Groundwater Monitoring Report

RCRA Corrective Action Program
Boeing Renton Facility
Wood Project # PS20203450.2022

Prepared for:

The Boeing Company
Seattle, Washington

May 26, 2022

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Prepared by:

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May 26, 2022

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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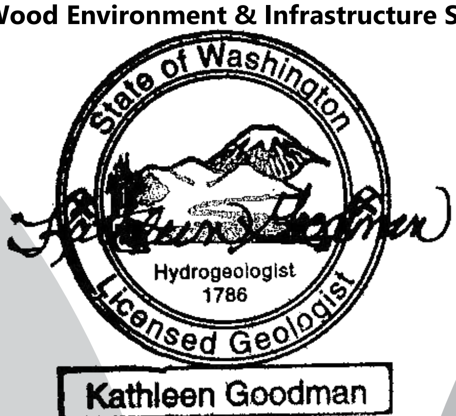
As approved by the Washington State Department of Ecology in a letter dated July 31, 2020, progress reporting is conducted on a semiannual basis in conjunction with monitoring, operations, and maintenance activities conducted pursuant to Agreed Order No. 8191and as outlined in the Engineering Design Report (AMEC, 2014).

Wood Environment & Infrastructure Solutions, Inc.



May 26, 2022

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List of acronyms

µg/L	micrograms per liter
AOC	area of concern
Boeing	The Boeing Company
CAP	Cleanup Action Plan
cis-1,2-DCE	cis 1,2-dichloroethene
CMP	Compliance Monitoring Plan
COC	constituent of concern
CPOC	conditional point of compliance
CUL	cleanup level
DO	dissolved oxygen
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
MA	monitored attenuation
mg/L	milligrams per liter
MNA	monitored natural attenuation
Order	Agreed Order No. 8191
ORP	oxidation/reduction potential
PCE	tetrachloroethene
RCRA	Resource Conservation and Recovery Act
SVE	soil vapor extraction
SWMU	solid waste management unit
TCE	trichloroethene
the Facility	the Boeing Renton facility
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TPH-D	total petroleum hydrocarbons as diesel
TPH-G	total petroleum hydrocarbons as gasoline
TPH-O	total petroleum hydrocarbons as motor oil
VC	vinyl chloride
VOC	volatile organic compound

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 2022 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) (CALIBRE, 2020) to Ecology on June 30, 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).

Although Apron A was not included in the CAP or EDR, this report includes monitoring results for Apron A. Semiannual monitoring began in Apron A 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. Concentrations for protection of groundwater for beneficial use 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 CULs in the Model Toxics Control Act regulations since the draft CAP (AMEC, 2012) was prepared that are relevant to the Facility CULs. Boeing submitted proposed updates to the CULs (CALIBRE, 2021) to Ecology that are currently under review. 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 2022 for the period from November 2021 through April 2022. 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 2022

The following work was completed during the wet season 2022 (the period from November 2021 through April 2022):

- Nitrate/sulfate injections were performed at the Building 4-78/79 area during November 2021.
- On behalf of Boeing, Wood Environment & Infrastructure Solutions, Inc. submitted the dry season 2021 Groundwater Monitoring Report to Ecology on November 29, 2021.
- The SVE system in SWMU-172 and SWMU-174 operated throughout the wet season, with one intermission from December 20, 2021, through January 24, 2022.
- CALIBRE collected samples for TO-15 analysis in SWMU-172/174 on January 24 and 25, and February 9, 2022, for monitoring of contaminant rebound.
- CALIBRE sampled the following injection well monitoring points on February 17, 2022, to monitor the status of COCs:
  - B003-001 in AOC-003,
  - GW-210S and B78-16 in the Building 4-78/79 Area, and

- B172-01 and B172-08 in SWMU-172/174.

- Landau Associates completed the 2022 site-wide wet season sampling from February 21–23, 2022.

1.2 Deviations from required tasks

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

1.3 Deviations from CAP

During this activity period, three deviations from the CMP occurred:

- No groundwater samples were collected in the Building 4-78/79 SWMU/AOC Group from source area wells GW031S and GW244S, which were decommissioned during 2021 excavation of soils contaminated with total petroleum hydrocarbons (TPH) and have not yet been replaced. More details regarding this deviation are provided in Section 3.3.2.
- For the Former Fuel Farm AOC group, a laboratory analyst error occurred for the groundwater sample from GW211S, in which the reporting limits were above the CULs. More details regarding this deviation are provided in Section 3.4.2.
- For AOC 90, the reporting limit for 1,1,2,2-tetrachloroethane was elevated above the CUL due to interference during the analysis. The analyte was not detected at the reporting limit; however, this does not meet the precision goals of the CMP. More details regarding this deviation are provided in Section 3.9.2.

Modifications proposed in CMP Addendum #3 (CALIBRE, 2020) and approved by Ecology have been incorporated into this sampling event and are summarized for each sampling area.

1.4 Schedule of monitoring

Ecology approved the modifications to the monitoring plan in CMP Addendum #3 (CALIBRE, 2020) on July 31, 2020, including a change from both quarterly and semiannual sampling to a sitewide semiannual program with sampling events to occur during the wet and dry seasons (in February and August, respectively). The revised monitoring plan is detailed in Appendix A, Table A-1. This revised sampling schedule began in August 2020.

In 2022, the wet season report will be delivered to Ecology on or before May 31 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 upcoming 2022 dry season event:

- In support of ongoing construction activities at the Boeing Renton site, well decommissioning and reinstallation in Apron R (AOC-001 and -002) is planned to take place. Monitoring wells in the area of construction at Apron R were decommissioned in November 2019 and more wells are planned to be decommissioned in late 2022. Construction schedule delays were incurred due to a recent concrete workers strike. Wells that were a part of the CMP Addendum #1 sampling program are scheduled to be reinstalled when construction is complete. The reinstallation is planned to be completed in late 2023. The Apron R Well Abandonment and Replacement: AOC-001 and AOC-002 Memo (Wood, 2021) provides more details and a comprehensive list of the plan of wells to be decommissioned and/or replaced.

- Monitoring wells GW031S and GW244S were decommissioned as a part of the Building 4-78/79 excavation work and are planned to be replaced in 2022, prior to the dry season CMP sampling event.
- A technical memorandum recommending closure/decommissioning of wells that are no longer required for investigative, bioremediation, or compliance monitoring purposes was submitted to Ecology on January 5, 2022 (CALIBRE, 2022). Ecology approved the well decommissioning plan on January 18, 2022, and the decommissioning activities are planned to start in May 2022 and be completed by the end of the year.
- Continued enhanced reductive dechlorination treatment is planned for SWMU-172/174, Building 4-78/79, AOC-003, AOC-060, AOC-090, and Apron A.
- Shutdown SVE system in SWMU-172/174, pending Ecology concurrence.
- 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).

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 also 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 2022. 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 for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and the groundwater elevation at the remaining well 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 (CALIBRE, 2020) by Ecology. CPOC area wells GW229S and GW231S have been removed from the monitoring plan in this area. The COC remained the same.

3.1.3 Water levels

The groundwater elevation measured during the wet season 2022 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, GW230I, is currently monitored in this group. The general direction of groundwater flow depicted on Figure 2 is based on historical information.

3.1.4 Groundwater monitoring results

Results for primary geochemical indicators are presented in Table 2; results for the single SWMU-168 COC, vinyl chloride, are presented in Table 3; and COC results for sampling events in recent years are presented in Appendix D.

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 pH value measured was slightly acidic at 6.41. The CPOC well showed reducing conditions with low dissolved oxygen (DO) and a low but positive oxidation/reduction potential (ORP) reading. Reducing conditions are present in well GW230I, indicating conditions favorable for dechlorination of volatile organic compounds (VOCs).

3.1.4.2 COC results for source area

Groundwater samples were not collected from the source area well, GW228S, for SWMU-168 per CMP Addendum #3 (CALIBRE, 2020).

3.1.4.3 COC results for conditional point of compliance area

The monitoring result for the CPOC area well is shown in Table 3. The concentration of VC in the groundwater from CPOC area well GW230I was slightly above the CUL of 0.11 micrograms per liter (µg/L), at 0.164 µg/L. Historical trends for VC in GW230I are shown in Appendix D and depicted on Figure 3. VC concentrations show an apparent seasonal pattern with lower concentrations in the wet season; the recent wet season concentration decreased since the last monitoring event, in keeping with the trend.

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 for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) 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 of 2022.

3.2.1.2 Soil vapor extraction and bioremediation operations

The SVE system operated throughout the wet season of 2022 with one intermission between December 20, 2021, and January 24, 2022, when the system was shut down to perform rebound testing. Samples were collected for TO-15 analysis on January 24 and 25, and February 9, 2022, to measure rebound effect. No rebound was observed. Details of 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 (CALIBRE, 2020) by Ecology. Downgradient plume area well GW081S and CPOC area well GW233I were removed from the monitoring plan under CMP Addendum #3 (CALIBRE, 2020). The COCs remained the same for SWMU-172 and SWMU-174 under CMP Addendum #3.

3.2.3 Water levels

Groundwater elevations for the SWMU-172 and SWMU-174 area measured during the wet season event 2022 are summarized in Table 4 and shown on Figure 4. The groundwater elevation data show a flow direction generally to the northeast, toward the Cedar River Waterway; however, the sheet pile wall to the east of this area prevents a direct groundwater connection to the river, as depicted by the contours.

3.2.4 Groundwater monitoring results

Groundwater at this area is monitored following the analysis protocol 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. Specific conductivity ranged between 140.6 and 352.6 microsiemens per centimeter across the area, which are normal observed values for the groundwater in this SWMU. pH was slightly acidic across SWMU-172 and SWMU-174. ORP was positive in the source area wells as well as in some of the downgradient and CPOC area wells; DO and ORP results indicate reducing conditions in the area and other natural attenuation parameter results were generally uniform across this area. Total organic carbon (TOC) concentrations ranged from 0.50 milligrams per liter (mg/L) to 7.80 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 2022 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. Figure 7 shows trend plots for the same COCs in downgradient plume area well GW226S. Groundwater flows generally 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 (and the associated duplicate sample): cis-1,2-DCE, PCE, TCE, and VC, and
- GW153S: cis-1,2-DCE and VC.

Downgradient plume area groundwater CUL exceedances (Table 6) consisted of:

- GW172S: cis-1,2-DCE, PCE, TCE, and VC,
- GW173S: none,
- GW226S: cis-1,2-DCE.

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 in this SWMU area. As shown on Figure 8, the arsenic concentrations in groundwater from source and downgradient plume area wells have generally remained stable over the past two years. The observed range of arsenic in groundwater is within the naturally occurring background arsenic range reported by Ecology[1] for Washington State (Ecology 2021).

Both copper and lead were detected above the CULs in the groundwater from source area well GW152S and its duplicate sample. Lead was also detected above the CUL in the groundwater from downgradient plume area well GW172S.

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, GW234S, and GW235I; TCE was also detected above the CUL in the groundwater from GW235I; and VC was detected above the CUL in the groundwater from GW232S. VC was also detected in GW234S and GW235I, but below the CUL. The only detected compound in GW236S was PCE, which narrowly exceeded the CUL at 0.0206 µg/L. Figure 9 shows the COCs in the CPOC area have decreased since the previous sampling event.

Arsenic was detected above the CUL in the groundwater from all CPOC area wells except for GW235I, where it was not detected. Lead and copper were detected in all CPOC area wells, but only exceeded the CUL in the groundwater from GW236S (Table 6). Figure 10 shows arsenic, copper, and lead concentration trends in groundwater from the CPOC area wells since the beginning of compliance monitoring. As shown in Figure 10, arsenic, copper, and lead remained within a stable range or decreased since the last monitoring event.

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[1] The 2021 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. For the Puget Sound Basin, 50 percent of samples are non-detect but the natural background range includes more than 1,400 samples between 0.8 and 76 µg/L arsenic, with an average of 5.4 µg/L. This naturally occurring range is consistent with prior studies by USGS (2000) and Ecology (1989) in Washington State.

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 2022. The cleanup remedy for this SMWU/AOC group is bioremediation and MA as well as excavation of soils contaminated with TPH; discontinuation of SVE was approved by Ecology on November 1, 2018, and the system was decommissioned during the first quarter of 2019. Figure 11 shows the location of the September 2021 TPH source area soil excavation, groundwater monitoring wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020), extraction wells, decommissioned wells, horizontal SVE wells, and bioremediation injection wells for this area. Decommissioned wells in the area are depicted on the figure with a gray symbol.

3.3.1 Cleanup action activities

3.3.1.1 Installation/construction activities

No installation or construction activities were conducted during the wet season 2022. Monitoring wells GW031S and GW244S are planned to be replaced during the dry season 2022.

3.3.1.2 Soil vapor extraction and bioremediation activities

SVE operations were discontinued in late 2018; anaerobic biodegradation of benzene by nitrate/sulfate injections is the current remediation method. Certain bioremediation injection wells are still sampled to monitor the status of COCs. Trend charts for *cis*-1,2-DCE and benzene in nitrate/sulfate injection wells are presented in Figure 12, and trend charts for TCE and VC in the injection wells are presented in Figure 13.

Two wells in the Building 4-78/79 SWMU/AOC group, GW-210S and B78-16, were sampled by CALIBRE during this monitoring period. A nitrate/sulfate solution was injected in this area for benzene treatment in November 2021. More details are available in SVE Report (Appendix E). These two wells are not regularly monitored; therefore, trend charts have not been created to include their results.

3.3.2 Compliance monitoring plan deviations

Deviations from the CMP during the wet season event did not include groundwater sample collection from wells GW031S and GW244S, which were decommissioned during the 2021 Building 4/78-79 source area soil excavation and have not yet been replaced. These wells will be replaced prior to the next semi-annual sampling event in August 2022. The wells monitored in this group changed with Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020). 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 was generally to the west. The measured groundwater elevations during this event did not allow for contouring of groundwater flow patterns.

3.3.4 Groundwater monitoring results

Groundwater at this area is monitored following the analysis protocol presented in Tables A-1 and A-2 in Appendix A. 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.

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 moderate levels of DO and high specific conductivity. The pH was slightly acidic, ranging between 5.97 and 6.36 standard units in all wells. The source area wells showed reducing conditions favorable for dechlorination of VOCs. Results for the other primary geochemical indicators were generally consistent in all wells. TOC concentrations in source area wells ranged from 7.7 to 8.8 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.

Benzene, cis-1,2-DCE, and VC were detected above the CUL in source area well GW033S (and the duplicate sample). VC was also detected above the CUL in GW034S. TPH as gasoline (TPH-G) was not detected above the CUL in any source area wells.

Figure 14 shows trends for VOCs in source area wells GW031S and GW033S. GW031S was not sampled during this monitoring event so the trend chart does not have any new data points. COCs in GW033S appear to be stabilizing over the past three 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 ten monitoring events. GW244S was not sampled during this event but 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 2022 are summarized in Table 9. Trends for CPOC area wells GW143S, GW237S, and GW240D are shown in Figures 16 through 18. Benzene was detected at 3.73 µg/L in groundwater from GW237S, above the 0.80 µg/L CUL. Cis-1,2-DCE was detected in GW143S and TPH-G was detected in GW237S, but both were below their CULs.

Benzene has been sporadically detected above the CUL in groundwater from the CPOC area well GW237S but has not been detected above the CUL in the groundwater from any of the other CPOC area wells.

Cis-1,2-DCE has been detected sporadically in groundwater above CUL from CPOC area well GW143S (though 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). Figure 17 shows that TCE has not been detected in the CPOC area for three consecutive events and VC was only detected in GW237S over the last five monitoring events; however, all CPOC area wells were non-detect for TCE and VC during the most recent event. Figure 18 shows that TPH-G was detected only in GW237S since monitoring began and has been steadily decreasing, with the last five monitoring events under the CUL.

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 2022. Figure 19 shows the layout of the groundwater monitoring wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020). 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 2022.

3.4.2 Compliance monitoring plan deviations

One deviation from the CMP occurred for this area during the wet season. The laboratory groundwater analyses reporting limits should be below the associated CULs in order to show whether or not an exceedance of the CUL occurred. For the groundwater sample from GW211S, an analyst error occurred, and the reporting limits were above the CULs. The laboratory was made aware of this issue to avoid recurrence of the same issue in the future. More details are available in Appendix C. The wells monitored in this group changed with Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020). Source area well GW255S and CPOC area wells GW183S, GW184S, GW212S, GW256S, GW257S, and 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 are too limited to produce accurate contours. Groundwater flow direction to the northeast is based on historical information from this AOC.

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.

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. Specific conductivity was moderate for groundwater. Near neutral pH was observed in CPOC area wells ranging from 5.97 to 6.63 standard units. Low to moderate DO and low ORP was observed in all monitored wells. The geochemical indicators indicate natural attenuation of the COCs for the Former Fuel Farm AOC Group is occurring.

3.4.4.2 COC results for source area

The single source area well for this group was removed from the monitoring plan with Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020).

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. TPH-D was detected above the CUL in GW221S and GW224S (and its duplicate sample). TPH-O was not detected in any of the CPOC area wells. Jet A was detected in both GW221S and GW224S, but only exceeded the CUL in the sample from GW224S. None of the COCs were detected in GW211S; however, the elevated reporting limits are above the CUL. It is worth noting that both TPH-D and Jet-A have been below the CUL in GW211S for the previous eight monitoring events. COC concentrations in GW221S remain in a stable range. Concentrations in GW224S appear to be decreasing steadily, with annual fluctuations in both TPH-D and Jet-A.

3.5 AOC-001 and AOC-002

Apron R near AOC-001 and AOC-002 is under construction. Therefore, no monitoring was conducted for this area during the wet season 2022. Monitoring wells in these areas were removed on November 25, 2019, and more are scheduled to be removed during the wet season 2022. Monitoring wells are planned to be reinstalled after construction is complete, which is currently anticipated for late 2023. Groundwater monitoring activities are anticipated to resume in 2024 after the wells are replaced.

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 wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and bioremediation wells, 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 Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020). 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. The layout of remaining groundwater elevations in this area does not allow for contouring of groundwater patterns. The groundwater flow direction to the northwest is estimated based on historical information of the area and is consistent with the available groundwater elevations measured during this event.

3.6.4 Groundwater monitoring results

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. High specific conductivity and low DO were observed during this monitoring event, and pH readings were near neutral for all wells in this area. Based on the geochemical indicators, reducing conditions are occurring in this area.

3.6.4.2 COC results for source and downgradient plume areas

Samples from wells in this group were analyzed for VC. The concentration in the source area well was above the CUL. VC was detected in the downgradient plume area well but was below the CUL. The results for this area are qualified as estimated (see Appendix C for more information). Figure 22 shows the historical trends of VC in source area well GW249S and downgradient plume area well GW188S.

3.6.4.3 COC results for conditional point of compliance area

VC was detected in both CPOC area wells, but only exceeded the CUL in GW248I. The results for this area are qualified as estimated (see Appendix C for more information). 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 wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and bioremediation wells, 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 Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020). CPOC area well GW174S was removed from the monitoring program for AOC-004. The COC remained the same (only lead is monitored in this area).

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 contouring and flow direction cannot be determined from the single groundwater elevation measurement, but a general direction of groundwater flow based on historical information is shown on Figure 24.

3.7.4 Groundwater monitoring results

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 6.96 standard units. Moderate specific conductivity, DO, and 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 and the result was below the CUL of 1 μg/L. Figure 25 shows the historical trend chart 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 wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and bioremediation wells, 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 Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020). 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 west, toward the Cedar River Waterway. Groundwater contouring and direction of groundwater flow is shown on Figure 26.

3.8.4 Groundwater monitoring results

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. Results during this monitoring event showed high specific conductivity and low DO. The pH was near neutral in this AOC, with all wells between 6.0 and 7.0 standard units. TOC results ranged from 2.3 to 8.2 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 VC. Wells GW009S, GW012S, and GW147S exceeded the CUL for TCE. Figure 27 shows historical trends for COCs in source area well 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. TCE in GW012S appears to have stabilized over the past several monitoring events.

3.8.4.3 COC results for conditional point of compliance area

Groundwater from both CPOC area wells exceeded the CUL for cis-1,2-DCE. Detections of VC were present in groundwater from both CPOC area wells but did not exceed the CUL. Figure 29 shows historical trends of COCs in CPOC area wells GW150S and GW253I. Considerable fluctuation is still present for cis-1,2-DCE and VC, but TCE appears to be stabilizing in both CPOC area wells.

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 wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and bioremediation wells, 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

One minor deviation from the CMP occurred for this area during the wet season: the reporting limit for 1,1,2,2-tetrachloroethane was elevated above the CUL due to interference during the analysis. The analyte was not detected at the reporting limit; however, this does not meet the precision goals of the CMP. More details are available in Appendix C. The wells and COCs monitored in this group changed with Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020). Wells GW163I, GW165I, GW175I, GW177I, GW179I, and GW180S were removed from the monitoring program. Analytes were reduced to chlorinated VOCs 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. Groundwater flow direction is to the west, toward the Cedar River Waterway; however, the sheet pile wall to the west of this area prevents a direct groundwater connection to the river, as depicted by the contours.

3.9.4 Groundwater monitoring results

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 all wells between 6.23 and 6.55 standard units. Specific conductivity was moderate to high across the wells in this area and DO was relatively low. TOC was measured at 3.30 mg/L in source area well GW189S. The trend plot for TOC in GW189S shows TOC has decreased significantly since the last substrate injection in 2017 (Figure 31).

3.9.4.2 COC results for source and downgradient plume areas

Groundwater from source area well GW189S did not exceed any of the CULs for monitored analytes. The reporting limit for 1,1,2,2-tetrachloroethane was elevated above the CUL but the sample was non-detect at the slightly elevated reporting limit. More details are available in Appendix C. Historical trends for GW189S show chlorinated VOCs are trending downward since the start of monitoring with seasonal fluctuations at a low during this monitoring event (Figure 31). Downgradient plume area well GW176S exceeded the CUL for VC.

3.9.4.3 COC results for conditional point of compliance area

Groundwater from all CPOC area wells exceeded the CUL for VC.

3.10 Building 4-70 area

The Building 4-70 Area was removed from the monitoring program with Ecology's approval of CMP Addendum #3 (CALIBRE, 2020).

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 for which sampling is required under CMP Addendum #3 (CALIBRE, 2020).

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 Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020). 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 tops of casing elevations were never surveyed. Groundwater flow direction is estimated based on historical information of the area and flows east toward the Cedar River Waterway.

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.

3.12.4.1 Monitored attenuation/geochemical indicators

Geochemical parameters are presented in Table 26. Observations included high specific conductivity, low DO, slightly acidic pH, and a low ORP reading.

3.12.4.2 COC results

Analytes from Apron A samples do not have established CULs because they were added to the monitoring program after the CMP (Amec Foster Wheeler, 2016a) was in place. 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 2.54 µg/L. This exceeds the CUL for VC of 0.11 µg/L in SWMU-168, which the closest monitoring area to Apron A on the west side of the Cedar River Waterway. The trend plot for COCs in GW264S is shown in Figure 33.

4.0 References

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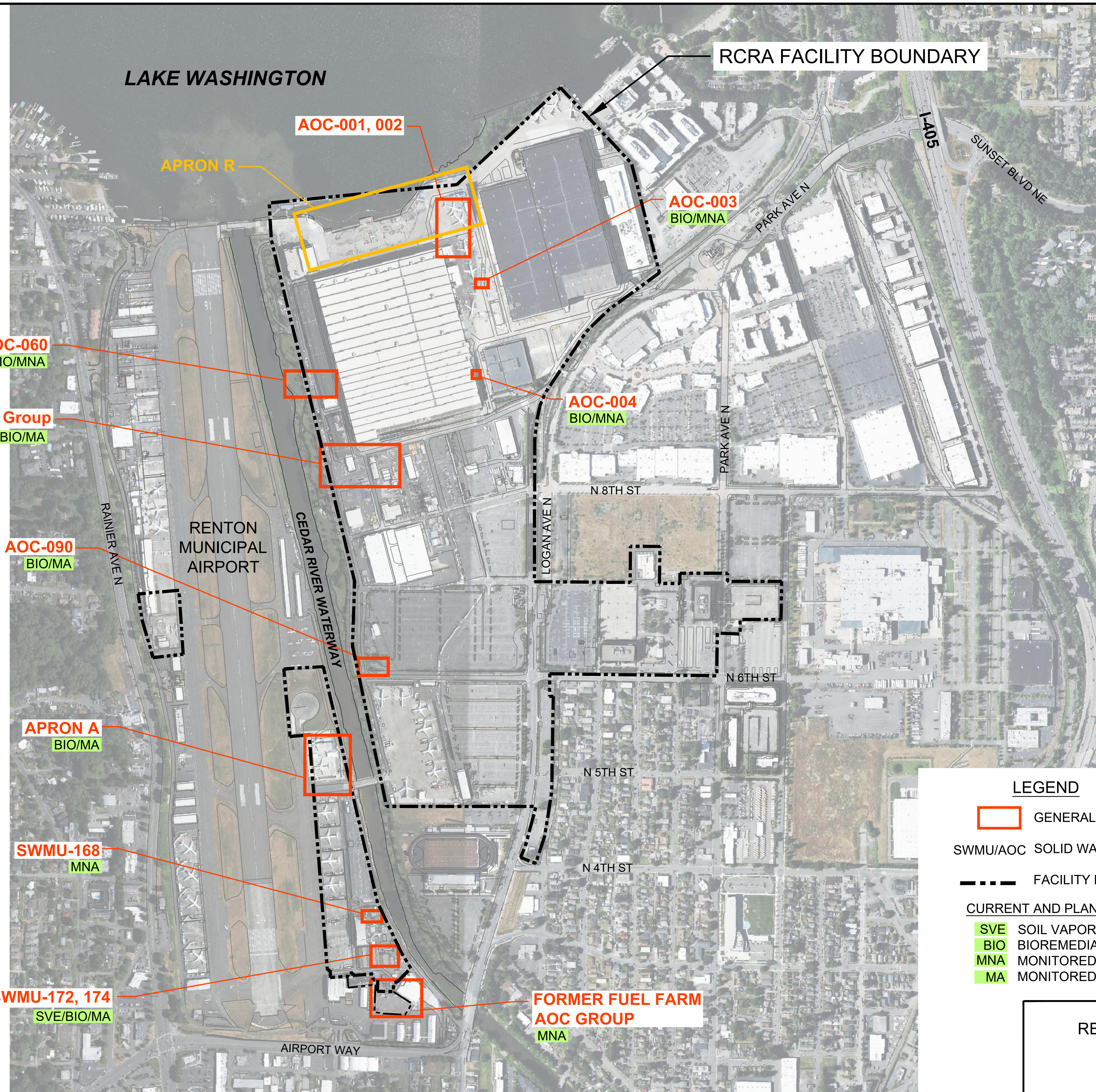
Figures



LEGEND

GENERAL LOCATION OF SWMUs AND AOCs

SWMU/AOC SOLID WASTE MANAGEMENT UNIT/AREA OF CONCERN

FACILITY BOUNDARY

CURRENT AND PLANNED CLEANUP REMEDIES:

SVE SOIL VAPOR EXTRACTION
BIO BIOREMEDIATION
MNA MONITORED NATURAL ATTENUATION
MA MONITORED ATTENUATION

0 400 800
APPROXIMATE SCALE IN FEET

BOEING

RENTON SWMU AND AOC LOCATIONS

Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/03/22	Project No. PS20203450
wood.		Figure 1

Plot Date: 05/03/22 - 1:27pm, Plotted by: adam.stenberg
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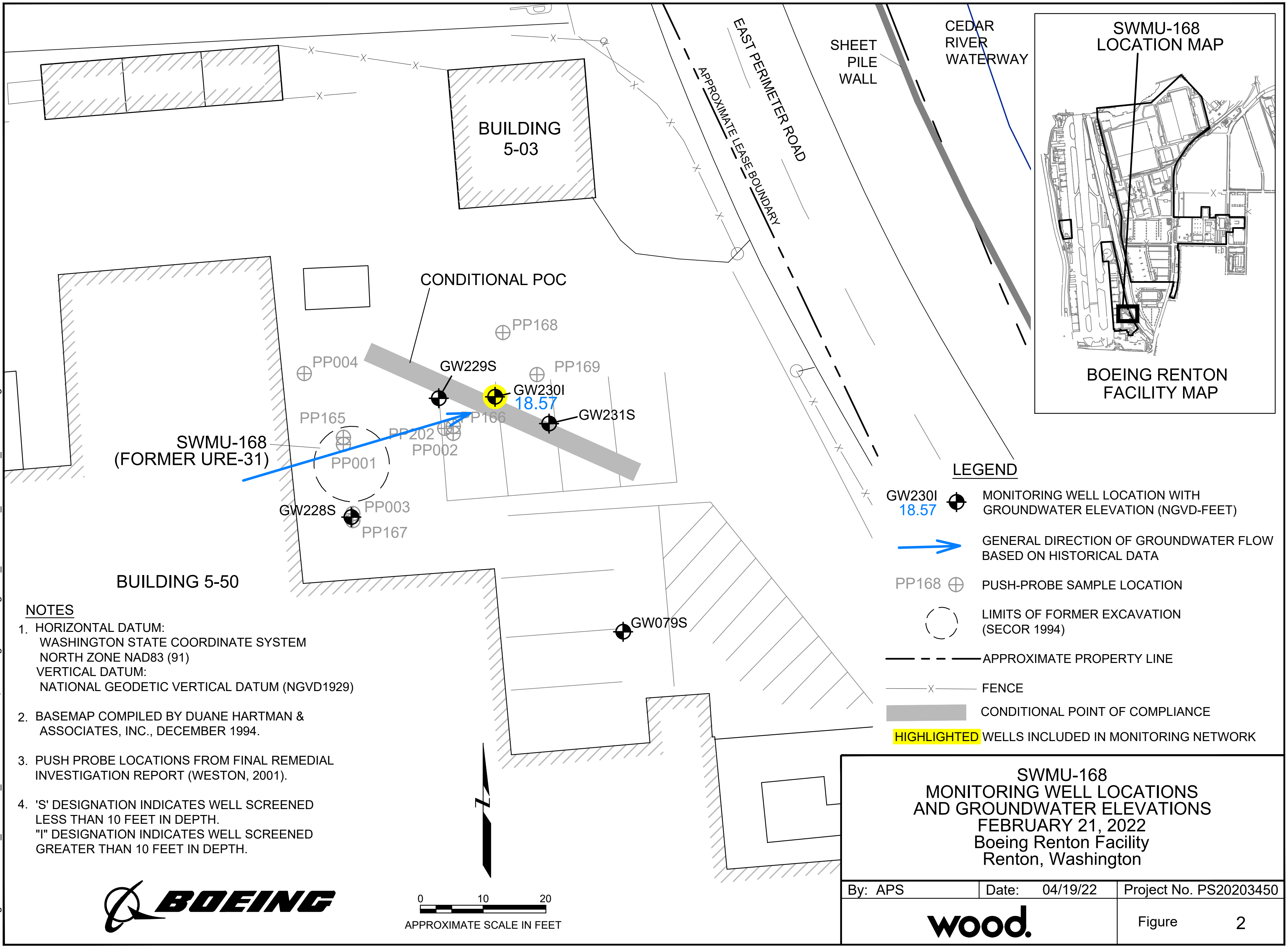


