35	Not Detected
sec-Butylbenzene	2.0	Not Detected	11	Not Detected
p-Cymene	2.0	Not Detected	11	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: Lab Blank

Lab ID#: 2101105-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011206f**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/12/21 01:08 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: CCV

Lab ID#: 2101105-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/12/21 11:14 AM**	

Compound	%Recovery
Chloromethane	100
Vinyl Chloride	100
Freon 113	97
1,1-Dichloroethene	106
Acetone	94
Carbon Disulfide	98
Methylene Chloride	99
trans-1,2-Dichloroethene	104
Hexane	106
1,1-Dichloroethane	106
2-Butanone (Methyl Ethyl Ketone)	106
cis-1,2-Dichloroethene	105
Chloroform	105
1,1,1-Trichloroethane	100
Benzene	101
Trichloroethene	101
Toluene	99
1,1,2-Trichloroethane	102
Tetrachloroethene	102
Chlorobenzene	101
Ethyl Benzene	104
m,p-Xylene	106
o-Xylene	106
Styrene	110
Cumene	107
Propylbenzene	104
1,3,5-Trimethylbenzene	102
1,2,4-Trimethylbenzene	106
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	95
Vinyl Acetate	117
Octane	100
Pentane	98
Butylbenzene	106
Decane	102
Dodecane	112
sec-Butylbenzene	104
p-Cymene	106

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: CCV

Lab ID#: 2101105-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/12/21 11:14 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: LCS

Lab ID#: 2101105-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/12/21 11:43 AM**	

Compound	%Recovery	Method Limits
Chloromethane	93	70-130
Vinyl Chloride	103	70-130
Freon 113	100	70-130
1,1-Dichloroethene	109	70-130
Acetone	95	70-130
Carbon Disulfide	98	70-130
Methylene Chloride	95	70-130
trans-1,2-Dichloroethene	105	70-130
Hexane	107	70-130
1,1-Dichloroethane	104	70-130
2-Butanone (Methyl Ethyl Ketone)	103	70-130
cis-1,2-Dichloroethene	106	70-130
Chloroform	105	70-130
1,1,1-Trichloroethane	102	70-130
Benzene	102	70-130
Trichloroethene	101	70-130
Toluene	98	70-130
1,1,2-Trichloroethane	101	70-130
Tetrachloroethene	102	70-130
Chlorobenzene	102	70-130
Ethyl Benzene	106	70-130
m,p-Xylene	109	70-130
o-Xylene	107	70-130
Styrene	110	70-130
Cumene	106	70-130
Propylbenzene	106	70-130
1,3,5-Trimethylbenzene	104	70-130
1,2,4-Trimethylbenzene	109	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	119	60-140
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCS

Lab ID#: 2101105-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/12/21 11:43 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: LCSD

Lab ID#: 2101105-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/12/21 12:10 PM**	

Compound	%Recovery	Method Limits
Chloromethane	92	70-130
Vinyl Chloride	98	70-130
Freon 113	98	70-130
1,1-Dichloroethene	110	70-130
Acetone	97	70-130
Carbon Disulfide	97	70-130
Methylene Chloride	95	70-130
trans-1,2-Dichloroethene	104	70-130
Hexane	107	70-130
1,1-Dichloroethane	104	70-130
2-Butanone (Methyl Ethyl Ketone)	104	70-130
cis-1,2-Dichloroethene	106	70-130
Chloroform	104	70-130
1,1,1-Trichloroethane	100	70-130
Benzene	102	70-130
Trichloroethene	101	70-130
Toluene	99	70-130
1,1,2-Trichloroethane	101	70-130
Tetrachloroethene	102	70-130
Chlorobenzene	102	70-130
Ethyl Benzene	105	70-130
m,p-Xylene	109	70-130
o-Xylene	107	70-130
Styrene	110	70-130
Cumene	106	70-130
Propylbenzene	105	70-130
1,3,5-Trimethylbenzene	103	70-130
1,2,4-Trimethylbenzene	109	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	118	60-140
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: LCSD

Lab ID#: 2101105-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p011204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/12/21 12:10 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	104	70-130