LEGEND

GW230I 18.57 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)

GENERAL DIRECTION OF GROUNDWATER FLOW BASED ON HISTORICAL DATA

PP168 — PUSH-PROBE SAMPLE LOCATION

LIMITS OF FORMER EXCAVATION (SECOR 1994)

APPROXIMATE PROPERTY LINE

FENCE

CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

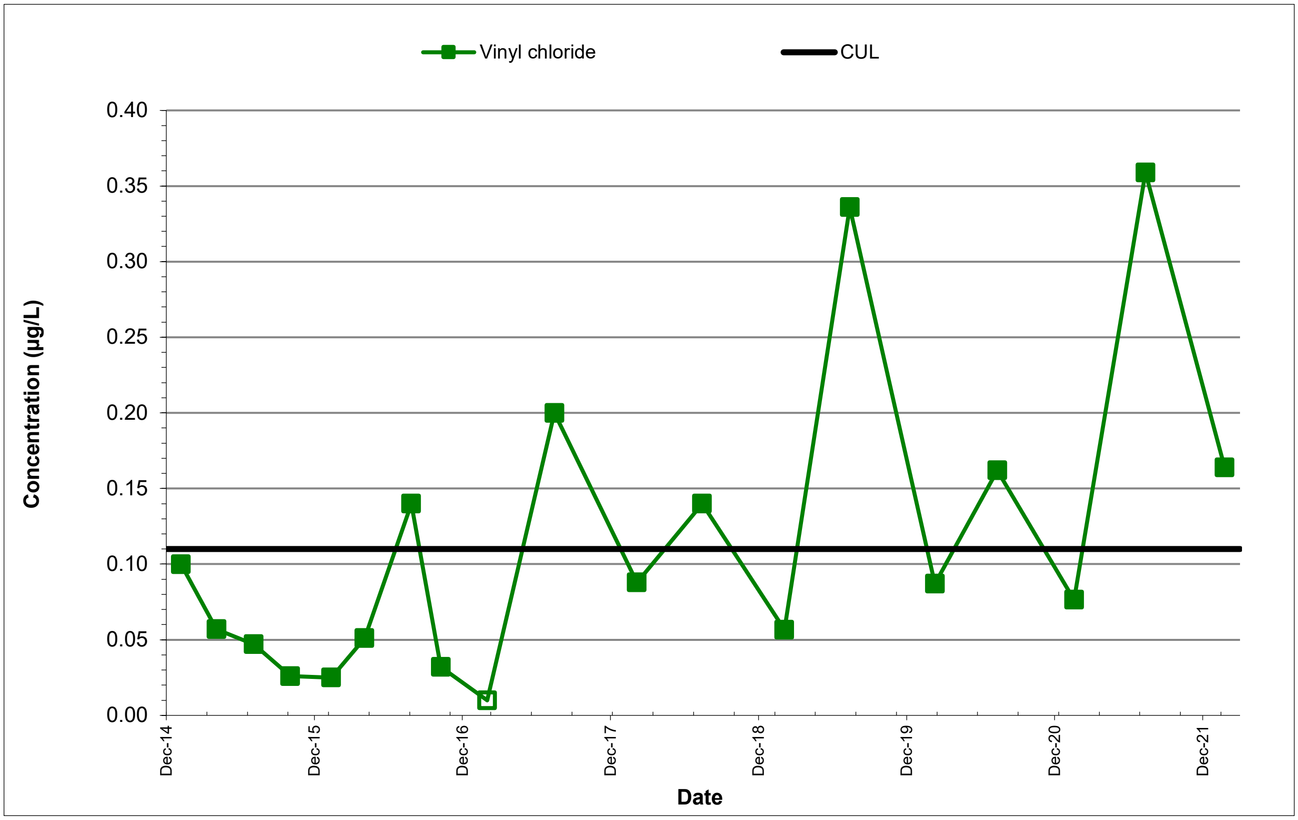
NOTES

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.

SWMU-168
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
FEBRUARY 21, 2022
Boeing Renton Facility
Renton, Washington

By: APS	Date: 04/19/22	Project No. PS20203450
wood.		Figure 2

Plot Date: 04/19/22 - 4:38pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\108_2022-Feb-GW-MR\, Drawing Name: Figure 2_SWMU-168_GW-ELEV_Feb2022.dwg



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

CPOC AREA WELL GW230I

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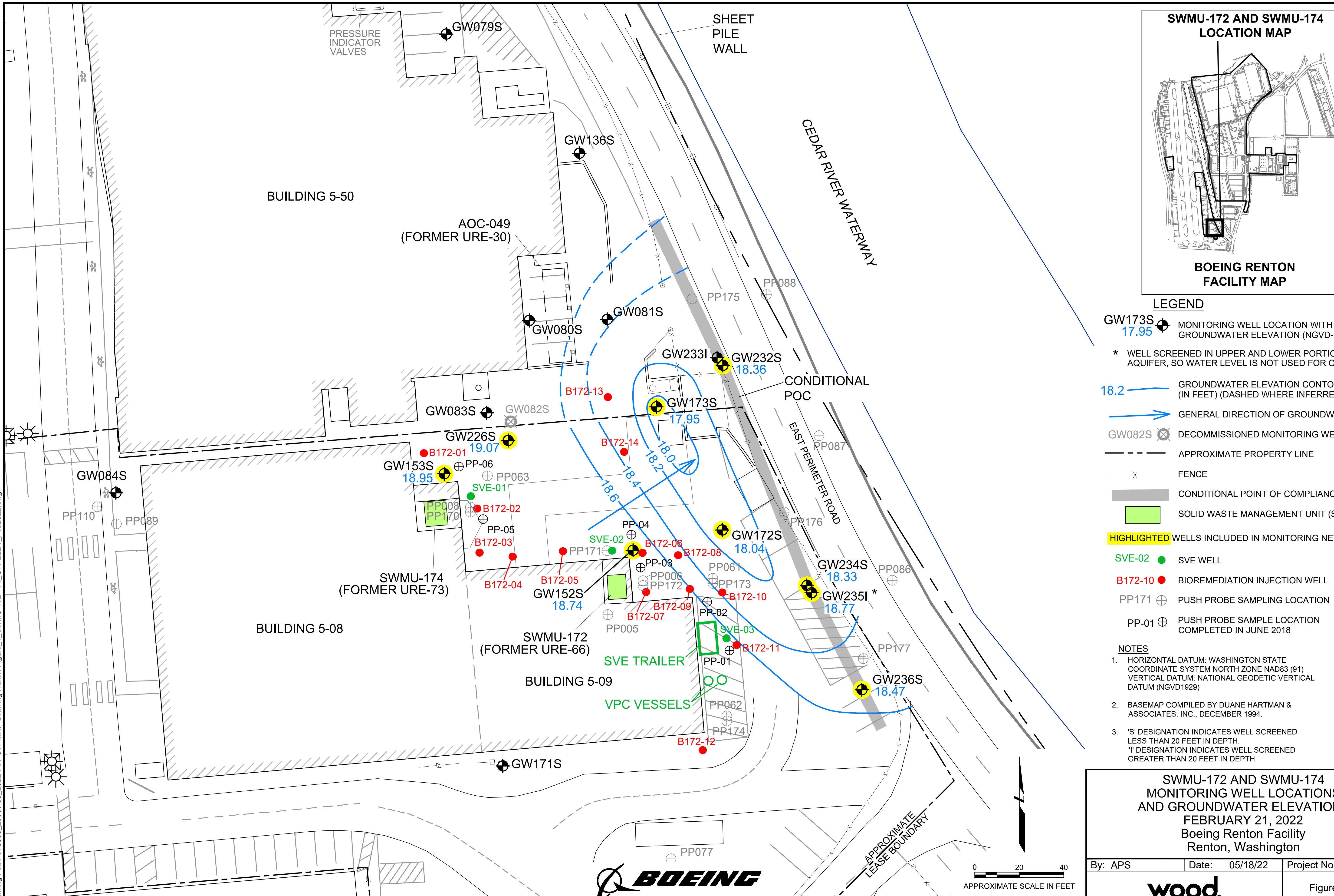
wood.

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

Project No.
PS20203450

Figure
3



LEGEND

GW173S 17.95	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.
18.2	GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
	GENERAL DIRECTION OF GROUNDWATER FLOW
GW082S	DECOMMISSIONED MONITORING WELL
	APPROXIMATE PROPERTY LINE
X	FENCE
	CONDITIONAL POINT OF COMPLIANCE
	SOLID WASTE MANAGEMENT UNIT (SWMU)
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

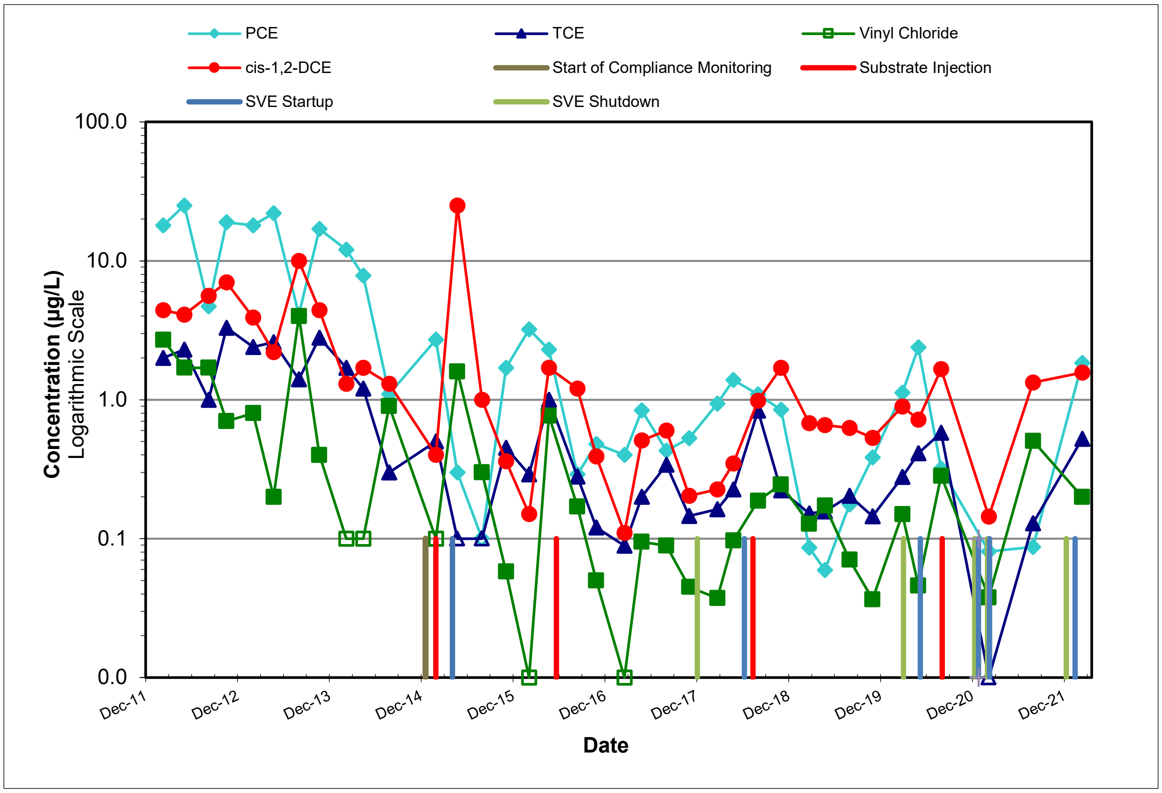
NOTES

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.

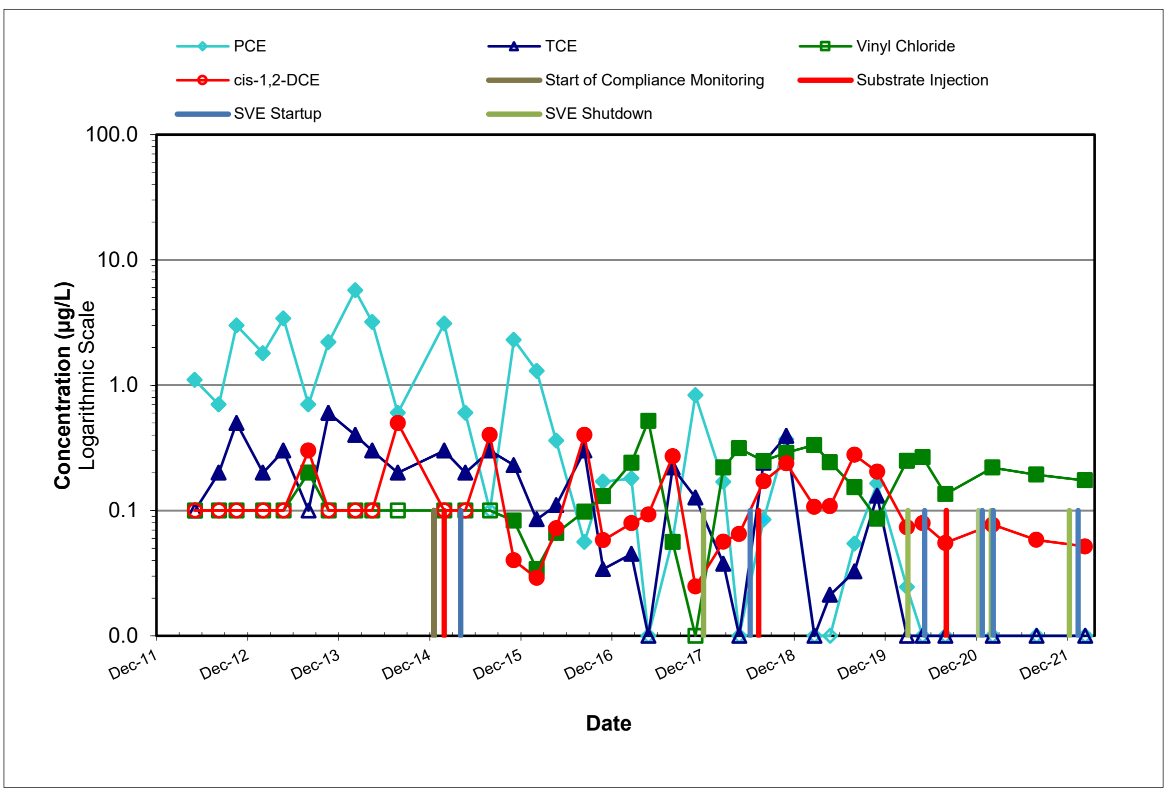
SWMU-172 AND SWMU-174
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
FEBRUARY 21, 2022
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/18/22	Project No. PS20203450
wood.		Figure 4

Plot Date: 05/18/22 - 11:45am, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\108_2022-Feb-GW-MR\, Drawing Name: Figure_4_SWMU-172-174_GW-ELEV_Feb2022.dwg



SOURCE AREA WELL GW152S

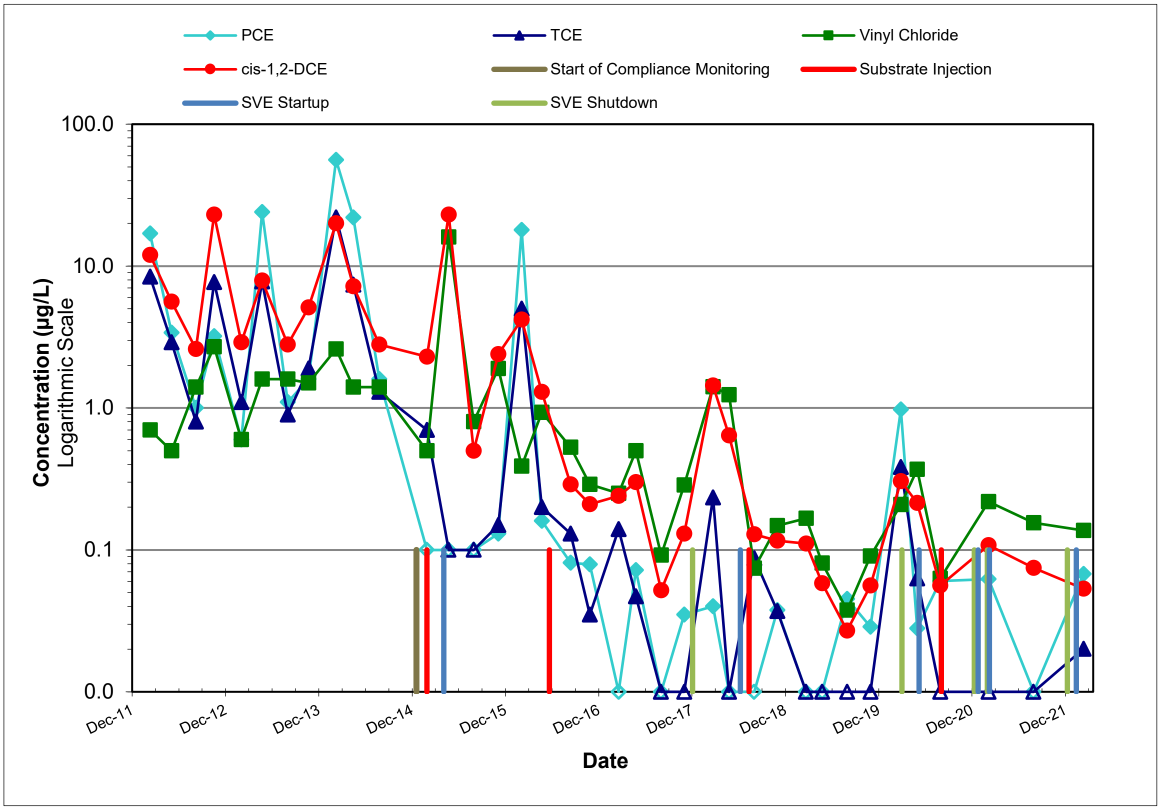


SOURCE AREA WELL GW153S

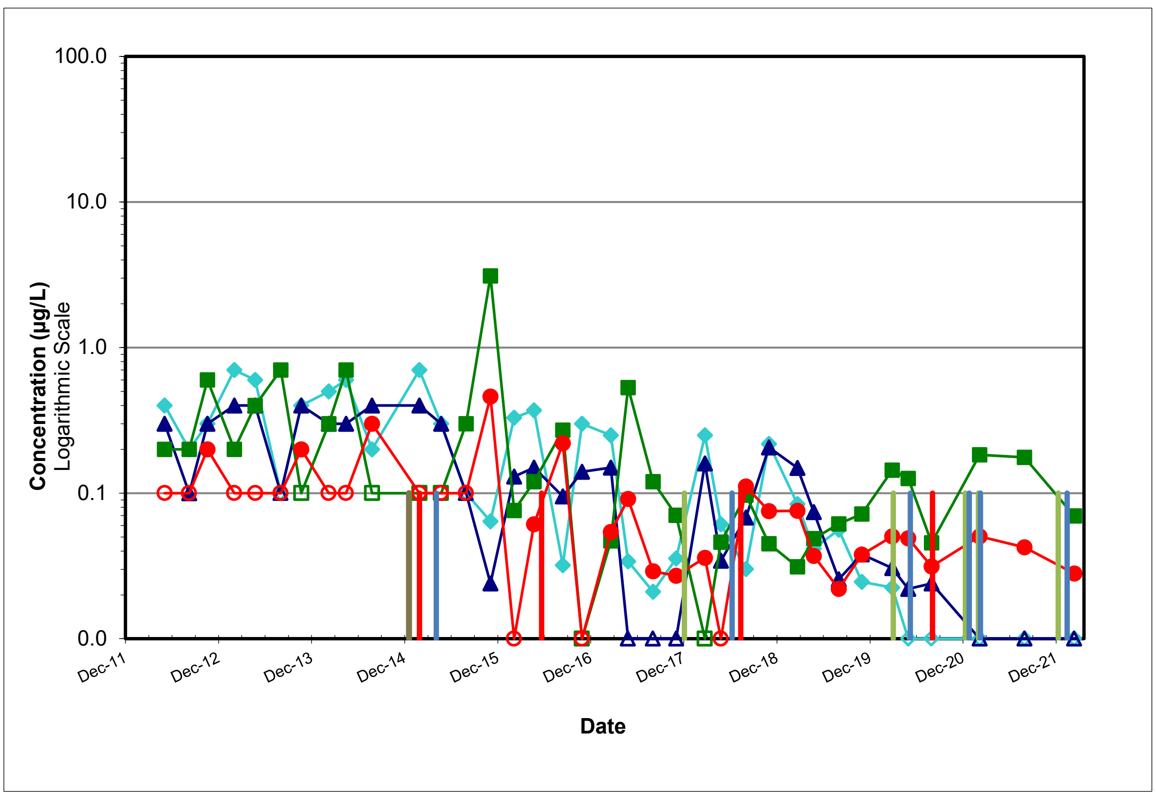
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

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

C:\Users\chelsea.foster\Desktop\Figure 5 to 10_ SWMU_172-174.xlsx



DOWNGRADIENT PLUME AREA WELL GW172S



DOWNGRADIENT PLUME AREA WELL GW173S

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

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

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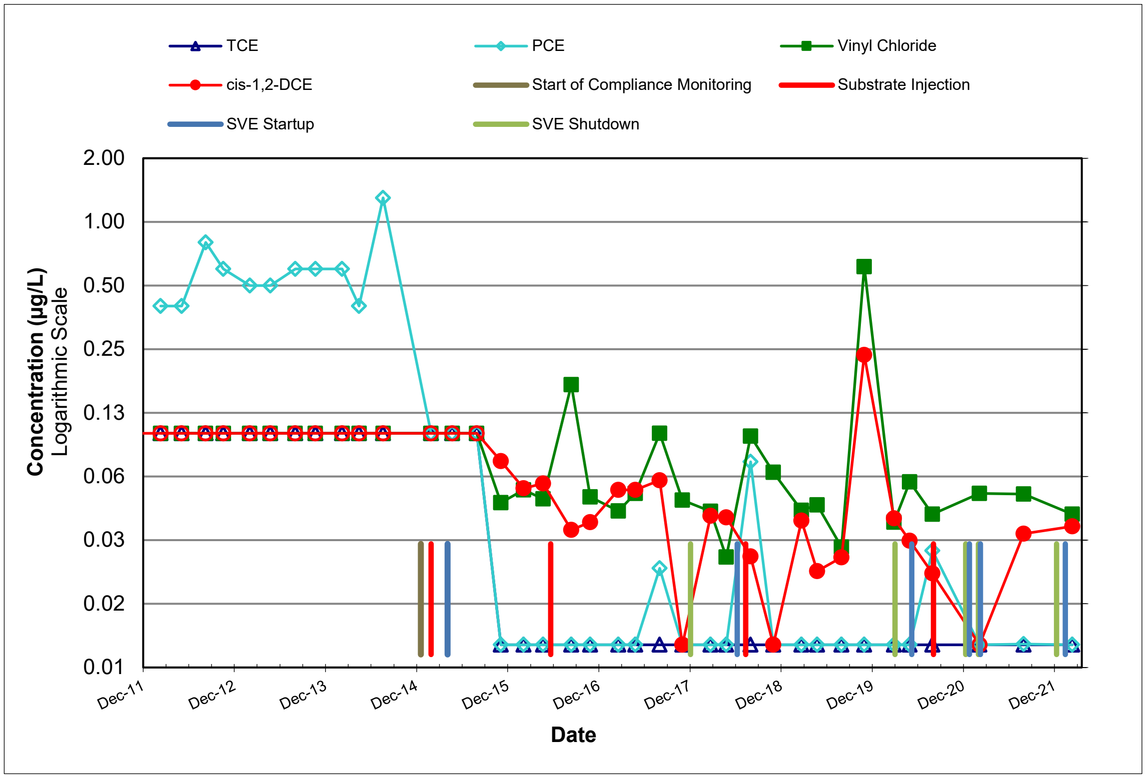
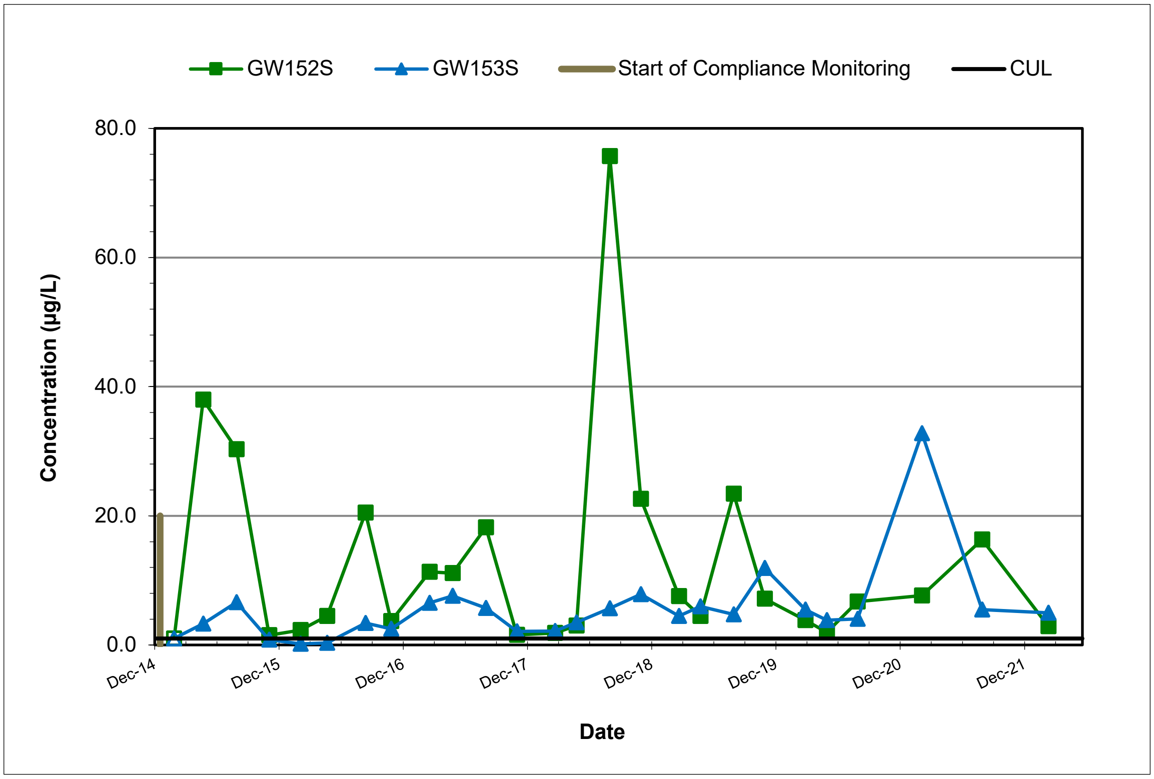


Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

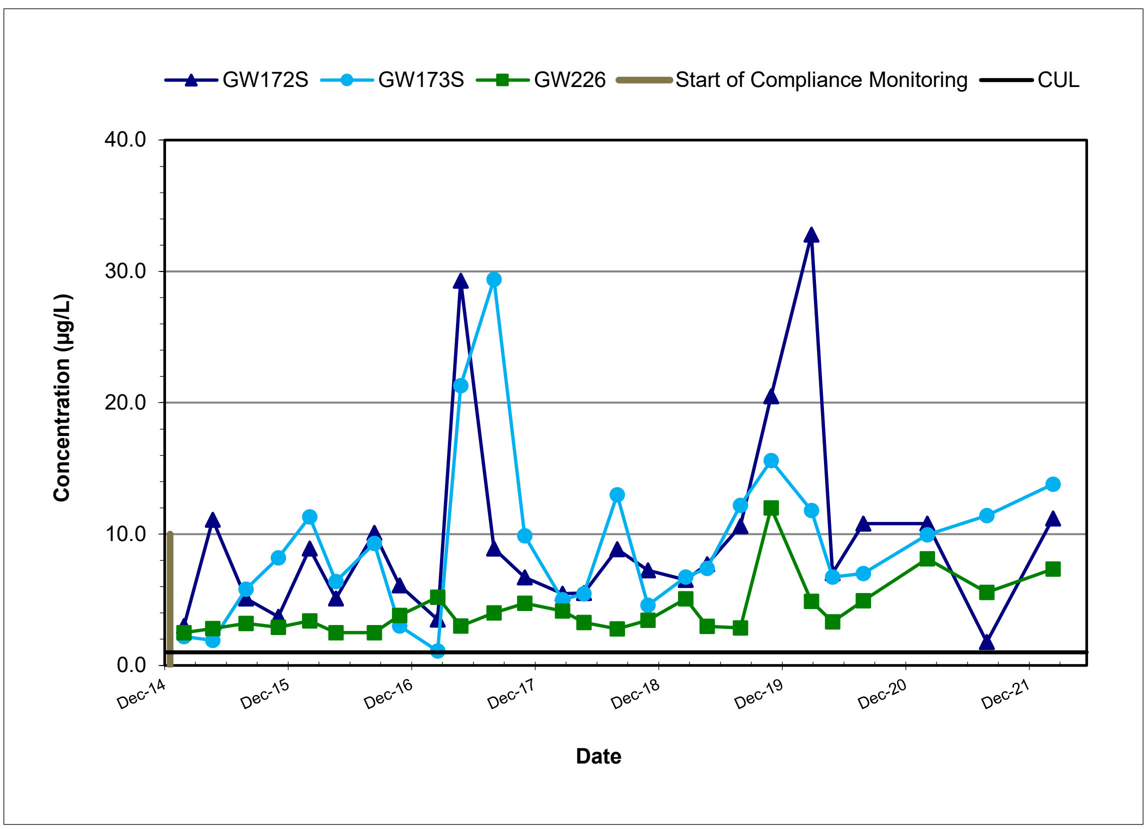
DOWNGRADIENT PLUME AREA WELL GW226S

C:\Users\chelsea.foster\Desktop\Figure 5 to 10_ SWMU_172-174.xlsx

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



TOTAL ARSENIC IN SOURCE AREA WELLS

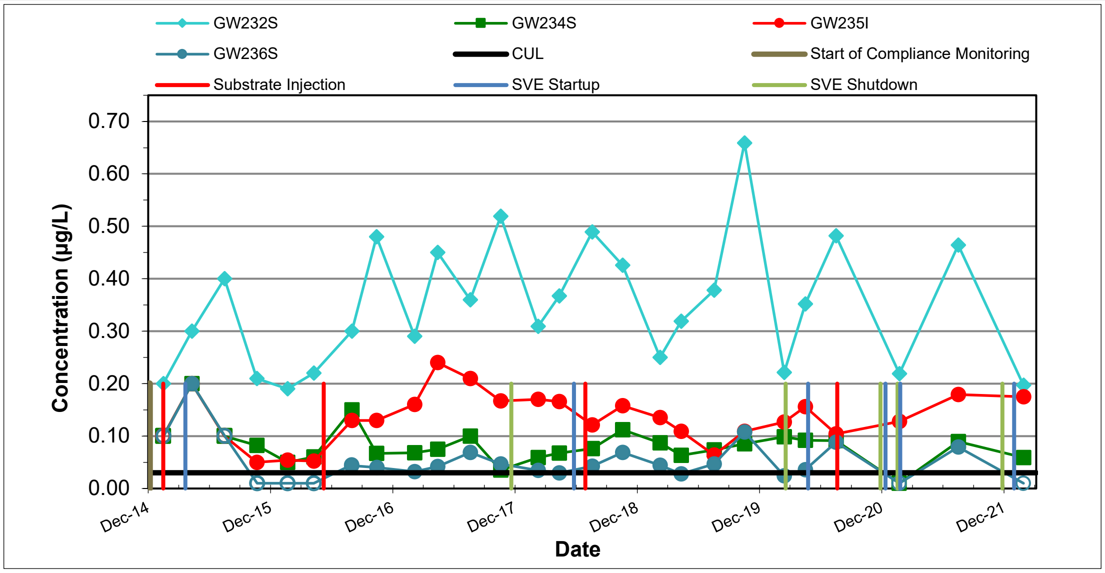


TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

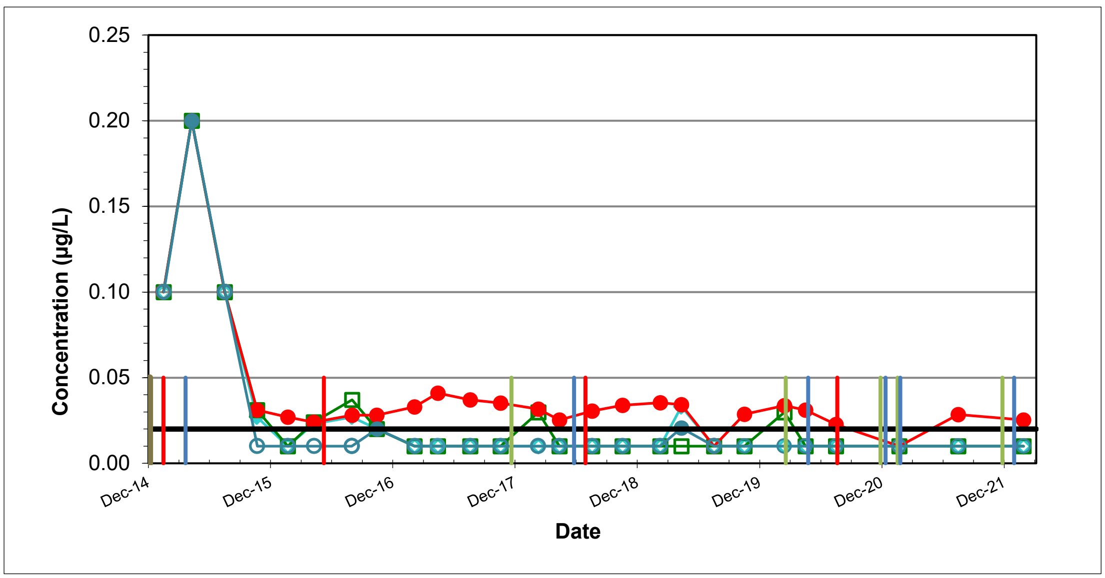
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

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

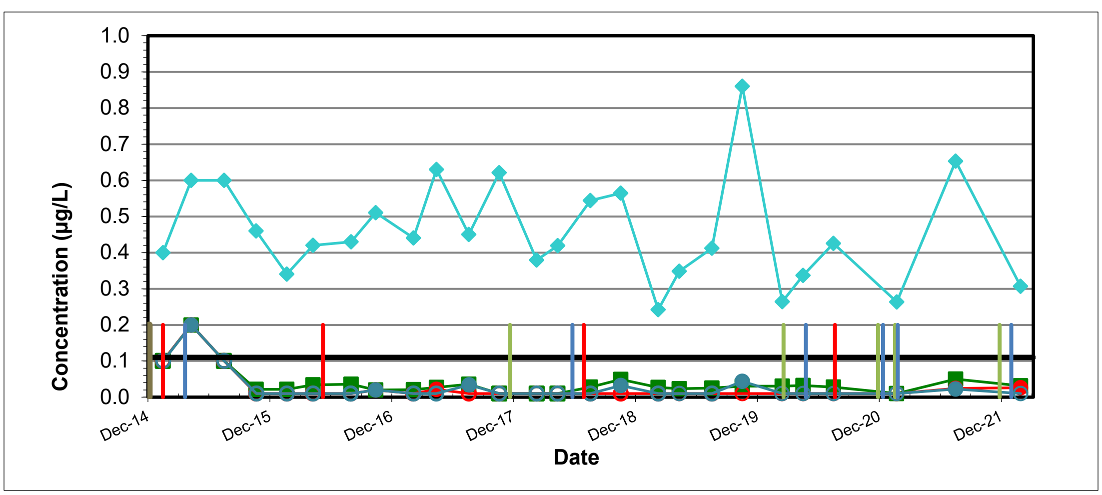
C:\Users\chelsea.foster\Desktop\Figure 5 to 10_ SWMU_172-174.xlsx



cis-1,2-Dichloroethene



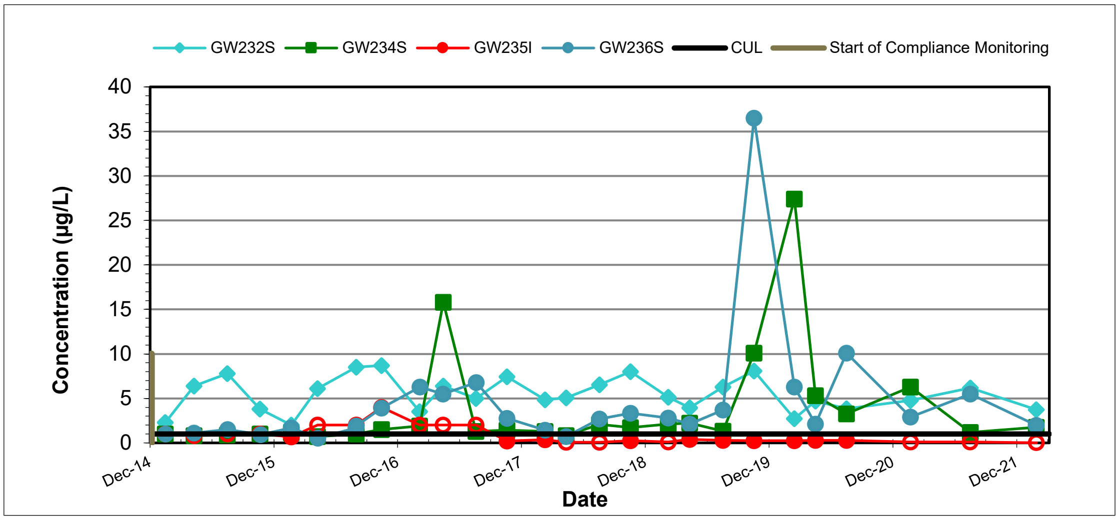
Trichloroethene



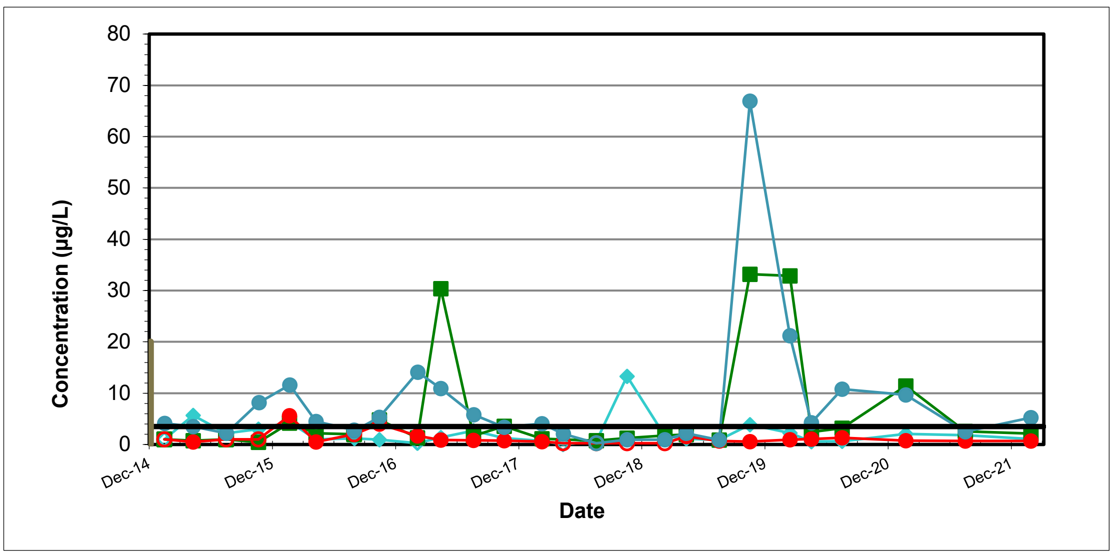
Vinyl Chloride

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

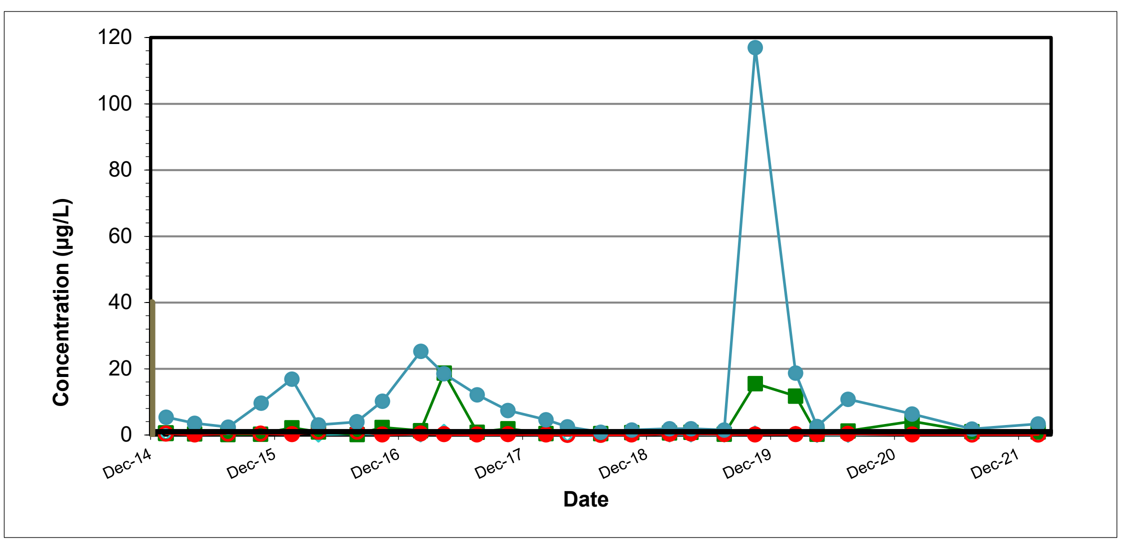
wood.	SWMU-172 AND SWMU-174 TREND PLOTS FOR CIS-1,2-DICHLROETHENE, TRICHLOROETHENE, AND VINYL CHLORIDE IN CPOC AREA WELLS START OF COMPLIANCE MONITORING TO PRESENT Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 9



Arsenic



Copper

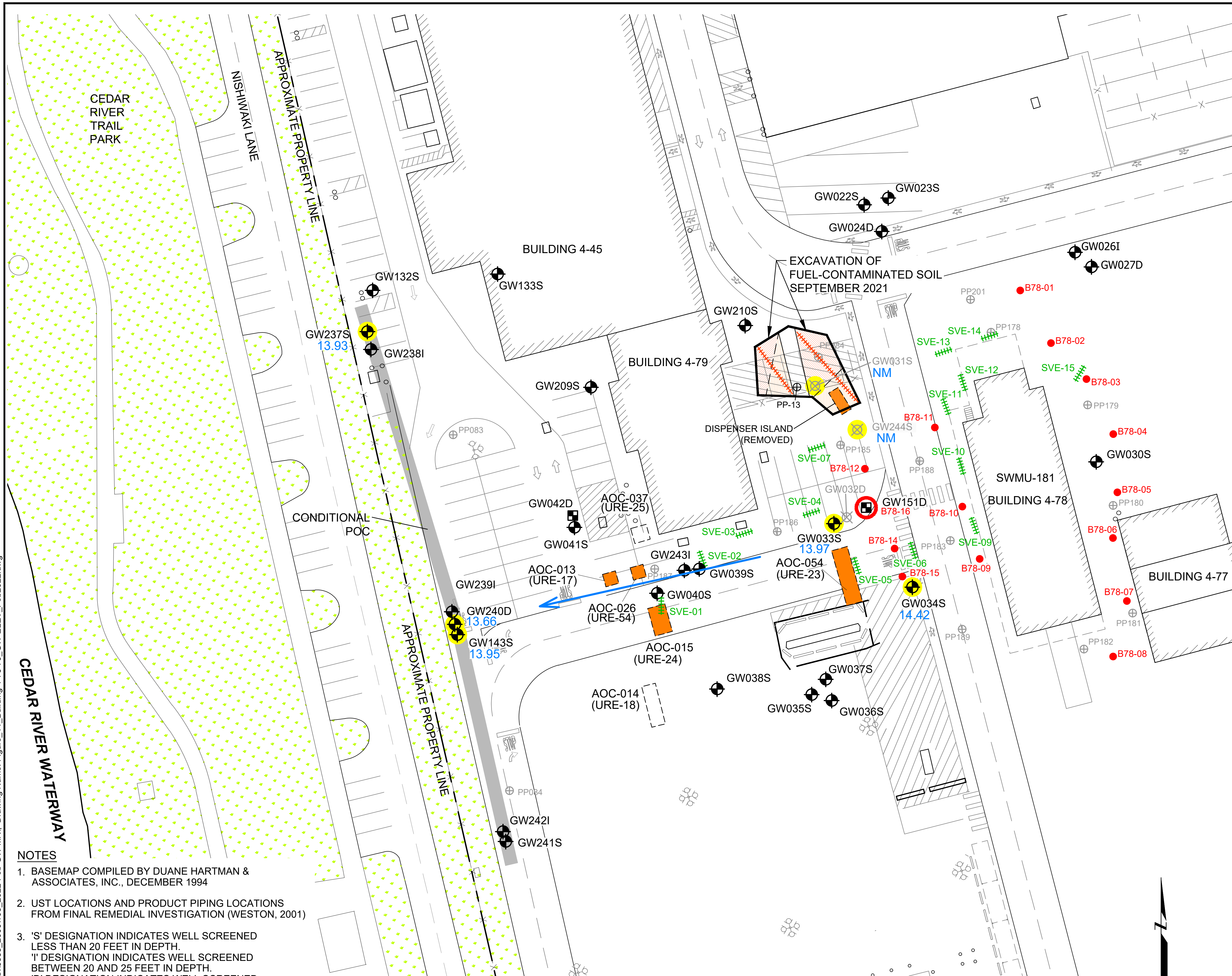


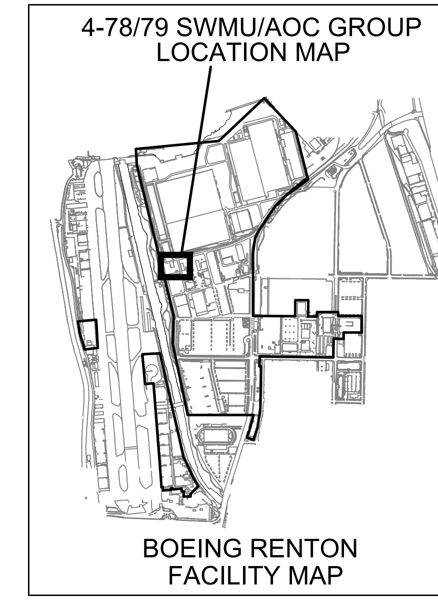
Lead

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

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

C:\Users\chelsea.foster\Desktop\Figure 5 to 10_ SWMU_172-174.xlsx





LEGEND

- GW033S 13.97 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- NM — NOT MEASURED DUE TO DECOMMISSIONING. MONITORING WELLS GW031 AND GW244 ARE PLANNED TO BE REPLACED.
- GENERAL GROUNDWATER FLOW DIRECTION
- GW042D — EXTRACTION WELL
- GW032D — DECOMMISSIONED MONITORING WELL
- SVE-15 — HORIZONTAL SVE WELL
- HORIZONTAL BIOREMEDIATION INJECTION WELL
- B78-12 — BIOREMEDIATION INJECTION WELL
- EXTRACTION WELL CONVERTED TO INJECTION WELL
- PP083 — PUSH-PROBE SAMPLE LOCATION
- x — FENCE
- APPROXIMATE FUEL AND NON-CHLORINATED VOC SOURCE AREAS
- REMOVED UST (WESTON, 2001)
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. 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.

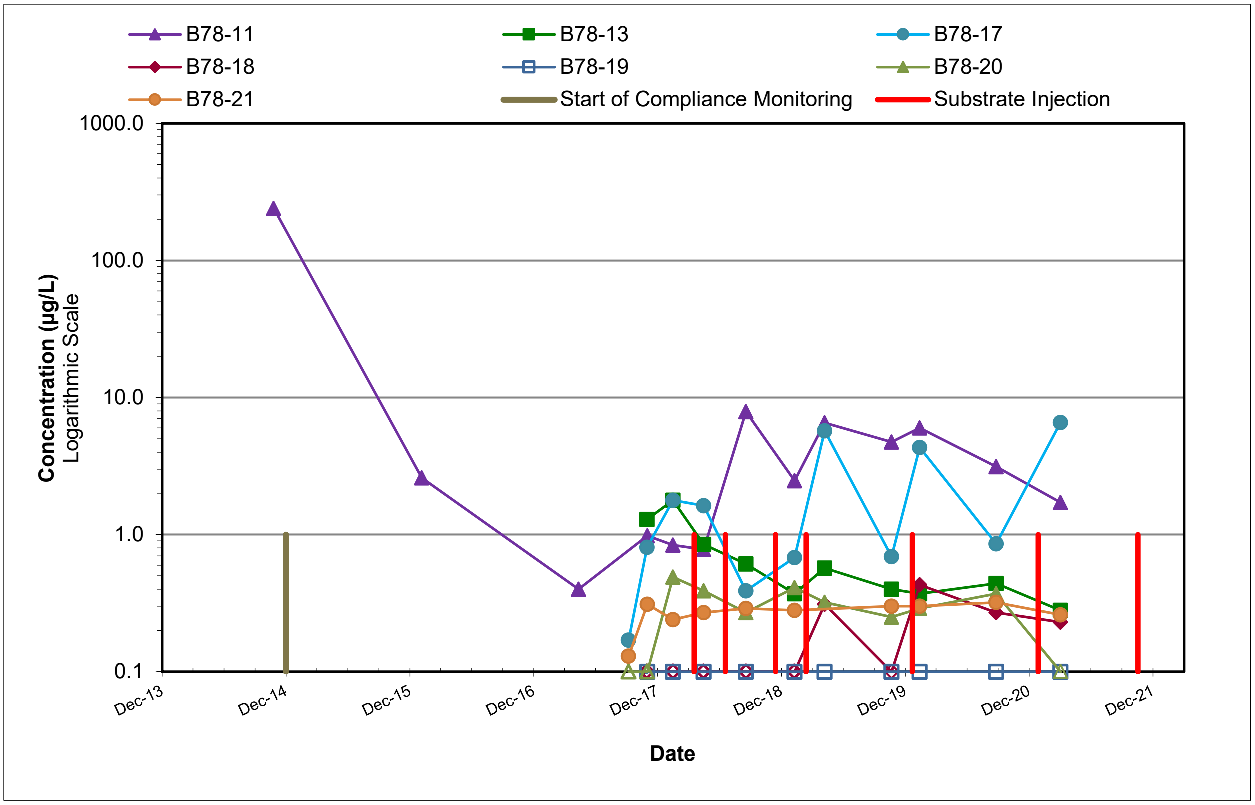
BOEING

BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS FEBRUARY 22, 2022

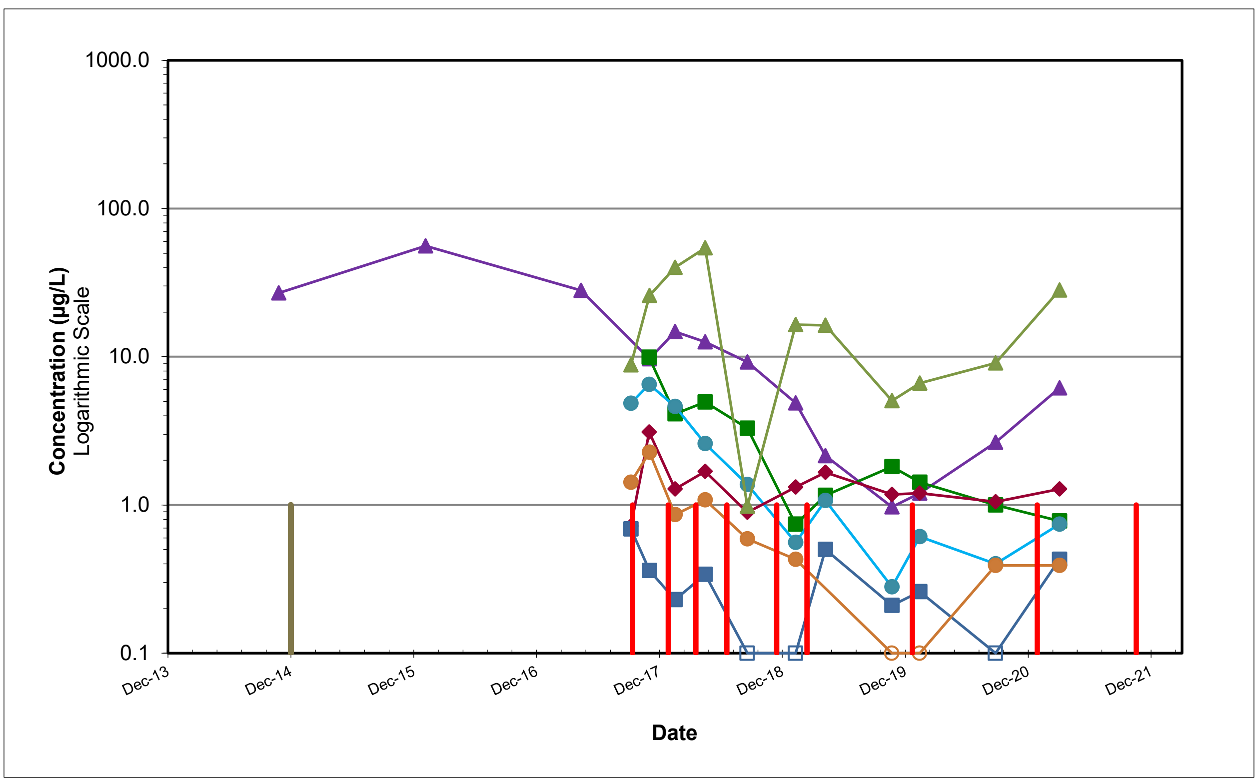
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/18/22	Project No. PS20203450
wood.		Figure 11

Plot Date: 05/18/22 - 11:51am, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006108_2022-Feb-GW-MR\, Drawing Name: Figure_11_Building 4-78-79_GW-ELEV_Feb2022.dwg



cis-1,2-Dichloroethene

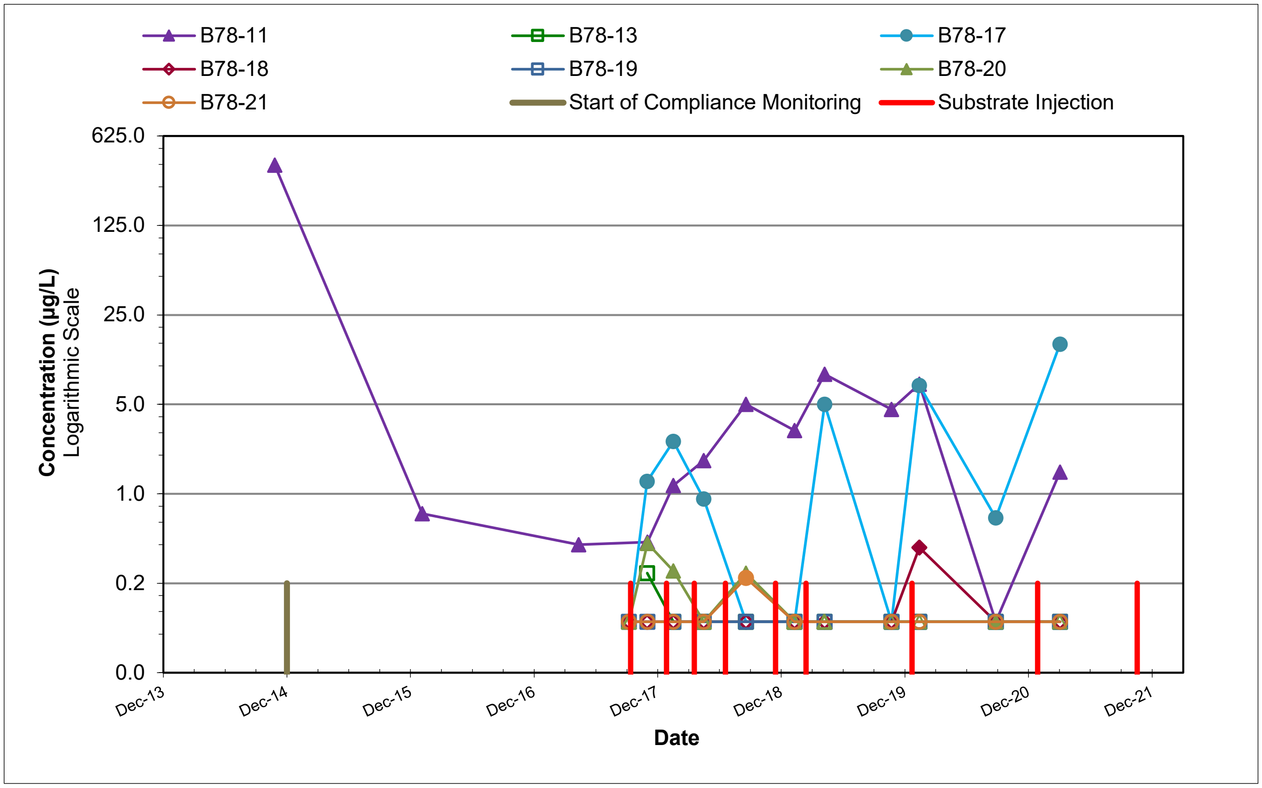


Benzene

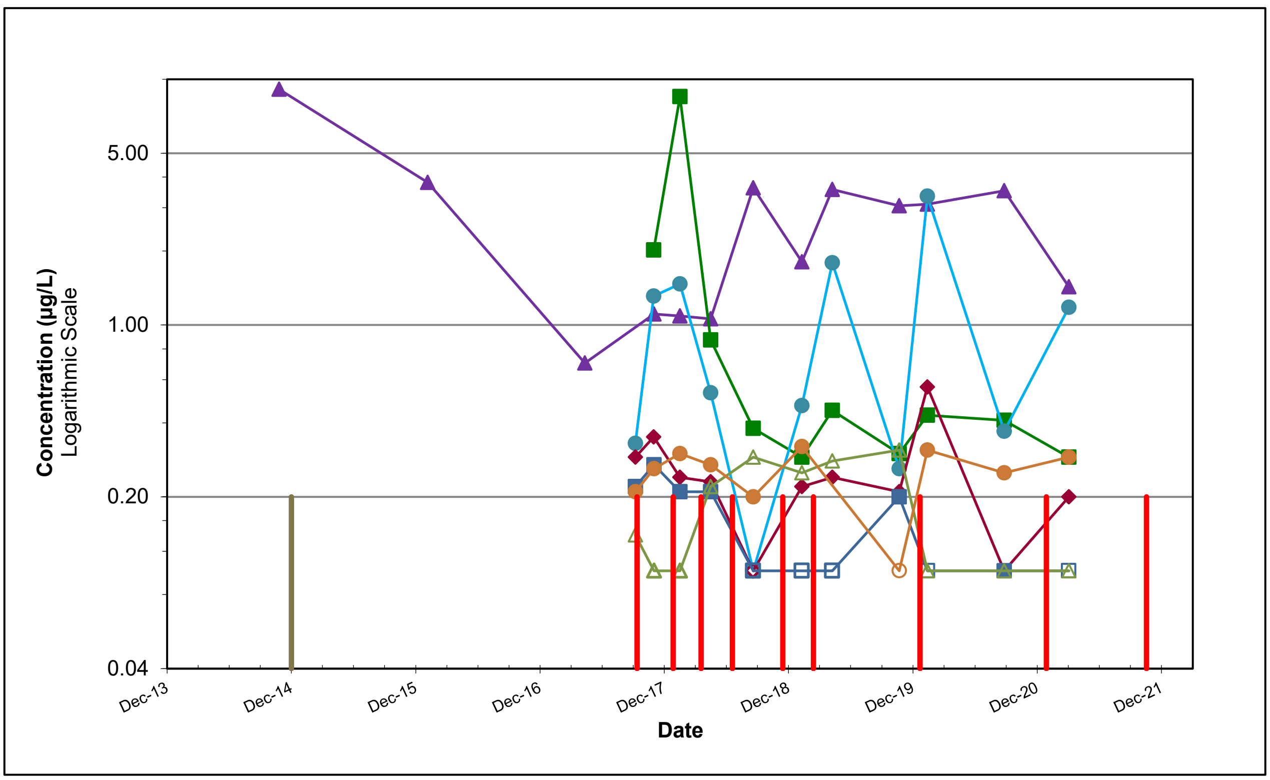
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

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

C:\Users\chelsea.foster\Desktop\Figure 12 to 18_ Bldg 4-78-79.xlsx



Trichloroethene



Vinyl Chloride

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

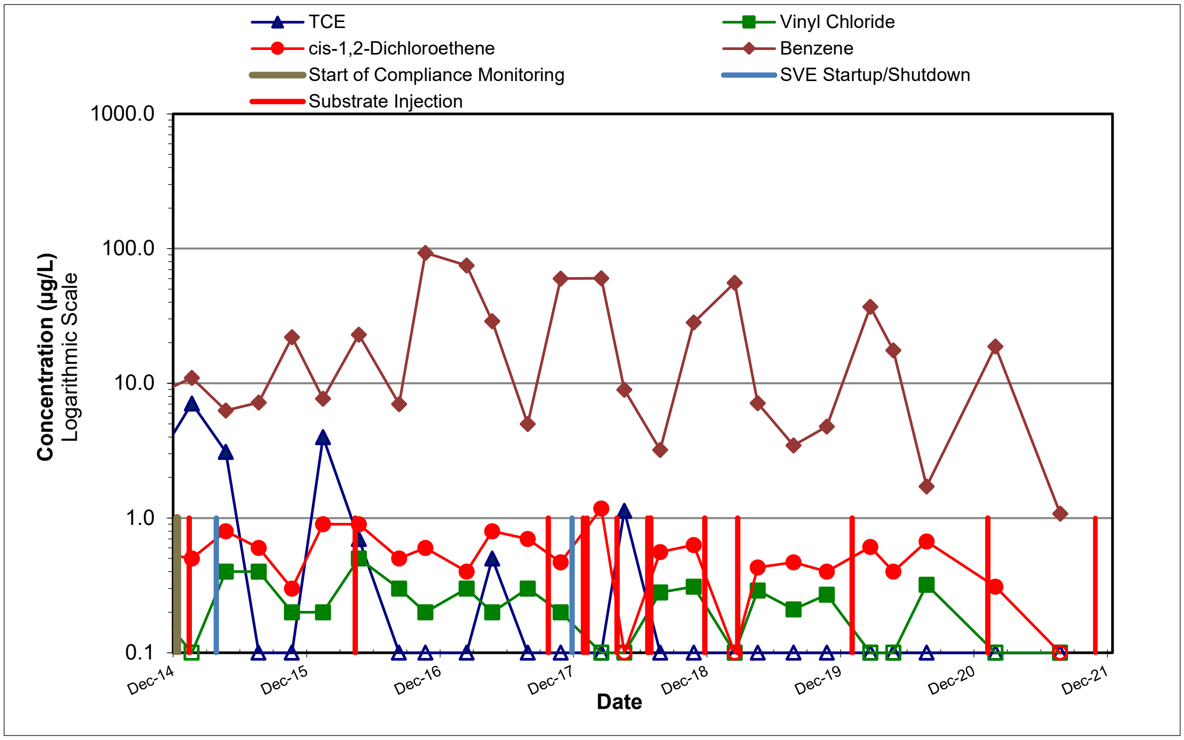
wood.

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

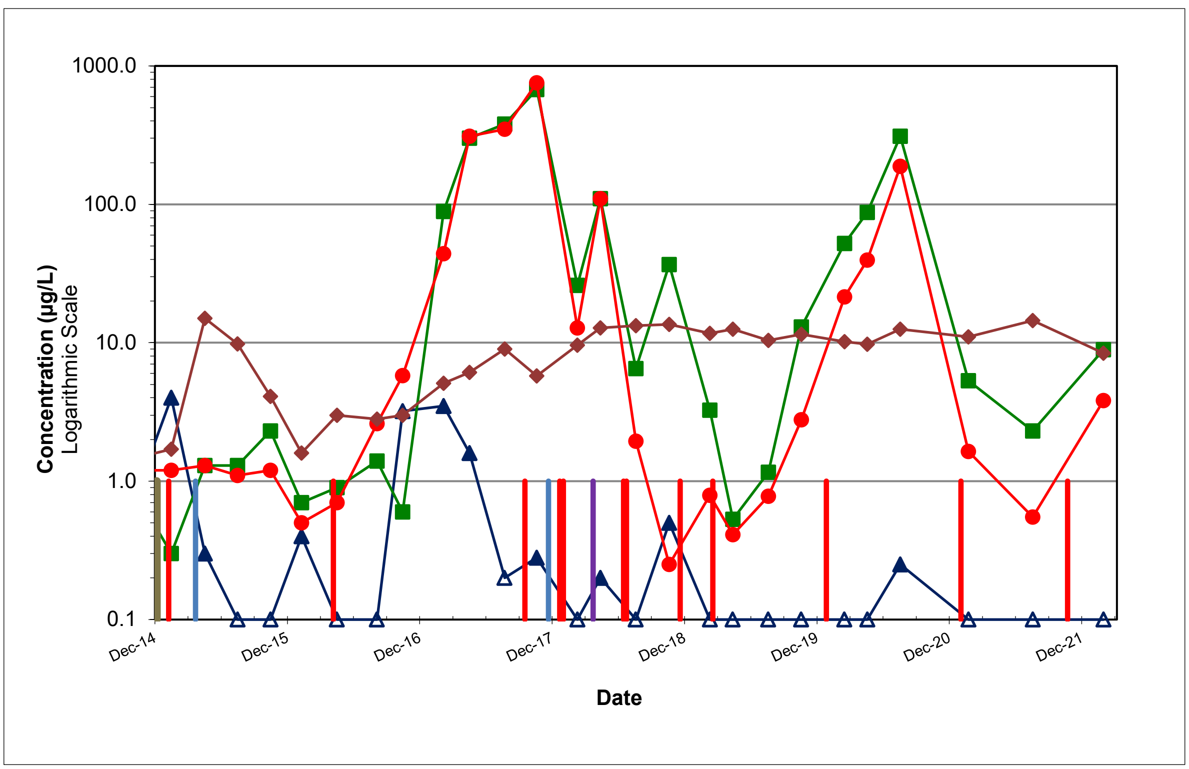
Project No. PS20203450

Figure 13

C:\Users\chelsea.foster\Desktop\Figure 12 to 18_ Bldg 4-78-79.xlsx



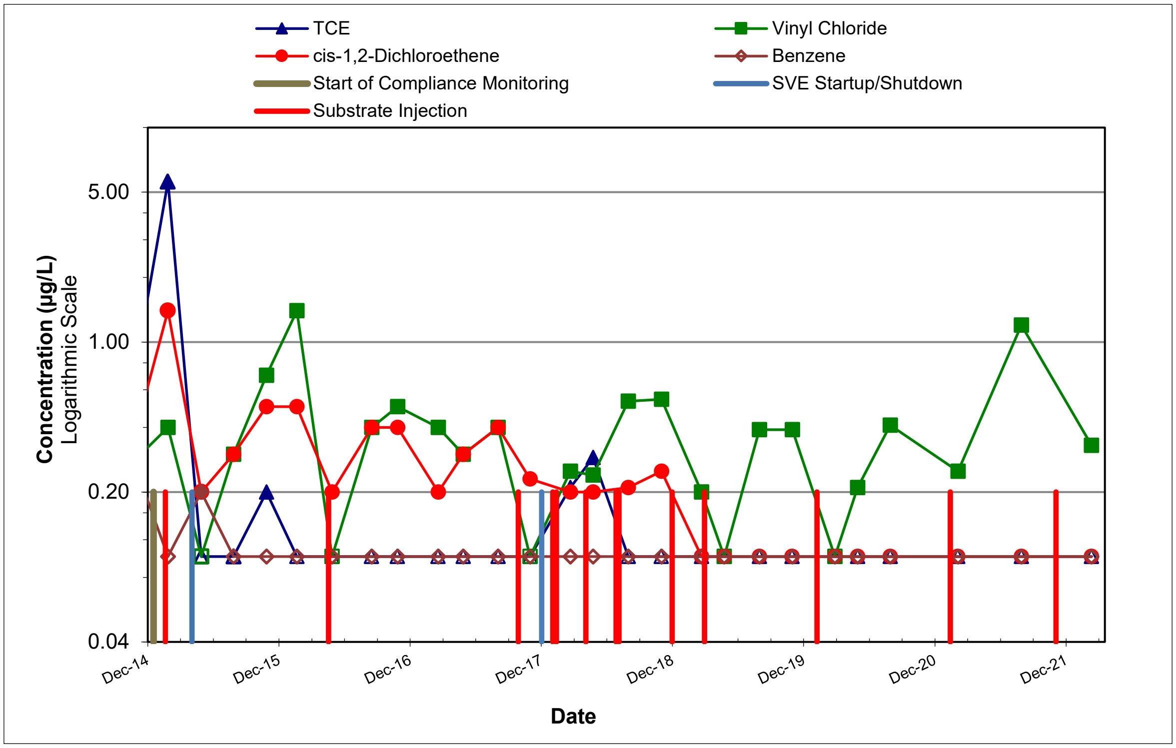
SOURCE AREA WELL GW031S



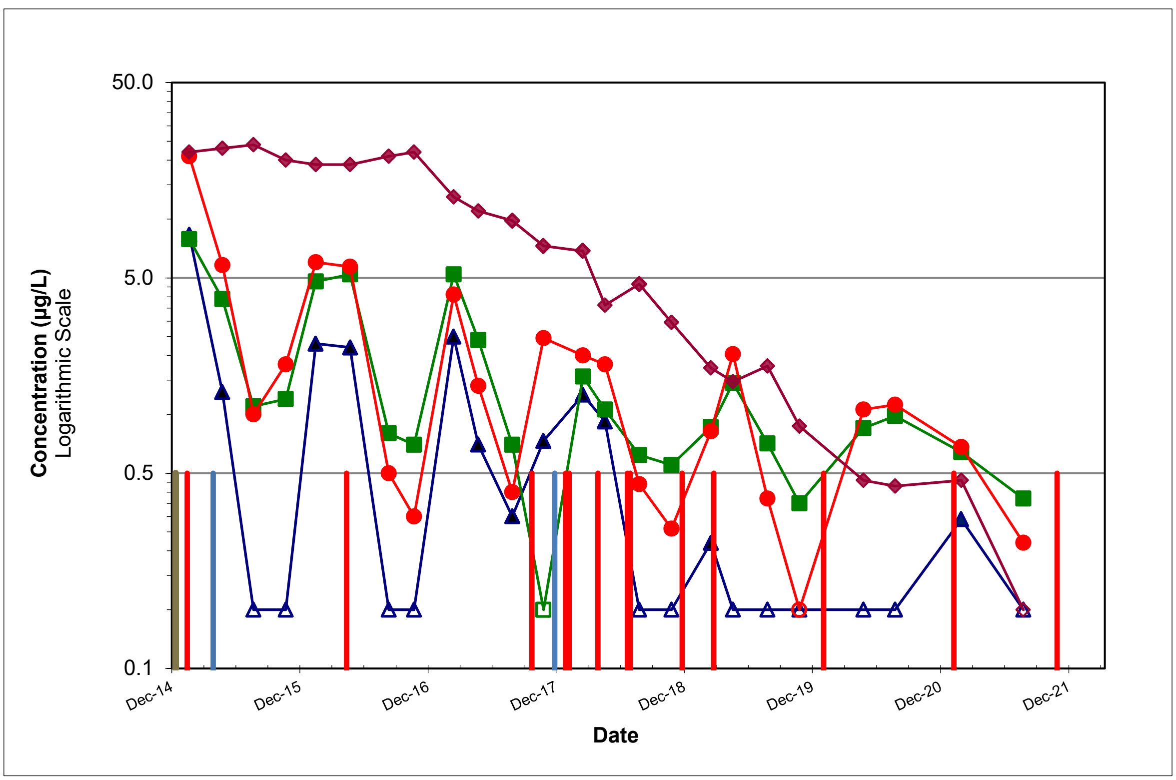
SOURCE AREA WELL GW033S

Note: Non-detected values shown at one-half the reporting limit and with an open symbol. GW031S was not sampled in February 2022, it is scheduled to be replaced prior to the August 2022 sampling event.

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



SOURCE AREA WELL GW034S

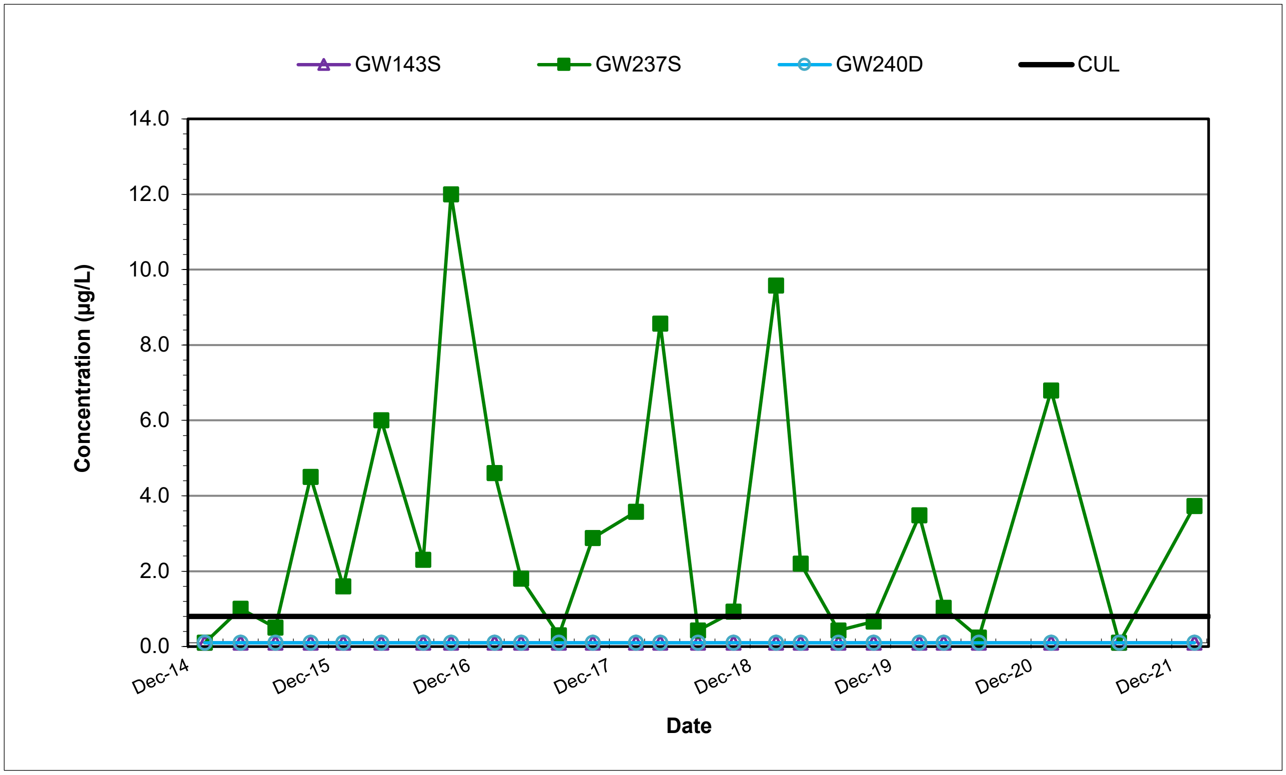


SOURCE AREA WELL GW244S

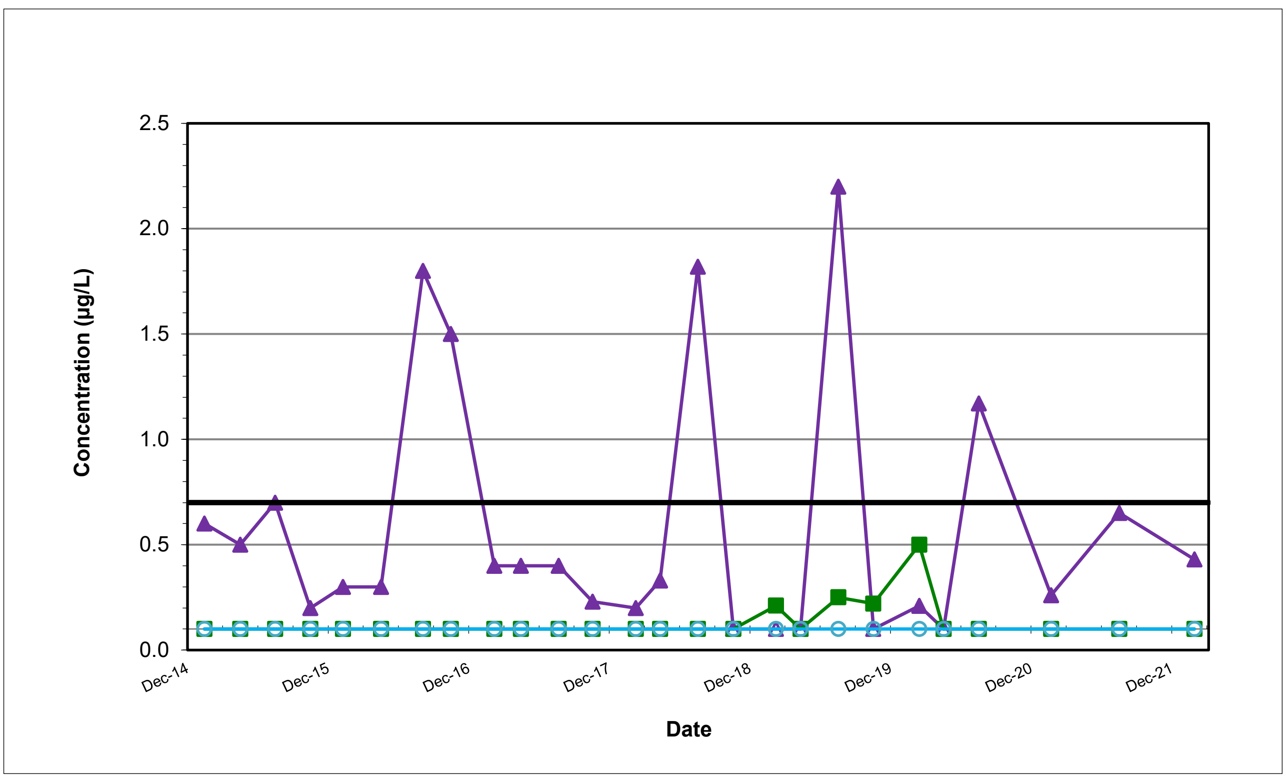
Note: Non-detected values shown at one-half the reporting limit and with an open symbol. GW244S was not sampled in February 2022, it is scheduled to be replaced prior to the August 2022 sampling event.

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

C:\Users\chelsea.foster\Desktop\Figure 12 to 18_ Bldg 4-78-79.xlsx



Benzene

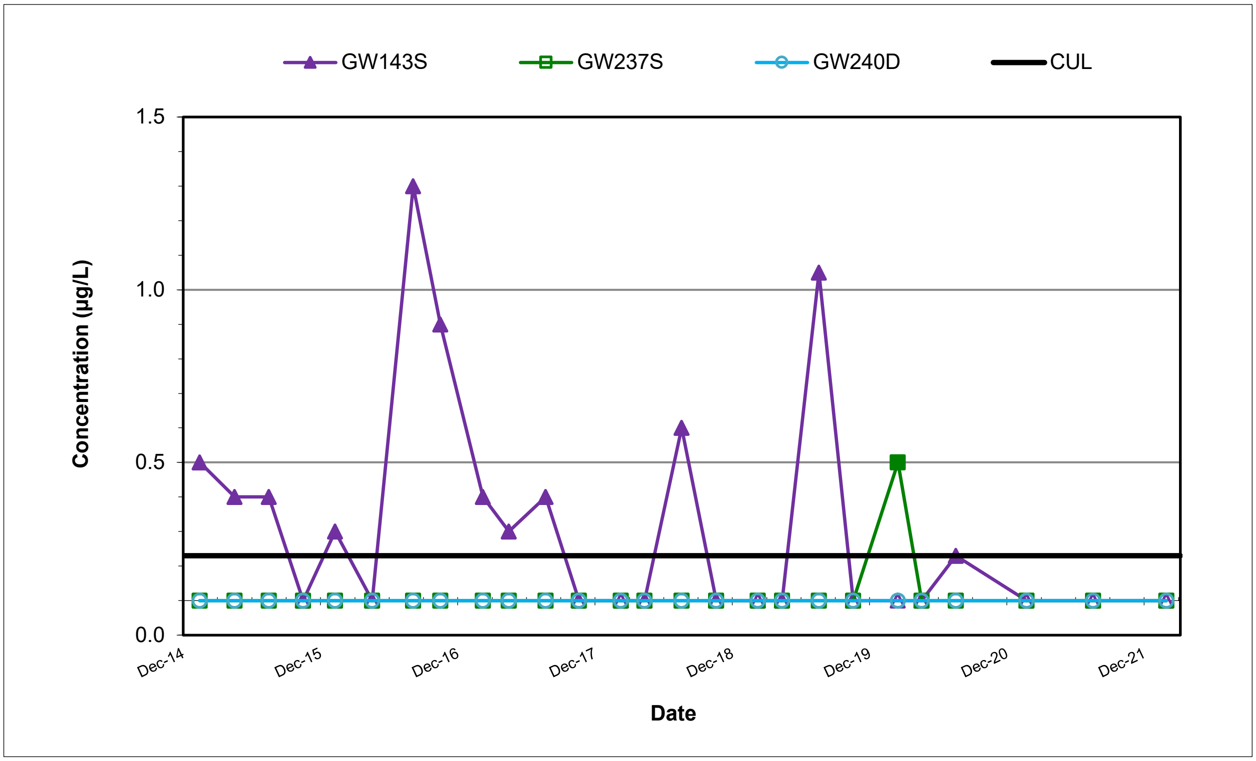


cis-1,2-Dichloroethene

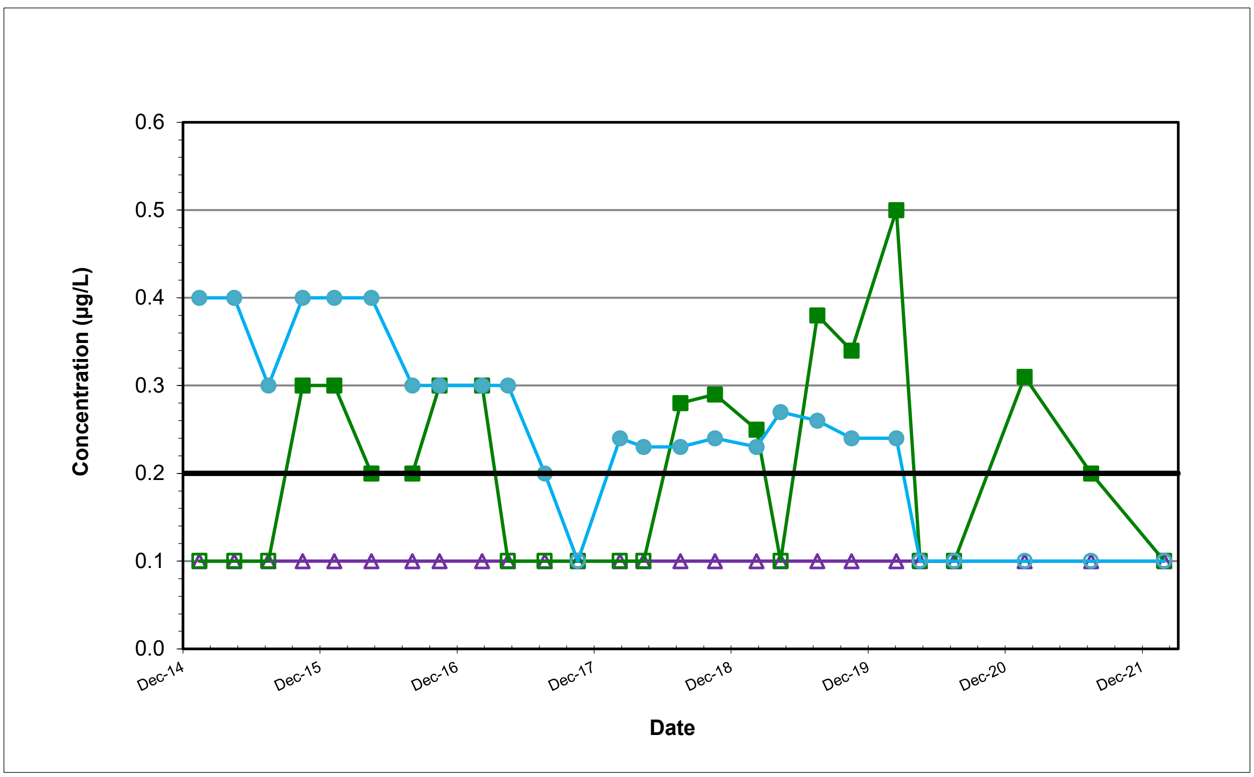
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

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

C:\Users\chelsea.foster\Desktop\Figure 12 to 18_ Bldg 4-78-79.xlsx



Trichloroethene

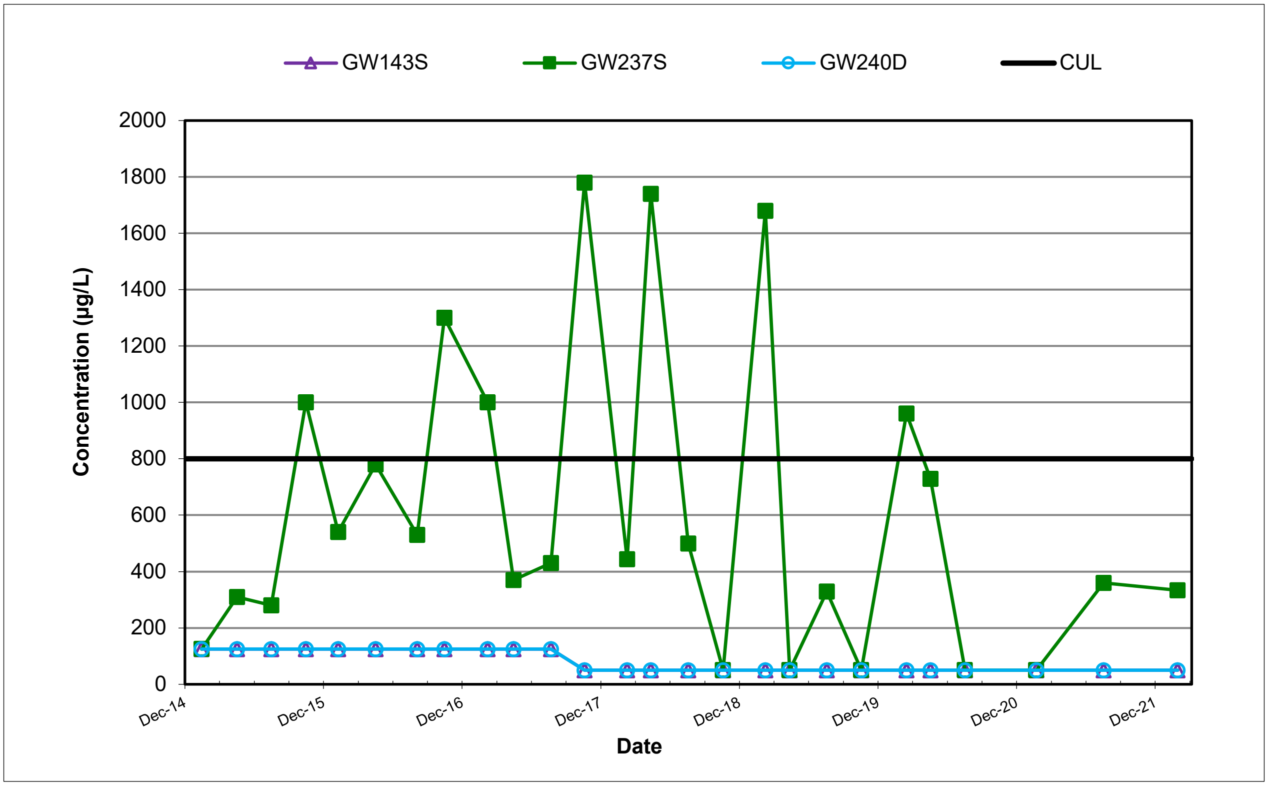


Vinyl Chloride

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

C:\Users\chelsea.foster\Desktop\Figure 12 to 18_ Bldg 4-78-79.xlsx

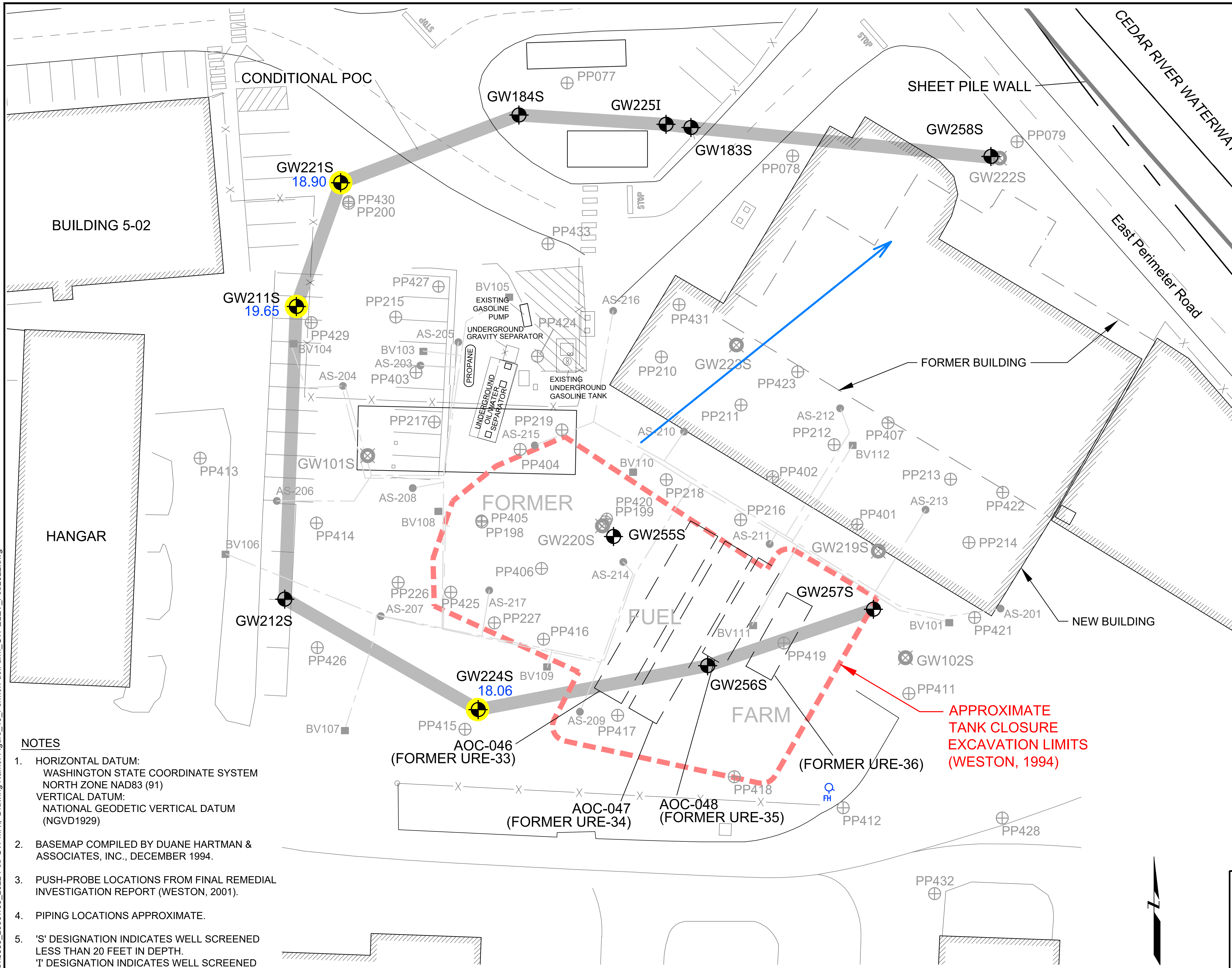


TPH as Gasoline

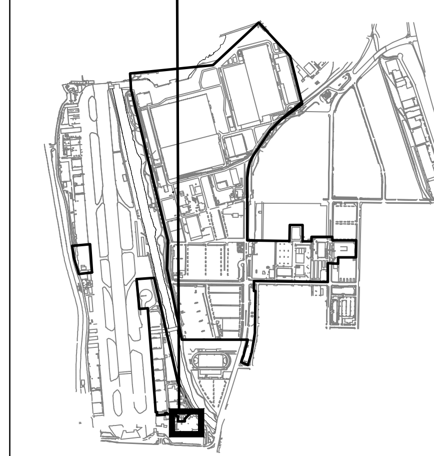
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

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

C:\Users\chelsea.foster\Desktop\Figure 12 to 18_ Bldg 4-78-79.xlsx



FORMER FUEL FARM AOC GROUP
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW224S 18.06 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- GENERAL DIRECTION OF GROUNDWATER FLOW BASED ON HISTORICAL DATA
- PP042 — PUSH PROBE LOCATION
- GW222S — DECOMMISSIONED 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

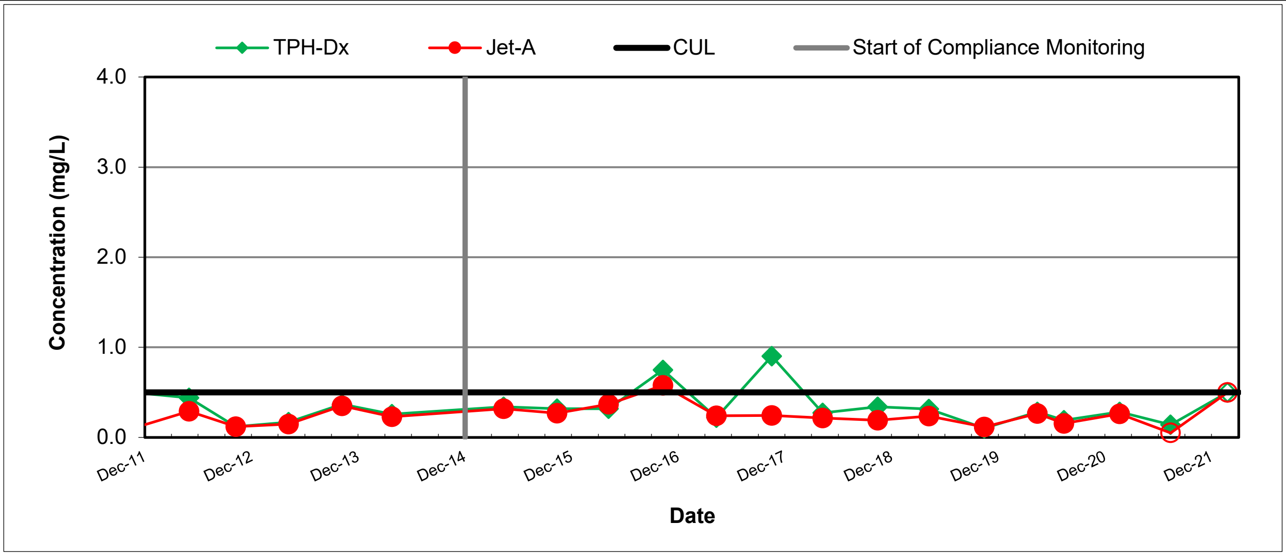
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM
   (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH-PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
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.

BOEING

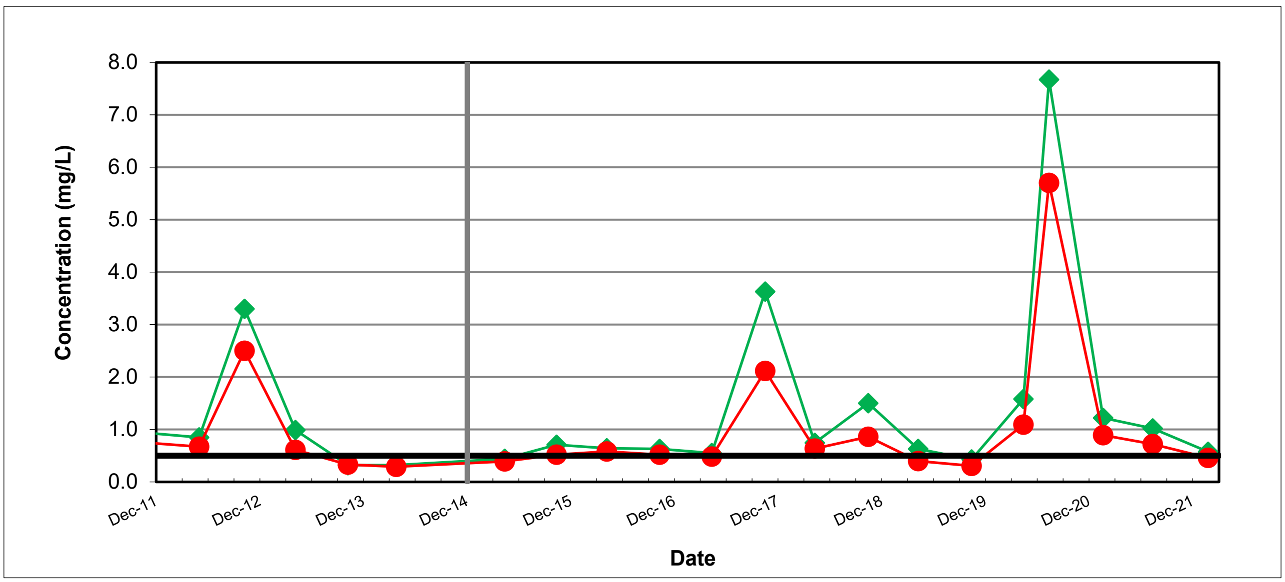
FORMER FUEL FARM AOC GROUP
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
FEBRUARY 21, 2022
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/18/22	Project No. PS20203450
wood.		Figure 19

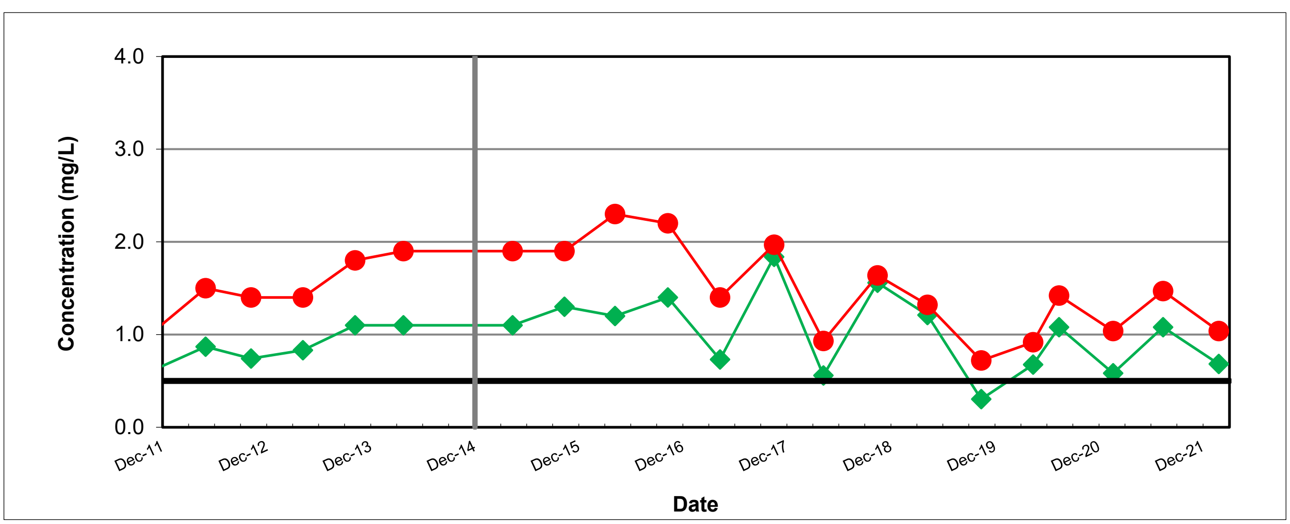
Plot Date: 05/18/22 - 12:18pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_20061108_2022-Feb-GW-MR\, Drawing Name: Figure_19_FormerFuelFarm_GW-ELEV_Feb2022.dwg



CPOC WELL GW211S



CPOC WELL GW221S



CPOC WELL GW224S

Note: Non-detected values shown at one-half the reporting limit and with an open symbol. Reporting limits were elevated for February 2022 results in GW211S.

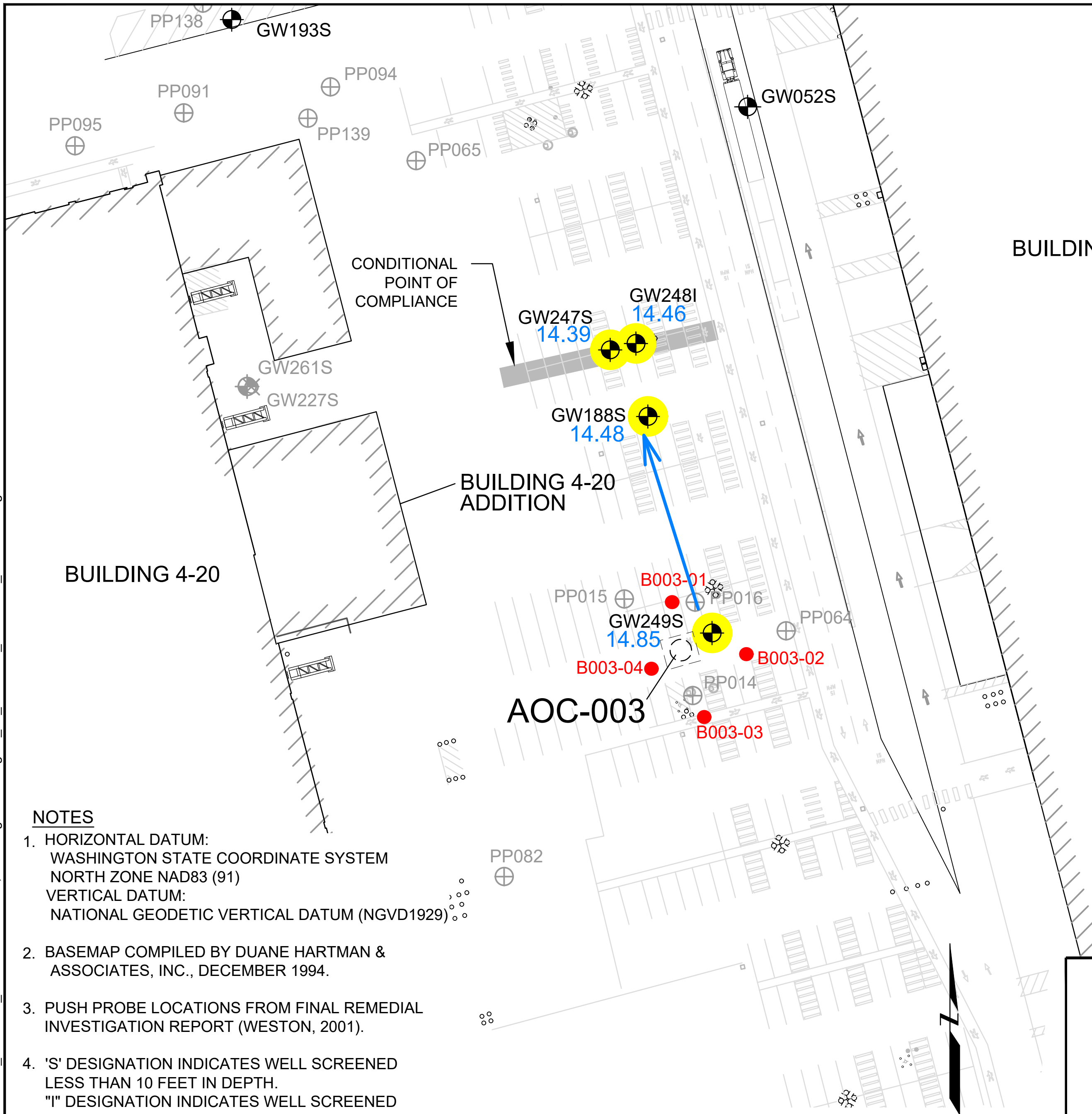
C:\Users\chelsea.foster\Desktop\Figure 20_FFF CPOC trend plot.xls

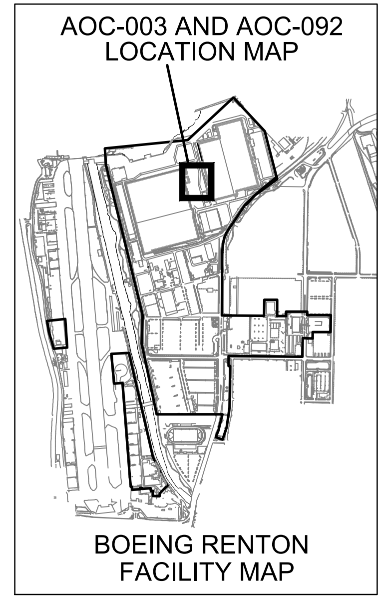
wood.

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





LEGEND

GW247S 14.39	AOC-003 MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
	GENERAL DIRECTION OF GROUNDWATER FLOW BASED ON HISTORICAL DATA
GW261S	FORMER AOC-092 MONITORING WELL LOCATION
GW227S	DECOMMISSIONED MONITORING WELL
B003-01	BIOREMEDIATION INJECTION WELL
PP011	PUSH PROBE SAMPLING LOCATION
	CONDITIONAL POINT OF COMPLIANCE
HIGHLIGHTED	WELLS INCLUDED IN MONITORING NETWORK

NOTES

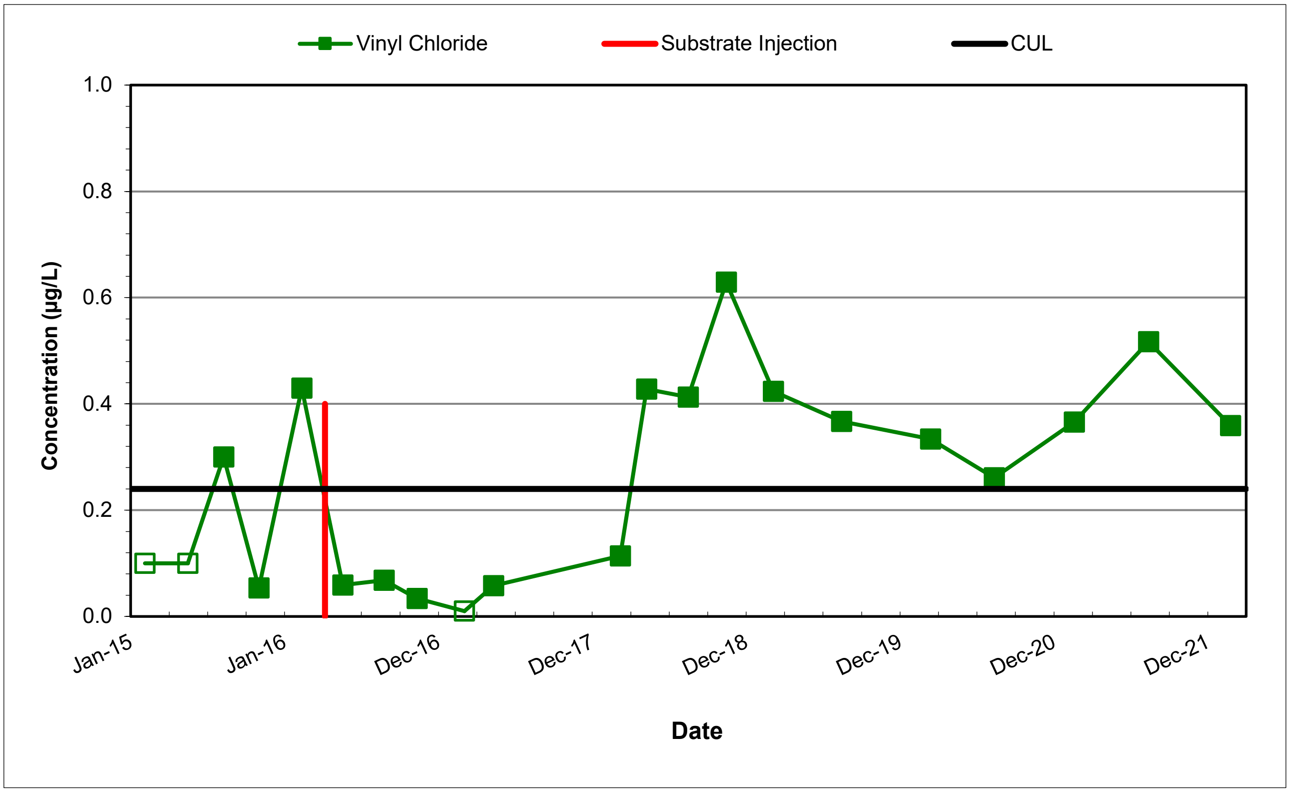
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).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

BOEING

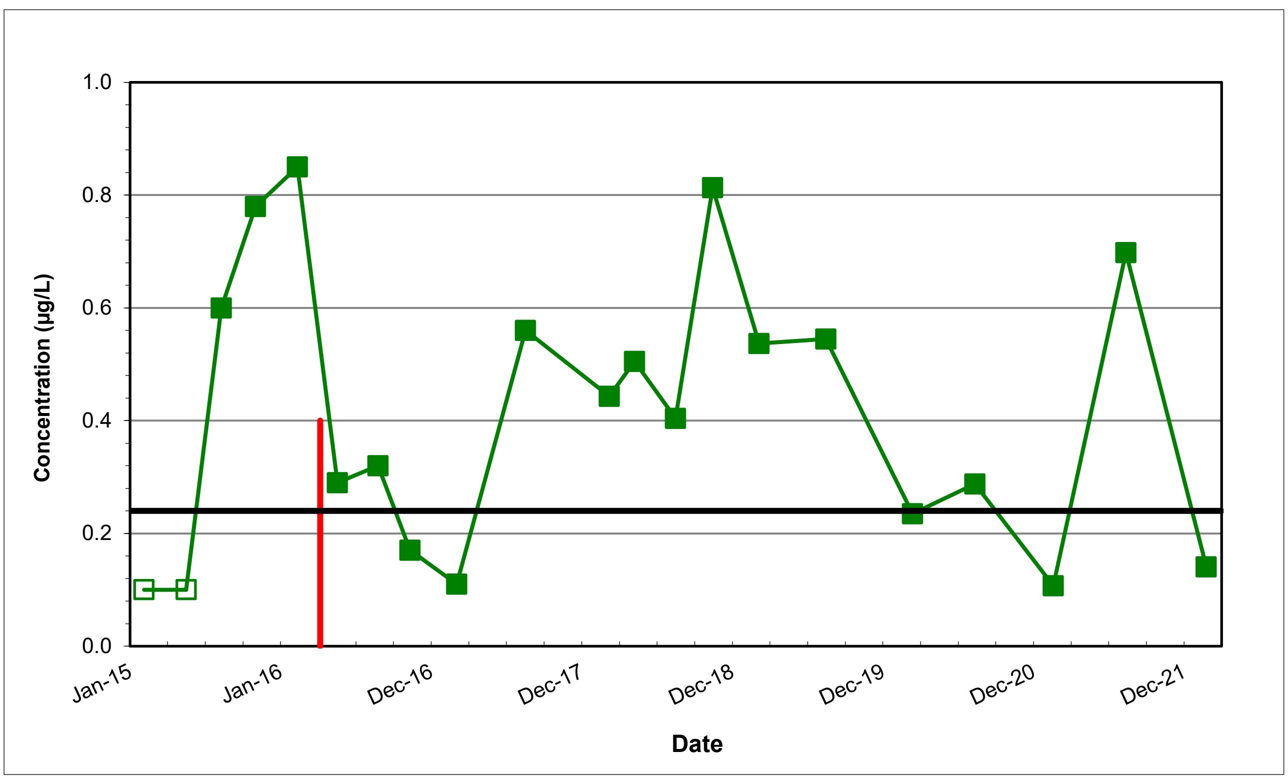
AOC-003
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
FEBRUARY 22 & 23, 2022
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/18/22	Project No. PS20203450
wood.		Figure 21

Plot Date: 05/18/22 - 12:26pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_20061108_2022-Feb-GW-MR\, Drawing Name: Figure_21_AOC-003_GW-ELEV_Feb2022.dwg



SOURCE AREA WELL GW249S

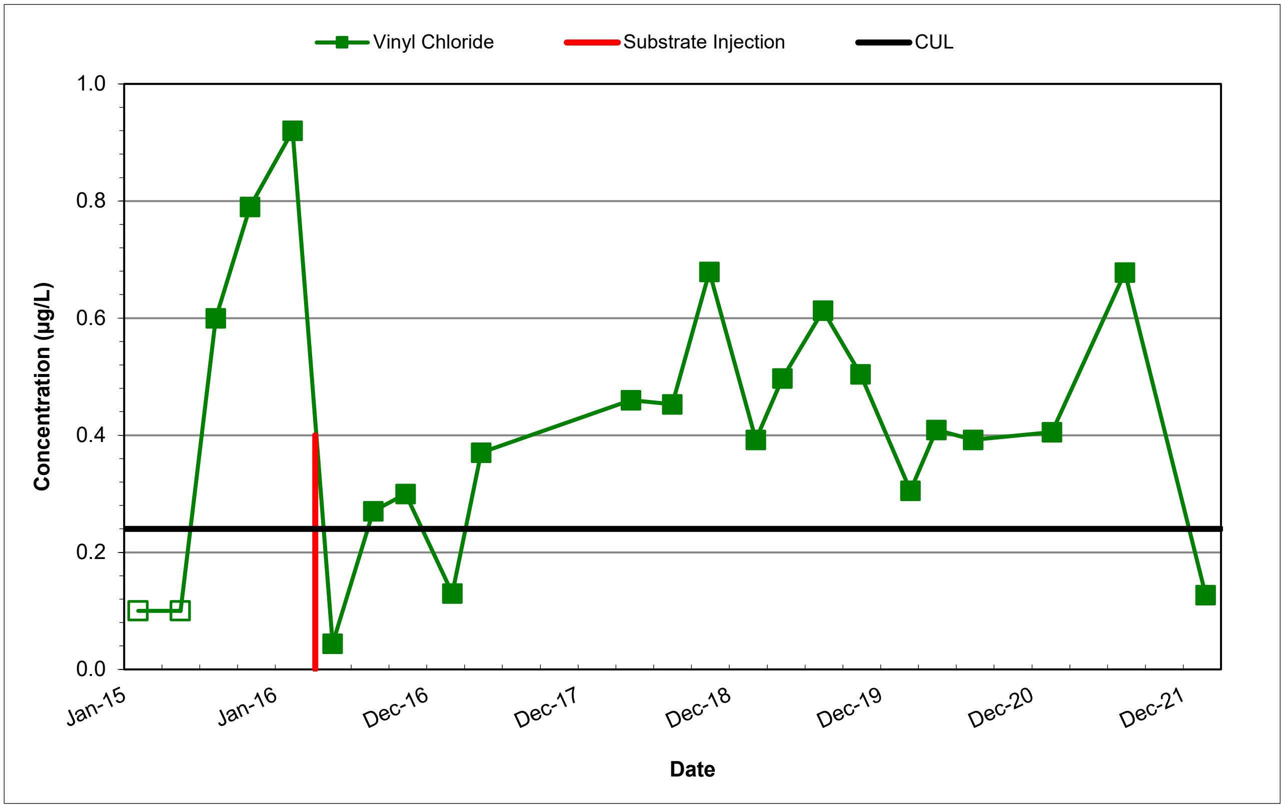


DOWNGRADIENT PLUME AREA WELL GW188S

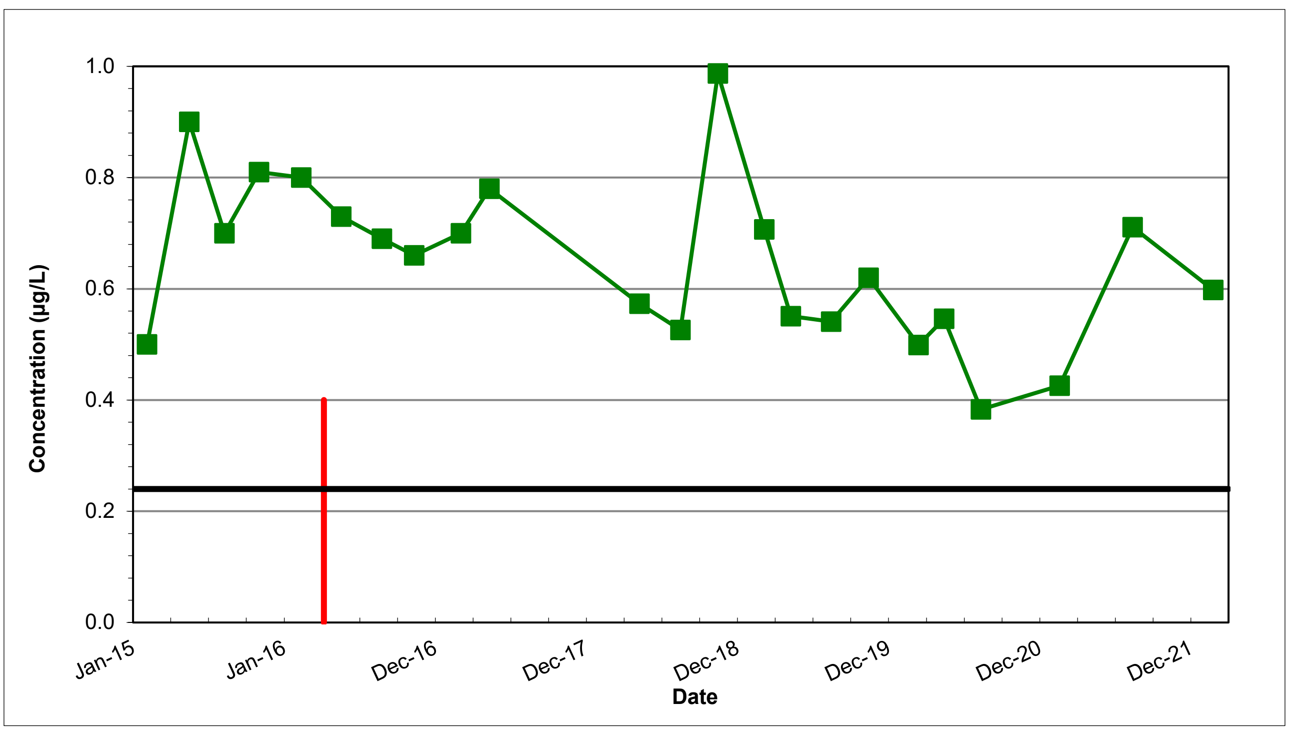
Note: Non-detected values shown at one-half the reporting limit and with an open symbol

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

C:\Users\chelsea.foster\Desktop\Figure 22 to 25_AOC 003-4.xlsx



CPOC WELL GW247S



CPOC WELL GW248I

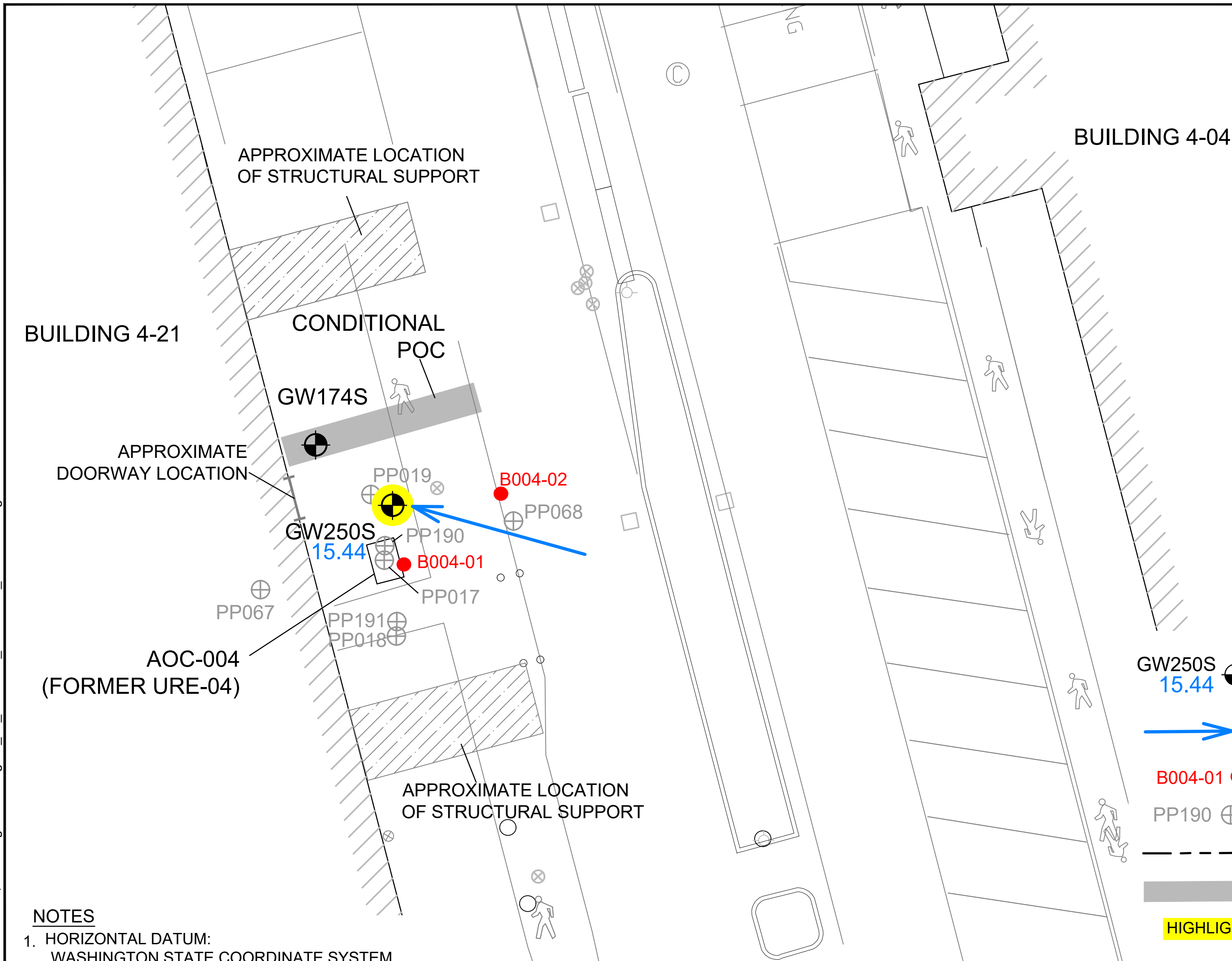
Note: Non-detected values shown at one-half the reporting limit and with an open symbol

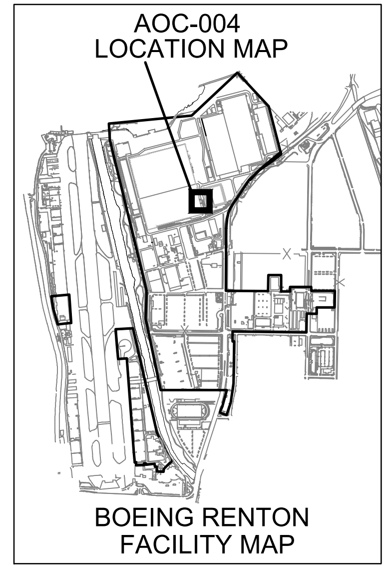
wood.

AOC-003 TREND PLOTS FOR CPOC WELLS GW247S AND GW248I
Boeing Renton Facility
Renton, Washington

Project No.
PS20203450

Figure
23





LEGEND

GW250S 15.44 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)

GENERAL DIRECTION OF GROUNDWATER FLOW BASED ON HISTORICAL DATA

B004-01 — BIOREMEDIATION INJECTION WELL

PP190 — PUSH PROBE SAMPLING LOCATION

APPROXIMATE PROPERTY LINE

CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

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

BOEING

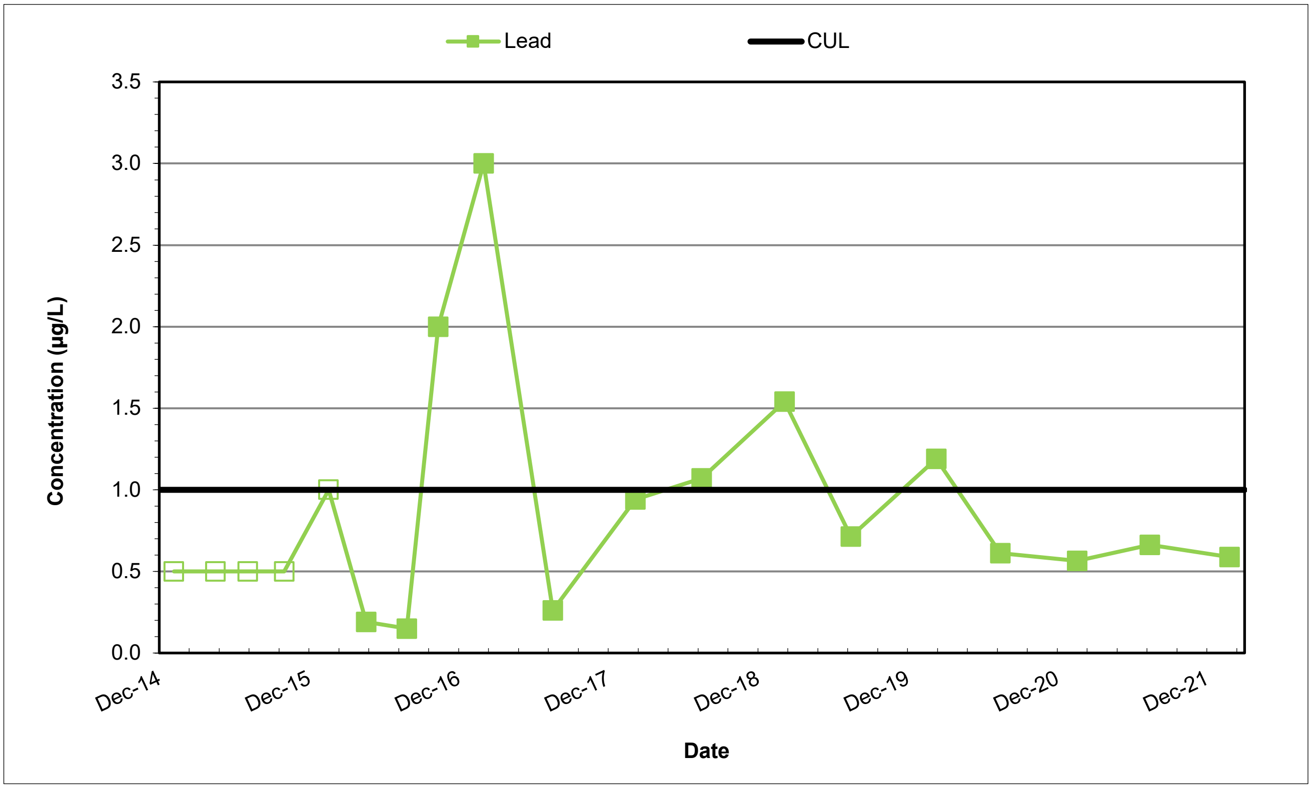
N

0 10 20
APPROXIMATE SCALE IN FEET

AOC-004
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
FEBRUARY 22, 2022
Boeing Renton Facility
Renton, Washington

By: APS	Date: 04/19/22	Project No. PS20203450
wood.		Figure 24

Plot Date: 04/19/22 - 4:36pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\108_2022-Feb-GW-MR\, Drawing Name: Figure_24_AOC-004_GW-ELEV_Feb2022.dwg

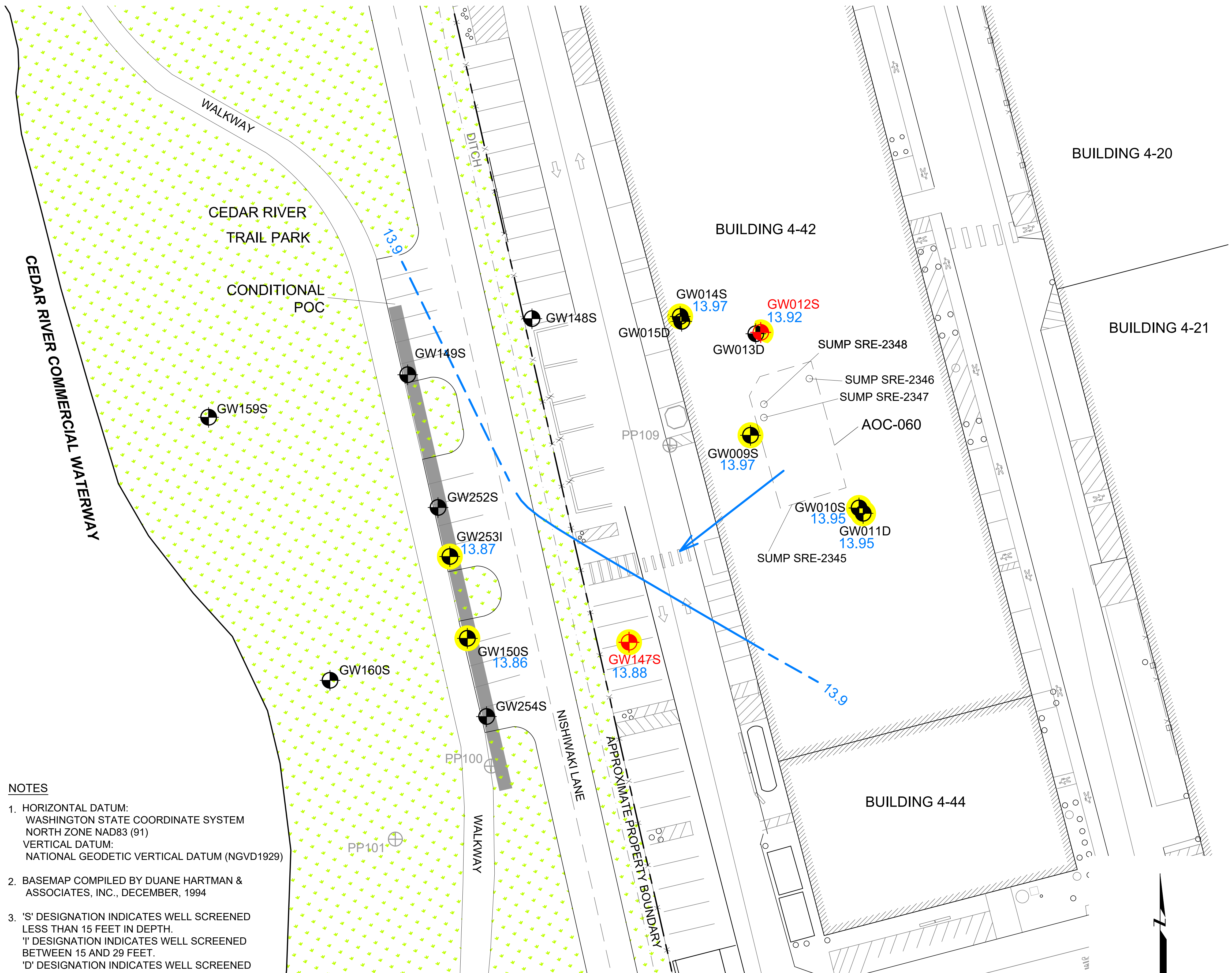


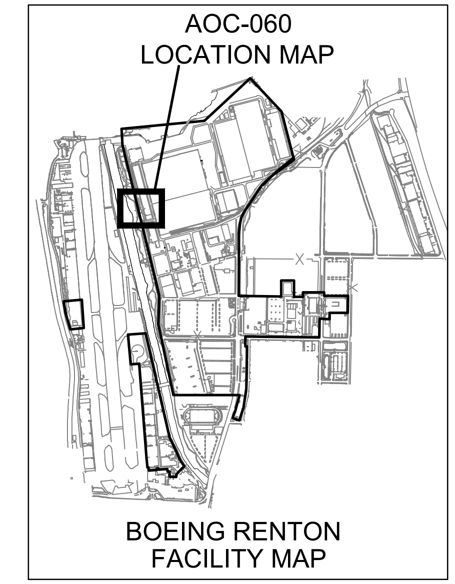
SOURCE AREA WELL GW250S

C:\Users\chelsea.foster\Desktop\Figure 22 to 25_AOC 003-4.xlsx

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

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





LEGEND

GW150S 13.86	MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
GW147S	BIOREMEDIATION 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

NOTES

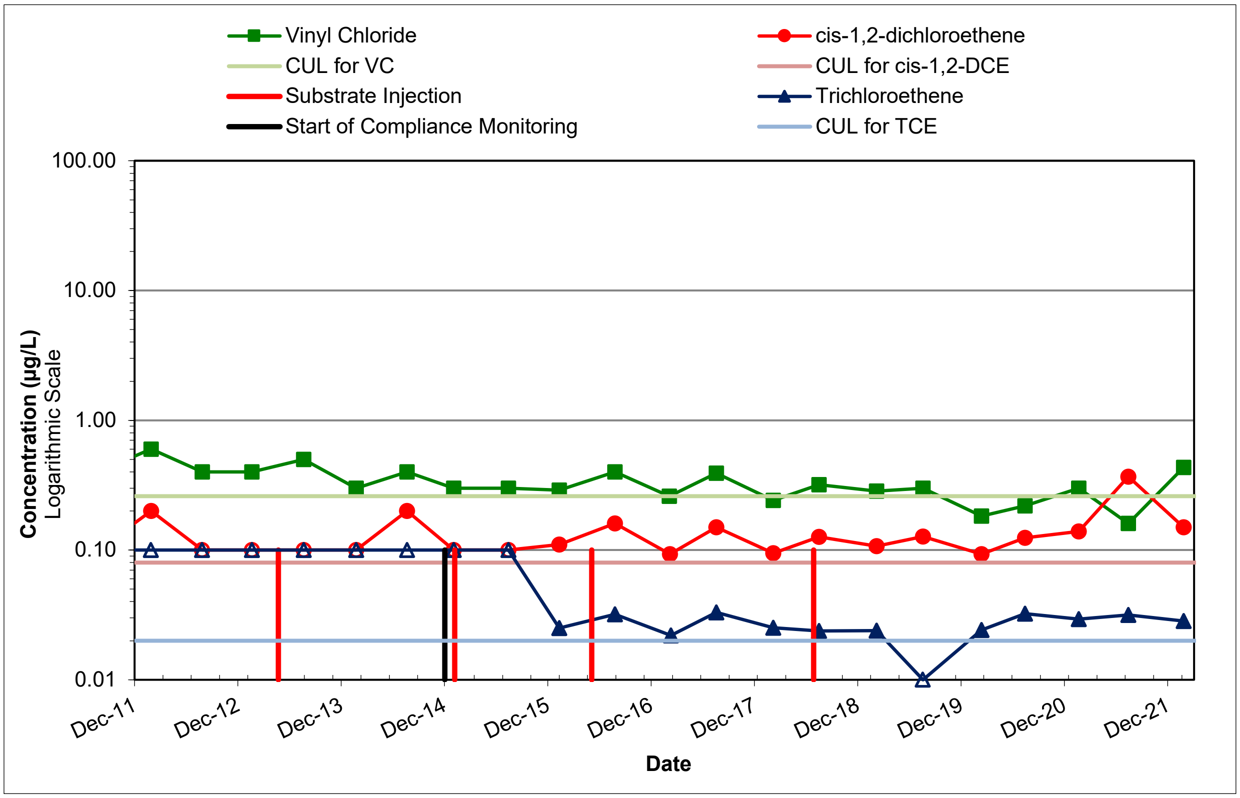
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER, 1994
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 15 FEET IN DEPTH.
   'I' DESIGNATION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

BOEING

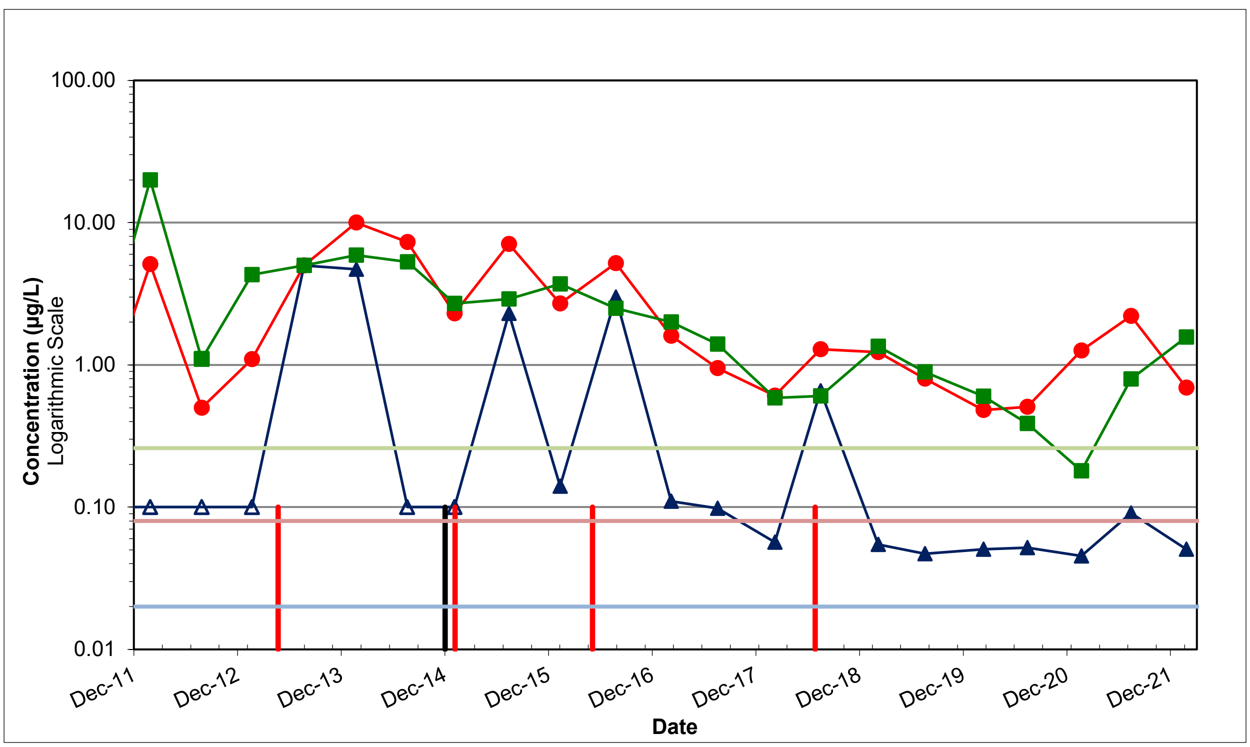
AOC-060
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 22, 2022
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/18/22	Project No. PS20203450
wood.		Figure 26

Plot Date: 05/18/22 - 12:31pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006108_2022-Feb-GW-MR\, Drawing Name: Figure_26_AOC-060_GW-ELEV_Feb2022.dwg



SOURCE AREA WELL GW009S

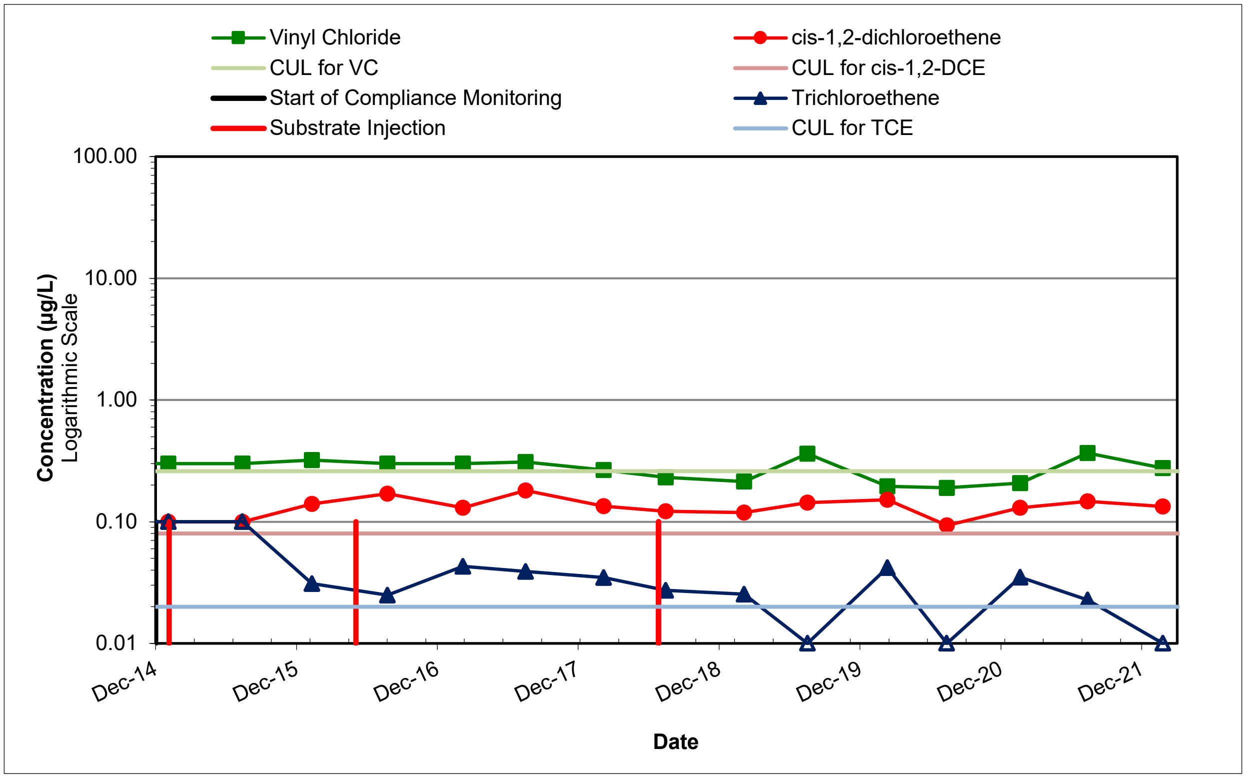


DOWNGRADIENT PLUME AREA WELL GW012S

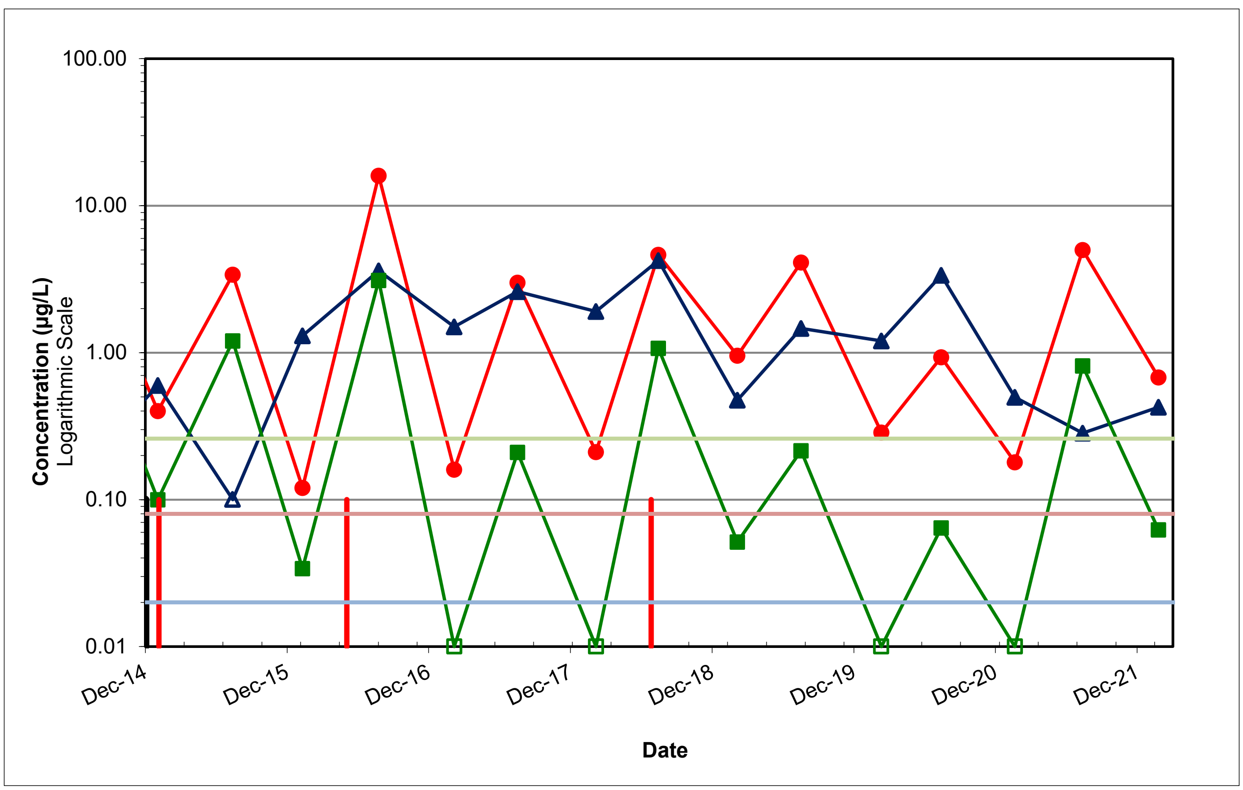
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

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

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



DOWNGRADIENT PLUME AREA WELL GW014S

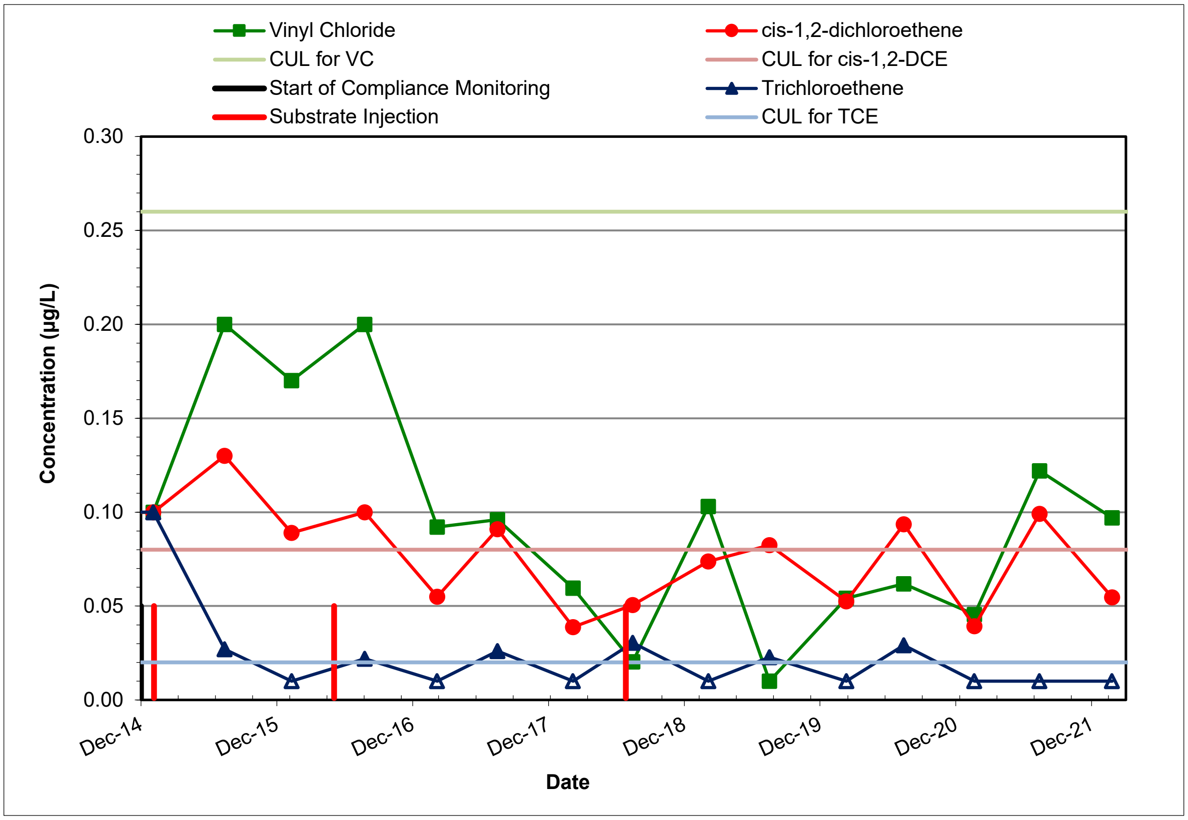


DOWNGRADIENT PLUME AREA WELL GW147S

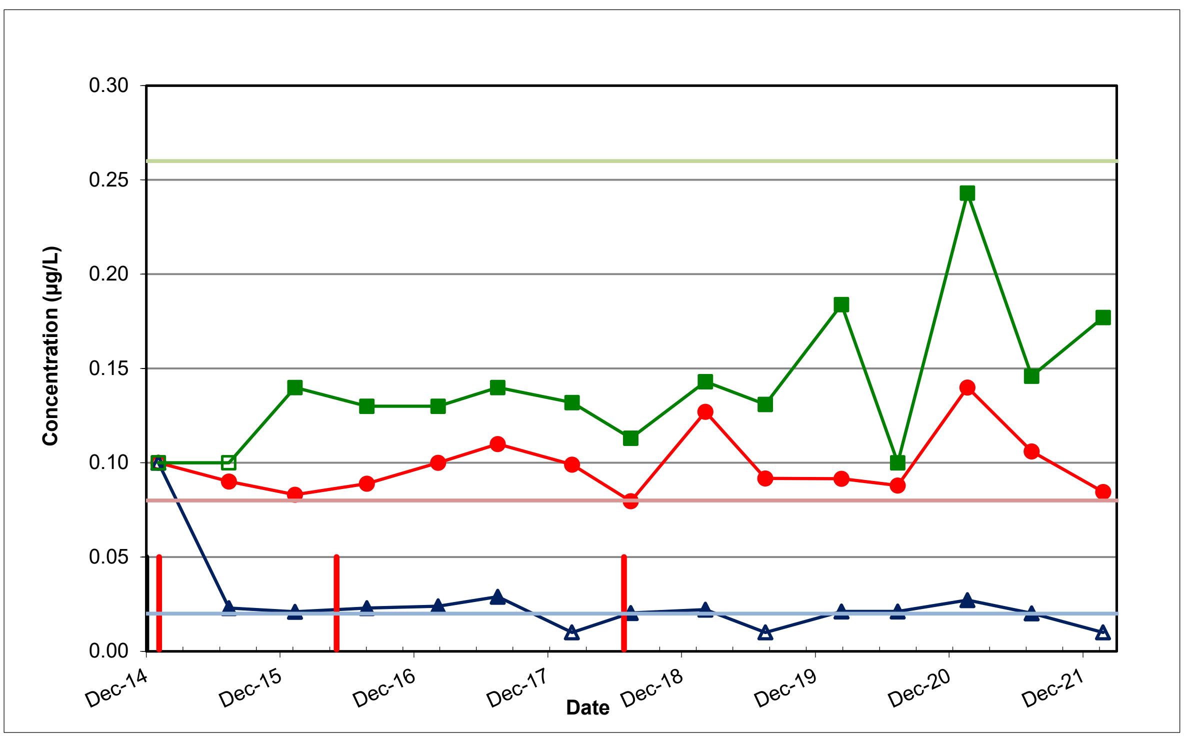
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

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

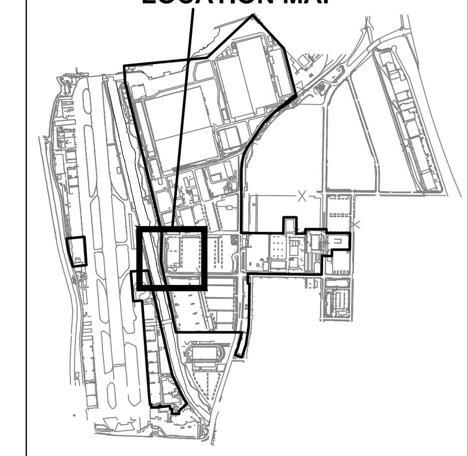


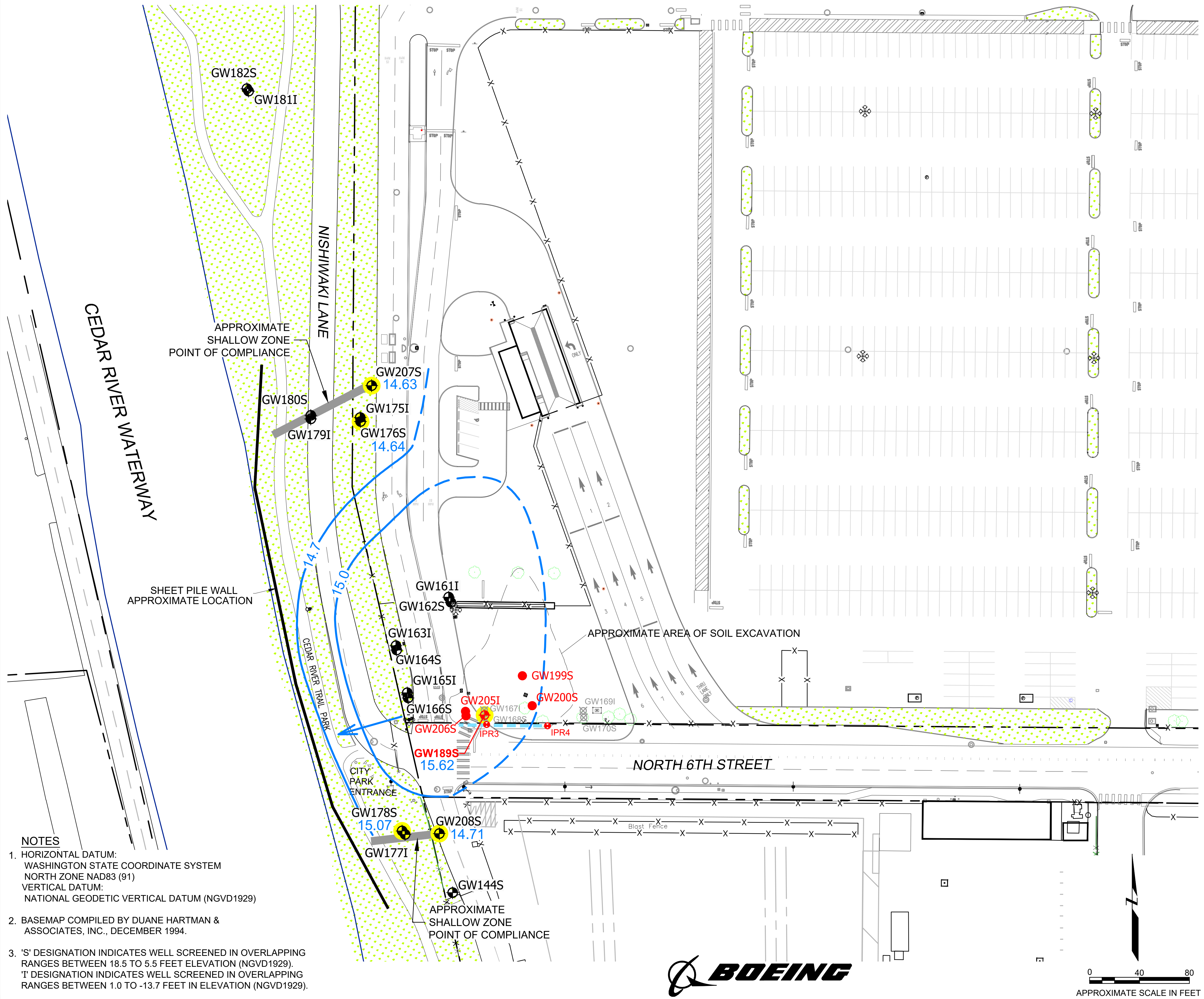
CPOC AREA WELL GW253I

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





LEGEND

GW178S 15.07	MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
14.7	GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
	GENERAL DIRECTION OF GROUNDWATER FLOW
GW201S	EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL
GW189S 15.62	EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL AND MONITORING WELL GROUNDWATER ELEVATION (NGVD-FEET)
IPR4	EXISTING INJECTION PIPE RISER
GW170S	DECOMMISSIONED MONITORING WELL
	APPROXIMATE PROPERTY LINE
—x—	FENCE
	APPROXIMATE LOCATION OF 4-INCH DIAMETER PERFORATED PIPE
	CONDITIONAL POINT OF COMPLIANCE
HIGHLIGHTED	WELLS INCLUDED IN MONITORING NETWORK

NOTES

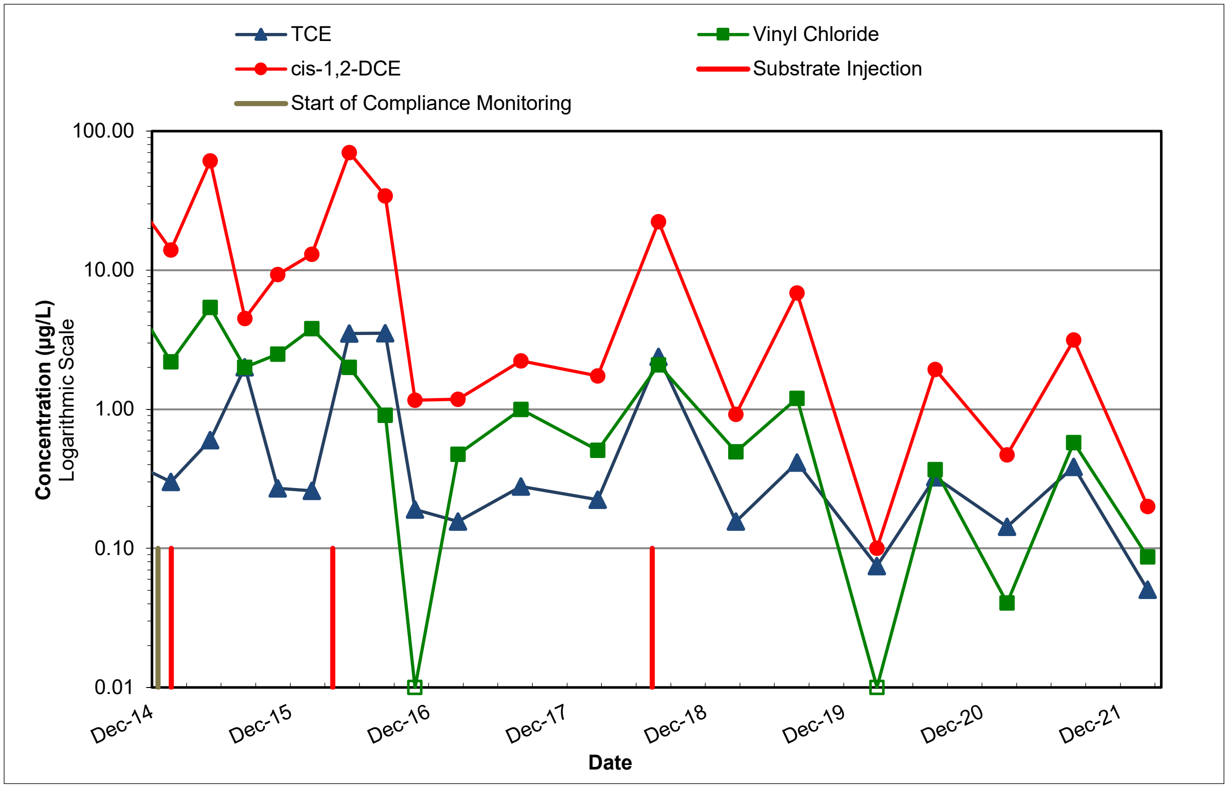
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 18.5 TO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

BOEING

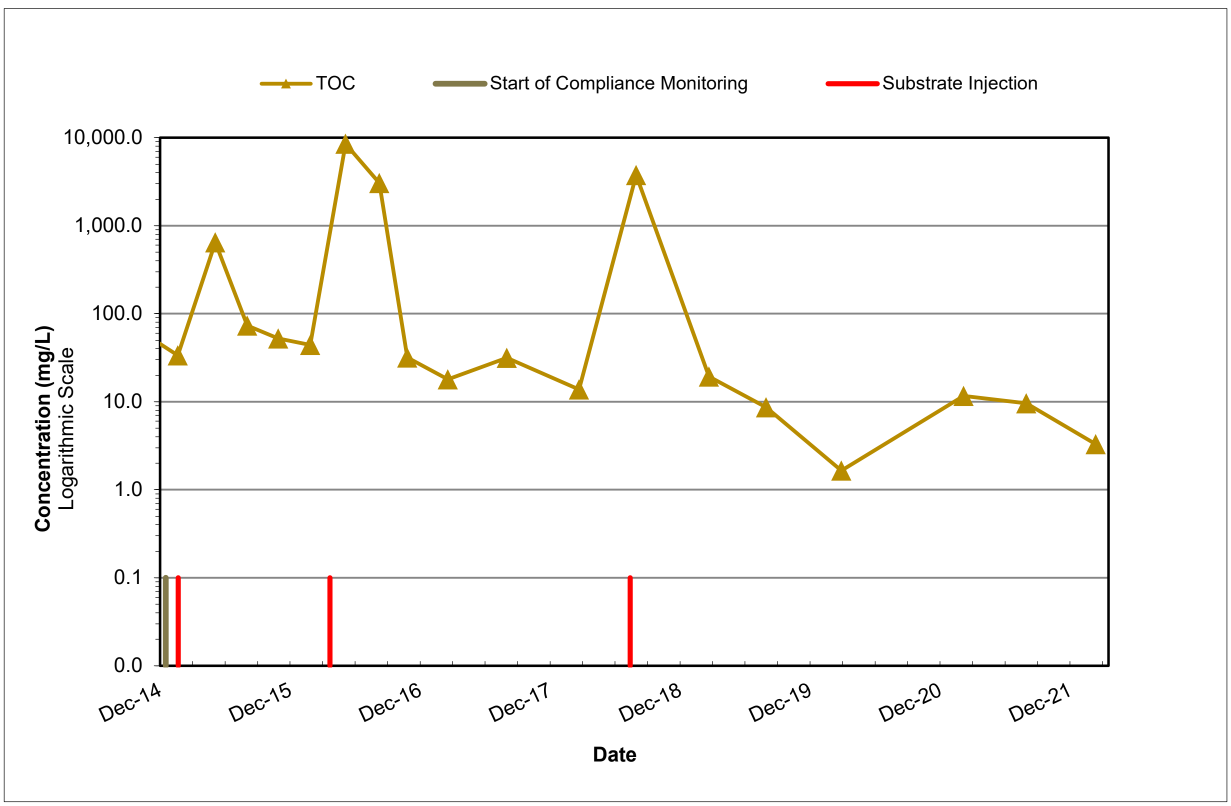
AOC-090
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
FEBRUARY 23, 2022
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/18/22	Project No. PS20203450
wood.		Figure 30

Plot Date: 05/18/22 - 12:34pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006108_2022-Feb-GW-MR\, Drawing Name: Figure_30_AOC-090_GW-ELEV-Feb2022.dwg



SOURCE AREA WELL GW189S

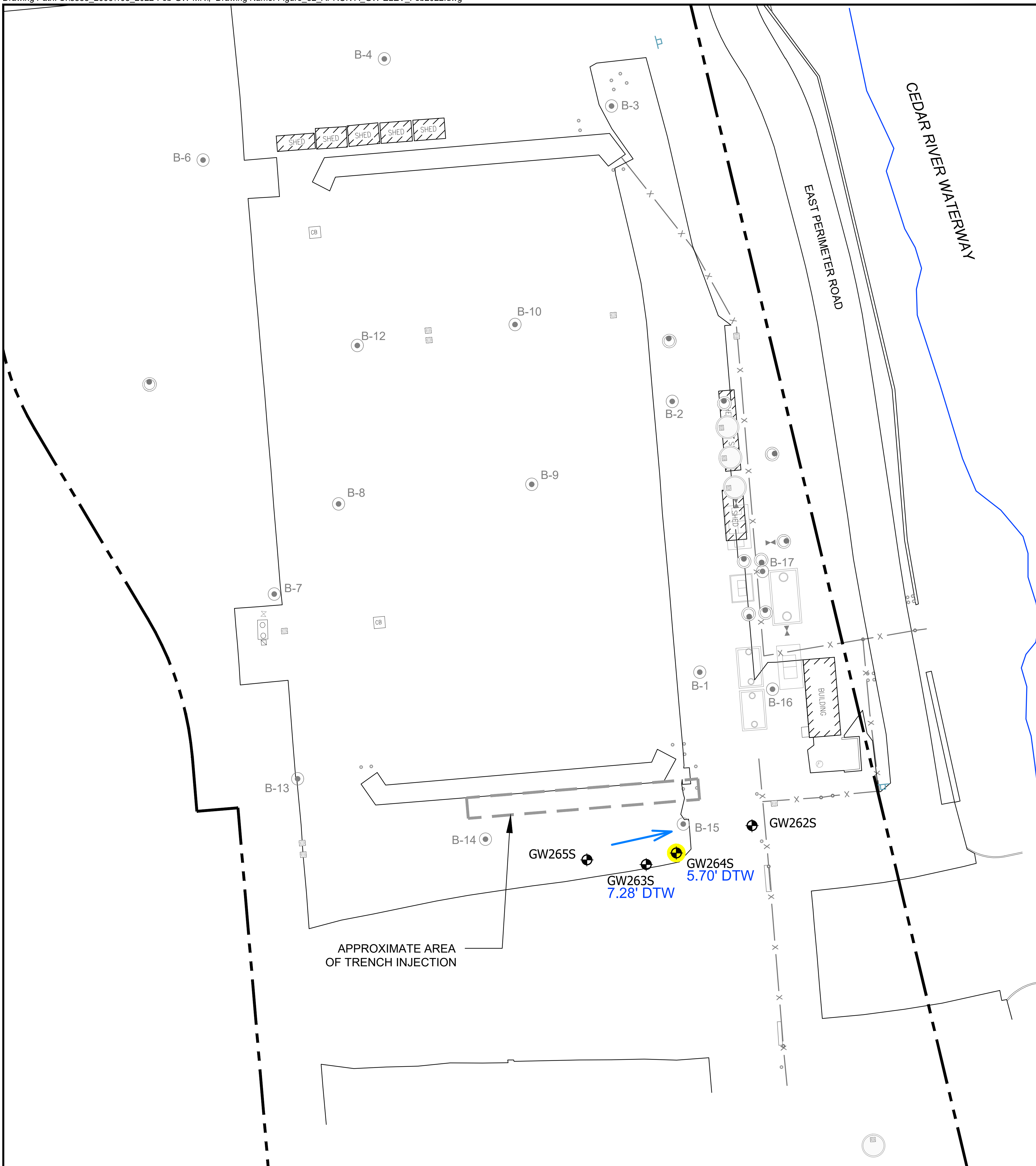


Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

C:\Users\chelsea.foster\Desktop\Figure 31 AOC-90 Trend Plots.xls

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

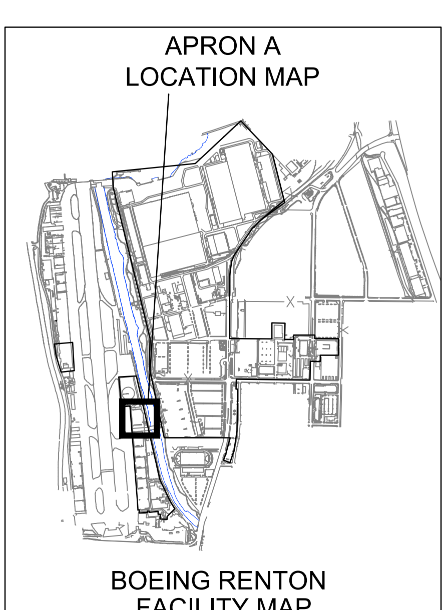
Plot Date: 05/18/22 - 12:42pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\108_2022-Feb-GW-MR\, Drawing Name: Figure_32_APRON A_GW-ELEV_Feb2022.dwg



LEGEND

GW264S 5.70' 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
x	FENCE
HIGHLIGHTED	WELLS INCLUDED IN MONITORING NETWORK

NOTE:
1. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 10 FEET IN DEPTH.

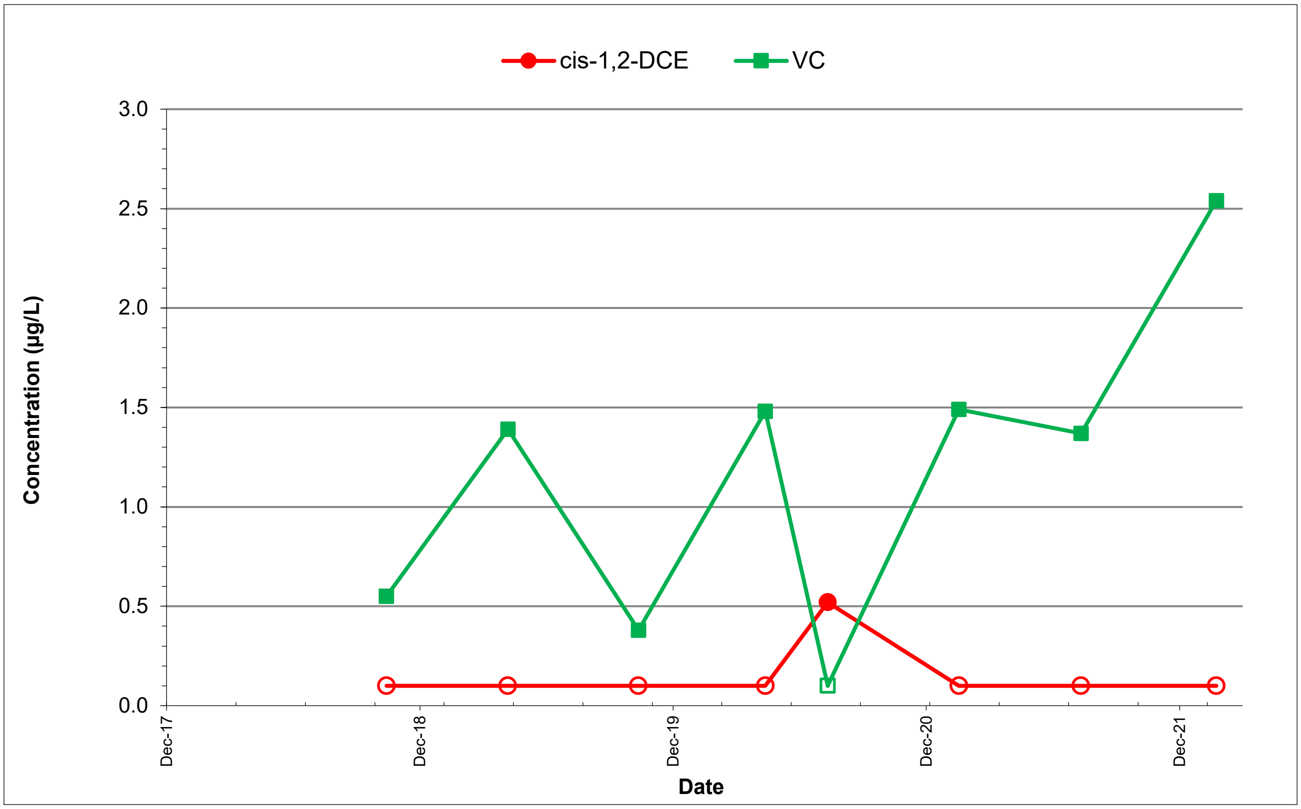


BOEING

0 20 40
APPROXIMATE SCALE IN FEET

APRON A AREA
MONITORING WELL LOCATIONS AND
DEPTH TO GROUNDWATER
FEBRUARY 21, 2022
Boeing Renton Facility
Renton, Washington

By: APS	Date: 05/18/22	Project No. PS20203450
wood.		Figure 32



SOURCE AREA WELL GW264S

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

C:\Users\chelsea.foster\Desktop\Figure 49_Apron A.xlsx

wood.

APRON A TREND PLOT FOR WELL GW264S
Boeing Renton Facility
Renton, Washington

Project No.
PS20203450

Figure
33

Tables

TABLE 1: SWMU-168 GROUNDWATER ELEVATION DATA
FEBRUARY 21, 2022
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	6.29	18.57

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 21, 2022

Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]
	CPOC Area
	GW230I
Temperature (degrees C)	9.1
Specific Conductivity (µS/cm)	248.4
Dissolved Oxygen (mg/L)	0.49
pH (standard units)	6.41
Oxidation/Reduction Potential (mV)	84.2

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 [1, 2]
FEBRUARY 21, 2022
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [3]	Well ID [4] CPOC Area GW230I
Volatile Organic Compounds (µg/L)		
Vinyl Chloride	0.11	**0.164**

Notes:
1. Data qualifiers are as follows:
   J = the value is estimated.
2. **Bolded** values exceed the cleanup levels.
3. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.
4. I = intermediate well.

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 21, 2022
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	8.24	18.74
GW153S	5 to 20[2]	27.47	8.52	18.95
GW172S	8 to 18[2]	26.44	8.40	18.04
GW173S	8 to 18[2]	26.51	8.56	17.95
GW226S	5 to 20[2]	26.86	7.79	19.07
GW232S	4 to 14	24.45	6.09	18.36
GW234S	3 to 13	24.95	6.62	18.33
GW235I	15 to 25	24.90	6.13	18.77
GW236S	5 to 15	24.36	5.89	18.47

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 21, 2022
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]									
	Source Area			Downgradient Plume Area			CPOC Area			
	GW152S	GW152S (field dup.)	GW153S	GW172S	GW173S	GW226S	GW232S	GW234S	GW235I	GW236S
Temperature (degrees C)	9.1	9.1	9.1	8.7	8.7	6.7	8.0	7.9	7.8	6.6
Specific Conductivity (µS/cm)	149.6	149.6	204.5	277.1	263.4	244.9	352.6	155.8	140.6	180.4
Dissolved Oxygen (mg/L)	0.58	0.58	0.87	1.03	0.69	0.66	1.31	1.43	0.81	2.09
pH (standard units)	6.21	6.21	6.59	6.54	6.66	6.66	6.29	6.19	6.31	6.11
Oxidation/Reduction Potential (mV)	90.8	90.8	72.9	-74.6	77.3	57.6	78.5	-11.7	-2.3	36.5
Total Organic Carbon (mg/L)	1.50	1.40	5.70	3.40	4.73	7.80	6.2	1.5	0.50	1.80

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

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

TABLE 6: SWMU-172 AND SWMU-174 GROUP CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
FEBRUARY 21, 2022
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	**1.57**	**1.59**	**0.0517**	**0.0532**	0.0280	**0.0363**	**0.197**	**0.0591**	**0.175**	0.0200 U
Tetrachloroethene	0.02	**1.84**	**1.71**	0.0200 U	**0.0677**	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	**0.0206**
Trichloroethene	0.02	**0.522**	**0.497**	0.0200 U	**0.0201**	0.0200 U	0.0200 U	0.0200 U	0.0200 U	**0.0253**	0.0200 U
Vinyl Chloride	0.11	**0.200**	**0.219**	**0.174**	**0.137**	0.0696	0.0414	**0.307**	0.0318	0.0259	0.0200 U
Total Metals (µg/L)											
Arsenic	1.0	**2.88**	**2.34**	**4.98**	**11.2**	**13.8**	**7.33**	**3.75**	**1.76**	0.200 U	**1.97**
Copper	3.5	**5.07**	**3.88**	1.45	2.86	2.58	2.40	1.09	2.13	0.687	**5.27**
Lead	1.0	**2.78 J**	**1.90 J**	0.302	**1.37**	0.788	0.237	0.234	0.930	0.159	**3.32**

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 22, 2022

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	NM	NM
GW033S	5 to 25	19.49	5.52	13.97
GW034S	5 to 25	19.65	5.67	14.42
GW143S	10 to 15	19.81	5.86	13.95
GW237S	5 to 15	18.85	4.92	13.93
GW240D	22 to 27	19.81	6.15	13.66
GW244S	5 to 15	19.53	NM	NM

Notes:

1. S = shallow well; D = deep well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.
3. Monitoring wells GW031S and GW244S were decomissioned in fall 2021 and are planned to be replaced.

Abbreviations:

AOC = area of concern
bgs = below ground surface
NM = not measured
SWMU = solid waste management unit
TOC = top of casing

TABLE 8: BUILDING 4-78/79 SWMU/AOC GROUP PRIMARY GEOCHEMICAL INDICATORS [1]
FEBRUARY 22, 2022
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]							
	Source Area					CPOC Area		
	GW031S[3]	GW033S	GW033S (field dup.)	GW034S	GW244S[3]	GW143S	GW237S	GW240D
Temperature (degrees C)	NA	8.5	8.5	5.1	NA	7.2	4.6	7.0
Specific Conductivity (µS/cm)	NA	384.5	384.5	234.8	NA	270.3	167.8	224.5
Dissolved Oxygen (mg/L)	NA	2.32	2.32	1.34	NA	0.88	1.05	0.79
pH (standard units)	NA	5.97	5.97	6.08	NA	6.23	6.36	6.22
Oxidation/Reduction Potential (mV)	NA	-62.0	-62.0	-50.0	NA	-43.6	-35.6	-50.4
Total Organic Carbon (mg/L)	NA	8.10	8.80	7.70	NA	6.6	6.3	3.7

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; D = deep well.
3. Monitoring wells GW031S and GW244S were decomissioned in fall 2021 and are planned to be replaced.

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 22, 2022
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [4]	Well ID [3]							
		Source Area					CPOC Area		
		GW031S[5]	GW033S	GW033S (field dup.)	GW034S	GW244S[5]	GW143S	GW237S	GW240D
Volatile Organic Compounds (μg/L)									
Benzene	0.80	NA	**8.41**	**8.57**	0.200 U	NA	0.200 U	**3.73**	0.200 U
cis -1,2-Dichloroethene	0.70	NA	**3.82**	**4.04**	0.200 U	NA	0.430	0.200 U	0.200 U
Trichloroethene	0.23	NA	0.200 U	0.200 U	0.200 U	NA	0.200 U	0.200 U	0.200 U
Vinyl Chloride	0.20	NA	**8.90**	**9.28**	**0.330**	NA	0.200 U	0.200 U	0.200 U
Total Petroleum Hydrocarbons (μg/L)									
TPH-G (C7-C12)	800	NA	168	166	100 U	NA	100 U	664	100 U

Notes:
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; D = deep well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.
5. Monitoring wells GW031S and GW244S were decomissioned in fall 2021 and are planned to be replaced.

Abbreviations:
μg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
field dup. = field duplicate
NA = not analyzed
SWMU = solid waste management unit
TPH-G = total petroleum hydrocarbons in gasoline range

TABLE 10: FORMER FUEL FARM GROUNDWATER ELEVATION DATA
FEBRUARY 21, 2022

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	8.12	19.65
GW221S	5 to 15	27.93	9.03	18.90
GW224S	5 to 15	27.98	9.92	18.06

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 21, 2022

Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]		
	CPOC Area		
	GW211S	GW221S	GW224S
Temperature (degrees C)	9.6	7.0	8.3
Specific Conductivity (µS/cm)	194.8	155	129.1
Dissolved Oxygen (mg/L)	0.28	1.39	1.56
pH (standard units)	6.63	5.97	5.94
Oxidation/Reduction Potential (mV)	32.6	16.8	17.1

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

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

TABLE 12: FORMER FUEL FARM CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
FEBRUARY 21, 2022
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	1.00 U	**0.575**	**0.682**	**1.01**
TPH-O (C24-C38)	NC	2.00 U	0.200 U	0.200 U	0.200 U
Jet A (C10-C18)	0.5	1.00 U	0.460	**1.04**	**1.76**

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 22 & 23, 2022
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW188S	3.5 to 13.5	18.78	4.30	14.48
GW247S	4 to 14	18.91	4.52	14.39
GW248I	10 to 20	18.78	4.32	14.46
GW249S	4 to 14	18.85	4.13	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 22 & 23, 2022
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	7.4	7.4	7.0
Specific Conductivity (µS/cm)	370.6	310.3	374.3	385
Dissolved Oxygen (mg/L)	1.2	1.12	1.71	1.86
pH (standard units)	6.05	6.12	6.20	6.08
Oxidation/Reduction Potential (mV)	-34.2	-19.9	-61.0	-42.5
Total Organic Carbon (mg/L)	14.3	6.7	4.3	10.4

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

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

TABLE 15: AOC-003 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

FEBRUARY 22 & 23, 2022

Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [4]	Well ID [3]			
		Source Area	Downgradient Plume Area	CPOC Area	
		GW249S	GW188S	GW247S	GW248I
Volatile Organic Compounds (μg/L)					
Vinyl Chloride	0.24	**0.359 J**	0.141 J	0.127 J	**0.598 J**

Notes:
1. Data qualifiers are as follows:
   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

AOC = area of concern

CPOC = conditional point of compliance

TABLE 16: AOC-004 GROUNDWATER ELEVATION DATA
FEBRUARY 22, 2022
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	3.87	15.44

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 22, 2022

Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]
	Source Area
	GW250S
Temperature (degrees C)	5.9
Specific Conductivity (µS/cm)	96.6
Dissolved Oxygen (mg/L)	1.85
pH (standard units)	6.96
Oxidation/Reduction Potential (mV)	82.2

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 22, 2022
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [2]	Well ID [1]
		Source Area
		GW250S
Metals (µg/L)		
Lead	1	0.588

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

Abbreviations:
AOC = area of concern
µg/L = micrograms per liter

TABLE 19: AOC-060 GROUNDWATER ELEVATION DATA
FEBRUARY 22, 2022

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	5.39	13.97
GW010S	4.5 to 14.5	19.47	5.52	13.95
GW011D	29 to 39	19.49	5.54	13.95
GW012S	4.5 to 14.5	19.11	5.19	13.92
GW014S	4.5 to 14.5	19.24	5.27	13.97
GW147S	5 to 15	18.73	4.85	13.88
GW150S	5 to 15	19.10	5.24	13.86
GW253I	10 to 20	19.02	5.15	13.87

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 22, 2022
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)	19.4	19.9	17.5	17.5	8.1	9.0	6.1
Specific Conductivity (µS/cm)	341.1	652	523	523	86.9	318.2	242.3
Dissolved Oxygen (mg/L)	0.47	0.61	0.59	0.59	1.31	0.71	1.19
pH (standard units)	6.38	6.11	6.32	6.32	6.36	6.65	6.57
Oxidation/Reduction Potential (mV)	83.6	31.3	51.9	51.9	82.8	84.6	98.5
Total Organic Carbon (mg/L)	4.90	8.20	2.40	2.30	3.80	5.40	3.30

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

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

TABLE 21: AOC-060 CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
FEBRUARY 22, 2022

Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Levels [4]	Well ID [3]					
		Source Area	Downgradient Plume Area			CPOC Area	
		GW009S	GW012S	GW014S	GW147S	GW150S	GW253I
Volatile Organic Compounds (µg/L)							
cis -1,2-Dichloroethene	0.08	**0.15**	**0.693**	**0.133**	**0.679**	**0.0547**	**0.0846**
Trichloroethene	0.02	**0.0284**	**0.0506**	0.0200 U	**0.425**	0.0200 U	0.0200 U
Vinyl Chloride	0.26	**0.434**	**1.57**	**0.276**	**0.0623**	0.0969	0.177

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

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

TABLE 22: AOC-090 GROUNDWATER ELEVATION DATA
FEBRUARY 23, 2022
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	5.51	14.64
GW178S	11.2 to 15.5	22.73	7.66	15.07
GW189S	4 to 14	22.01	6.39	15.62
GW207S	7.3 to 12	21.12	6.49	14.63
GW208S	6.3 to 11	22.45	7.74	14.71

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 23, 2022
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)	8.6	6.8	6.9	8.9	6.5
Specific Conductivity (µS/cm)	147.7	402.1	271.9	319.7	344.6
Dissolved Oxygen (mg/L)	0.53	0.97	0.65	1.47	0.47
pH (standard units)	6.23	6.35	6.35	6.55	6.36
Oxidation/Reduction Potential (mV)	27.8	73.8	69.7	82.9	76.5
Total Organic Carbon (mg/L)	3.30	NA	NA	NA	NA

Notes:
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well.
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 23, 2022
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
Chlorinated Volatile Organic Compounds (µg/L)						
1,1,2,2-Tetrachloroethane	0.17	0.24 U	NA	NA	NA	NA
1,1,2-Trichloroethane	0.2	0.20 U	NA	NA	NA	NA
1,1-Dichloroethene	0.057	0.0200 U	NA	NA	NA	NA
Acetone	300	5.00 U	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	0.20 U	NA	NA	NA	NA
Methylene Chloride	2	1.00 U	NA	NA	NA	NA
Toluene	75	0.47 J	NA	NA	NA	NA
trans-1,2-Dichloroethene	53.9	0.20 U	NA	NA	NA	NA
Tetrachloroethene	0.05	0.0200 U	NA	NA	NA	NA
Trichloroethene	0.08	0.0505 UJ	NA	NA	NA	NA
Vinyl Chloride	0.13	0.0867 J	**0.311 J**	**0.361 J**	**0.356 J**	**0.404 J**
Total Petroleum Hydrocarbons (µg/L)						
TPH-G (C7-C12)	800	370 J	NA	NA	NA	NA
TPH-D (C12-C24)	500	192 J	NA	NA	NA	NA
TPH-O (C24-C40)	500	263 J	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.
   UJ = The analyte was not detected at the estimated 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.
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 21, 2022
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	7.28	NA
GW264S	8 to 18	NA	5.70	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 21, 2022

Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2] Source Area GW264S
Temperature (degrees C)	10.5
Specific Conductivity (µS/cm)	561.0
Dissolved Oxygen (mg/L)	0.61
pH (standard units)	6.11
Oxidation/Reduction Potential (mV)	39.8
Total Organic Carbon (mg/L)	25.5

Notes

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

Abbreviations

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

TABLE 27: APRON A CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]

FEBRUARY 21, 2022

Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Levels	Well ID[2] GW264S
Volatile Organic Compounds (µg/L)		
cis- 1,2-Dichloroethene	NE	0.200 U
Vinyl Chloride	NE	2.54

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

Summary of Groundwater Sampling Methodology

TABLE A-1: GROUNDWATER COMPLIANCE MONITORING PLAN

Boeing Renton Facility, Renton, Washington

Cleanup Action Area	Monitoring Wells[1, 2] Source Area Wells	Downgradient Plume Wells	CPOC Wells	Level Monitoring Wells[3]	Constituents of Concern[4]	Analyses[5]
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 PLAN

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

Field Forms

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 22 /2022@ 1213
Sample Number: RGW009S- 220222
Weather: INSIDE
Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.39 Time: 1148 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 22/2022 @ 1150 End Purge: Date/Time: 2/ 22/2022 @ 1212 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1153	19.5	348.1	0.59	6.37	90.9		5.39		
1156	19.5	342.8	0.49	6.38	85.5		5.39		
1159	19.4	341.1	0.47	6.38	83.6		5.39		

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, NO 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	19.4	340.8	0.44	6.38	82.6				
2	19.4	340.3	0.43	6.38	82.3				
3	19.4	340.3	0.44	6.38	82.1				
4	19.4	340.3	0.43	6.38	81.9				
Average:	19.4	340.4	0.44	6.38	82.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton   Project Number: 0025217.099.099
Event: Feb. 2022   Date/Time: 2/ 22 /2022@
Sample Number: RGW010S- 220222   Weather: INSIDE
Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES)   Damaged (NO)   Describe: FLUSHMOUNT
DTW Before Purging (ft) 5.52   Time: 1110   Flow through cell vol.   GW Meter No.(s HERON 2
Begin Purge: Date/Time: 2/ /2022 @ NA   End Purge: Date/Time: 2/ /2022 @ NA   Gallons Purged: NA
Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

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

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type
Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated
Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated
(By Numerical Order) ☐ Other
Sample Description (color, turbidity, odor, sheen, etc.):

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

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

Duplicate Sample No(s):
Comments:
Signature: Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22 /2022@
Sample Number:	RGW011D- 220222	Weather:	INSIDE
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.54 Time: 1115 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ /2022 @ NA End Purge: Date/Time: 2/ /2022 @ NA 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		
	WATER LEVEL ONLY								

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

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

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

(By Numerical Order) ☐ Other

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

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

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

Duplicate Sample No(s):

Comments:

Signature: Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22/2022@ 1113
Sample Number:	RGW012S- 220222	Weather:	INSIDE
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.19 Time: 1026 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 22/2022 @ 1048 End Purge: Date/Time: 2/ 22/2022 @ 1111 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	
1051	19.9	626	0.54	6.11	60.5		5.21		
1054	19.8	635	0.58	6.11	48.7		5.21		
1057	19.9	644	0.63	6.11	39.2		5.21		
1100	19.9	648	0.62	6.11	34.2				
1103	19.9	652	0.61	6.11	31.3				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, N ODOR, N OSHEEN SUSPENDED PARTICULATES

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	19.9	652	0.60	6.11	30.8				
2	19.9	652	0.60	6.11	30.7				
3	19.9	653	0.60	6.11	30.6				
4	19.9	653	0.59	6.11	30.4				
Average:	19.9	653	0.60	6.11	30.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22/2022@ 1040
Sample Number:	RGW014S- 220222	Weather:	INSIDE
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.27 Time: 1013 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 22/2022 @ 1015 End Purge: Date/Time: 2/ 22 /2022 @ 1038 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1018	16.1	437.1	0.99	6.22	91.7		5.27		
1021	16.0	465.8	0.91	6.24	82.2		5.27		
1024	16.4	482.9	1.23	6.26	71.1		5.27		
1027	16.7	502.0	1.33	6.29	62.5		5.27		
1030	17.2	513.0	0.87	6.31	57.7				
1033	17.3	520.0	0.67	6.32	53.1				
1036	17.5	523.0	0.59	6.32	51.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT BROWN, LOW -MED TURB. NO ODOR, NO SHEEN SUSPENDE PARTICULATES

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.5	524	0.58	6.32	51.9				
2	17.5	525	0.59	6.32	51.5				
3	17.5	543	0.57	6.32	51.5				
4	17.6	543	0.88	6.32	51.2				
Average:	17.5	534	0.66	6.32	51.5	#DIV/0!			

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

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

Comments:

Signature: AHA Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 22 /2022@ 1045
Sample Number: RGWDUP4 220222
Weather: INSIDE
Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

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

Begin Purge: Date/Time: 2/ /2022 @ End Purge: Date/Time: 2/ /2022 @ Gallons Purged:

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

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

DUPLICATE TO RGW014S

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.): LIGHT BROWN, LOW -MED TURB. NO ODOR, NO SHEEN SUSPENDE PARTICULATES

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.4	524	0.59	6.32	51.6				
2	17.5	525	0.58	6.32	51.5				
3	17.5	543	1.13	6.32	51.3				
4	17.6	544	0.78	6.32	51.2				
Average:	17.5	534	0.77	6.32	51.4	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW014S

Comments:

Signature: AHA Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22 /2022@ 922
Sample Number:	RGW033S- 220222	Weather:	SUNNY 30'S
Landau Representative:	AHA/JAM/SJL		

WATER LEVEL/WELL/PURGE DATA

Well Conditio GOOD, NO I Secure (YES) Damaged (NO) Describe: FLUSH

DTW Before Purging (ft) 5.52 Time: 852 Flow through cell vol. GW Meter No.(s SLOPE INDICATOI

Begin Purge: Date/Time: 2/ 22 /2022 @ 0855 End Purge: Date/Time: 2/ 22 /2022 @ 919 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	
858	11.2	433.4	2.63	6.16	-36.9		5.53		
901	10.4	416.0	2.42	6.01	-51.8		5.53		
904	10.3	413.6	2.46	6.00	-55.1		5.53		
907	9.5	404.3	2.35	5.98	-58.5				
910	9.3	394.0	2.36	5.97	-60.1				
913	9.0	391.3	2.32	5.97	-60.8				
916	8.5	384.5	2.32	5.97	-62.0				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.5	380.4	2.35	5.96	-62.1				
2	8.2	380.8	2.37	5.97	-62.2				
3	8.2	379.5	2.34	5.97	-62.2				
4	8.3	379.1	2.33	5.96	-62.3				
Average:	8.3	380.0	2.35	5.97	-62.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SJL Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22 /2022@ 928
Sample Number:	RGWDUP2 220222	Weather:	SUNNY 30'S
Landau Representative:	AHA/JAM/SJL		

WATER LEVEL/WELL/PURGE DATA

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

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

Begin Purge: Date/Time: 2/ /2022 @ End Purge: Date/Time: 2/ /2022 @ 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	

DUPLICATE TO RGW033S

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.2	376.1	2.28	5.97	-62.5				
2	8.2	375.7	2.3	5.97	-62.5				
3	8.1	374.3	2.3	5.96	-62.6				
4	8.1	374.9	2.28	5.97	-62.6				
Average:	8.2	375.3	2.3	6.0	-62.6	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW033S

Comments:

Signature: SJL Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22 /2022@ 1002
Sample Number:	RGW034S- 220222	Weather:	SNOWING, 30s
Landau Representative:	AHA/JAM/SJL		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.67 Time: 936 Flow through cell vol. GW Meter No.(s SLOPE #2

Begin Purge: Date/Time: 2/ 22 /2022 939 End Purge: Date/Time: 2/ 22 /2022 @ 1001 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	
942	10.8	254.5	0.80	6.05	-16.2		5.64		
945	8.7	254.2	0.94	6.07	-31.6		5.64		
948	8.1	251.2	1.02	6.07	-40.9		5.62		
951	7.2	247.1	1.10	6.08	-45.4				
954	6.2	242.0	1.21	6.07	-47.8				
957	5.6	237.0	1.30	6.07	-49.2				
1000	5.1	234.8	1.34	6.08	-50.0				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	5.2	234.2	1.33	6.08	-50.1				
2	5.2	234.1	1.33	6.08	-50.2				
3	5.2	233.7	1.34	6.08	-50.2				
4	5.0	233.4	1.35	6.08	-50.3				
Average:	5.2	233.9	1.34	6.08	-50.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SJL Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22 /2022@ 1138
Sample Number:	RGW143S- 220222	Weather:	SNOWING, 30s
Landau Representative:	AHA/JAM/SJL		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.86 Time: 1112 Flow through cell vol. GW Meter No.(s SLOPE #2

Begin Purge: Date/Time: 2/ 22 /2022 1116 End Purge: Date/Time: 2/ 22 /2022 @ 1137 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	
1119	10.5	273.9	0.59	6.07	-1.0		5.84		
1122	8.7	273.5	0.68	6.20	-13.4		5.85		
1125	7.7	272.4	0.76	6.25	-29.3		5.85		
1128	7.5	272.0	0.83	6.26	-35.2				
1131	7.1	270.8	0.86	6.25	-39.8				
1134	7.0	270.1	0.86	6.24	-41.7				
1136	7.2	270.3	0.88	6.23	-43.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): PALE YELLOW NO ODOR NO SHEEN FLOATING PARTICULATES MOSTLY CLEAR

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.2	270.3	0.90	6.23	-43.9				
2	7.2	270.3	0.91	6.23	-44.2				
3	7.2	270.5	0.91	6.23	-44.7				
4	7.2	270.8	0.92	6.23	-45.0				
Average:	7.2	270.5	0.91	6.23	-44.5	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SJL Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/22 /2022@ 1011
Sample Number:	RGW147S- 220222	Weather:	SNOWING 30'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.85 Time: 945 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 22/2022 @ 947 End Purge: Date/Time: 2/ 22 /2022 @ 959 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	
950	9.2	95.8	1.34	6.53	86.4		4.85		
953	8.9	90.9	1.28	6.41	83.5		4.85		
956	8.1	86.9	1.31	6.36	82.8		4.85		

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): BROWN, MED-HIGH TUIRB, 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	7.9	85.1	1.28	6.36	82.7				
2	7.6	84.6	1.26	6.36	82.7				
3	7.1	84.2	1.26	6.35	82.7				
4	6.9	83.2	1.26	6.35	82.7				
Average:	7.4	84.3	1.27	6.36	82.7	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 22 /2022@ 1327
Sample Number: RGW150S- 220222
Weather: CLOUDY 30'S
Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.24 Time: 1250 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 22/2022 @ 1302 End Purge: Date/Time: 2/ 22 /2022 @ 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1305	9.9	306.9	0.61	6.66	93.5		5.25		
1308	9.2	315.1	0.60	6.65	87.4		5.25		
1311	9.00	318.2	0.71	6.65	84.6		5.25		

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, NO 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	319.2	0.72	6.65	82.8				
2	8.9	318.8	0.74	6.65	82.4				
3	8.9	319.1	0.73	6.65	81.9				
4	8.9	319.4	0.72	6.66	81.5				
Average:	8.9	319.1	0.73	6.65	82.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21 /2022@ 1251
Sample Number:	RGW152S- 220221	Weather:	CLOUDY 40'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.24 Time: 1226 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/21 /2022 @ 1227 End Purge: Date/Time: 2/ 21 /2022 @ 1250 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	
1230	12.8	165.6	0.16	6.33	101.8		8.22		
1233	10.2	205.3	0.51	6.28	94.6		8.22		
1236	10.0	185.8	0.53	6.29	91.1		8.22		
1239	9.4	170.6	0.57	6.27	89.6		8.23		
1242	9.1	159.8	0.57	6.25	89.7				
1245	8.9	153.9	0.59	6.22	91.1				
1248	9.1	149.6	0.58	6.21	90.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): MUGGY, MED-HIGH 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	9.1	149.1	0.59	6.22	90.3				
2	9.3	148.5	0.59	6.22	90.3				
3	9.3	148.4	0.61	6.21	90.2				
4	9.3	148.2	0.61	6.21	90.1				
Average:	9.3	148.6	0.60	6.22	90.2	#DIV/0!			

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

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

Comments:

Signature: AHA Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 21 /2022@ 1255
Sample Number: RGWDUP1 22022121
Weather: CLOUDY 40'S
Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

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

Begin Purge: Date/Time: 2/ /2022 @ End Purge: Date/Time: 2/ /2022 @ Gallons Purged:

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

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

DUPLICATE TO RGW152S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): MUGGY, MED-HIGH 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	148.1	0.55	6.22	89.5				
2	9.2	147.8	0.56	6.22	89.8				
3	9.2	147.7	0.56	6.22	90.1				
4	9.2	147.8	0.57	6.22	90.2				
Average:	9.2	147.9	0.56	6.22	89.9	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW152S

Comments:

Signature: AHA Date: 2/22/2021

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 21 /2022@ 1021
Sample Number: RGW153S- 220221
Weather: CLOUDY 40'S
Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.52 Time: 956 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/21/2022 @ 957 End Purge: Date/Time: 2/ 21 /2022 @ 1020 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1000	11.6	201.9	3.49	6.67	89.7		8.57		
1003	11.1	205.2	2.44	6.59	85.4		8.57		
1006	10.0	207.8	2.05	6.57	81.7		8.57		
1009	9.6	206.9	1.68	6.58	79.8		8.58		
1012	9.3	205.9	1.12	6.59	77.7				
1015	9.3	205.1	0.88	6.59	74.1				
1018	9.1	204.5	0.87	6.59	72.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT BROWN, LOW-MED 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	9.1	204.3	0.86	6.59	72.7				
2	9.1	204.1	0.85	6.59	72.7				
3	9.1	203.8	0.85	6.59	72.5				
4	9.0	203.7	0.85	6.59	72.3				
Average:	9.1	204.0	0.85	6.59	72.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21 /2022@ 1248
Sample Number:	RGW172S- 220221	Weather:	40s SUNNY
Landau Representative:	AHA/JAM		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.4 Time: 12:20 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 21 /2022 1222 End Purge: Date/Time: 2/ 21 /2022 @ 1246 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	
1225	12.2	263.5	1.27	6.34	-24.9		8.44		
1228	11.7	270.3	1.68	6.38	-44.5		8.44		
1231	11.1	273.8	1.50	6.40	-53.5		8.44		
1234	10.5	278.1	1.08	6.42	-60.5		8.44		
1237	9.7	282.4	0.82	6.48	-67.7		8.44		
1240	9.2	281.7	0.90	6.52	-72.9		8.44		
1243	8.7	277.1	1.03	6.54	-74.6		8.44		

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): PALE YELLOW, MEDIUM HIGH 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	8.8	276.3	1.05	6.54	-74.7				
2	8.7	275.4	1.07	6.54	-74.8				
3	8.7	275.0	1.08	6.54	-74.9				
4	8.7	274.7	1.09	6.54	-74.9				
Average:	8.7	275.4	1.07	6.54	-74.8				

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

Duplicate Sample No(s):

Comments: WELL HOUSING FILLED WITH PARKING LOT SLUDGE, NO BOLTS, WELL ITSELF STILL CLEAN

Signature: JAM Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21/2022@ 1209
Sample Number:	RGW173S- 220221	Weather:	CLOUDY 40'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.56 Time: 1144 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/ 21/2022 @ 1145 End Purge: Date/Time: 2/21 /2022 @ 1207 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1148	10.4	247.1	1.39	6.56	95.3		8.49		
1151	10.0	253.9	0.89	6.54	93.2		8.49		
1154	9.6	264.1	0.15	6.60	88.1		8.49		
1157	9.3	266.9	0.56	6.63	82.6		8.49		
1200	9.3	266.6	0.72	6.63	82.3				
1203	8.8	264.4	0.71	6.65	78.8				
1206	8.7	263.4	0.69	6.66	77.3				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

NOCOLOR, LOW-MED 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	8.7	263.3	0.67	6.66	76.9				
2	8.7	263.3	0.68	6.66	76.8				
3	8.7	263.3	0.68	6.66	76.6				
4	8.7	262.9	0.67	6.66	76.3				
Average:	8.7	263.2	0.68	6.66	76.7	#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) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: AHA Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 23 /2022@ 1025
Sample Number:	RGW176S- 220223	Weather:	SUNNY 40'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.51 Time: 950 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 23 /2022 @ 1001 End Purge: Date/Time: 2/ 23 /2022 @ 1023 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	
1004	11.1	501.0	1.12	6.38	97.9		5.51		
1007	9.9	494.1	3.29	6.36	82.3		5.51		
1010	8.9	473.2	2.77	6.35	74.2		5.51		
1013	7.7	434.7	1.36	6.36	72.5		5.52		
1016	7.4	423.4	1.23	6.36	73.2				
1019	7.1	414.9	1.13	6.36	73.6				
1022	6.8	402.1	0.97	6.35	73.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT BROWN, MED-HIGH 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	6.8	401.9	0.97	6.35	73.7				
2	6.8	401.9	0.95	6.35	73.6				
3	6.8	400.6	0.92	6.35	73.6				
4	6.8	400.5	0.92	6.35	73.5				
Average:	6.8	401.2	0.94	6.35	73.6	#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) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/23/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 23 /2022@ 1139
Sample Number:	RGW178S- 220223	Weather:	SUNNY 40'S
Landau Representative:			

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.66 Time: 1113 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 23 /2022 1115 End Purge: Date/Time: 2/ 23 /2022 @ 1137 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1118	8.9	311.5	0.63	6.35	75.1		7.71		
1121	7.6	292.3	0.60	6.35	70.8		7.71		
1124	6.9	271.9	0.65	6.35	69.7		7.71		

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	6.8	271.8	0.56	6.34	69.8				
2	6.8	271.2	0.58	6.34	69.9				
3	6.8	270.6	0.59	6.34	69.9				
4	6.8	269.9	0.61	6.34	69.8				
Average:	6.8	270.9	0.59	6.34	69.9	#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)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/23/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22 /2022@ 1352
Sample Number:	RGW188S- 220222	Weather:	SNOWING, 30s
Landau Representative:	SJL/JAM/AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.30 Time: 1325 Flow through cell vol. GW Meter No.(s SLIOPE #2

Begin Purge: Date/Time: 2/ 22 /2022 1327 End Purge: Date/Time: 2/ 22 /2022 @ 1350 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		
1330	9.8	331.9	1.08	6.06	7.3		4.31		
1333	7.8	316.5	1.08	6.10	-14.6		4.30		
1336	7.5	314.0	1.09	6.10	-16.4		4.29		
1339	7.4	310.3	1.12	6.12	-19.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.3	309.0	1.07	6.12	-21.2				
2	7.3	308.7	1.05	6.12	-21.6				
3	7.3	308.3	1.04	6.12	-22.2				
4	7.3	307.7	1.02	6.12	-22.6				
Average:	7.3	308.4	1.05	6.12	-21.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SJL Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 23 /2022@ 1207
Sample Number: RGW189S- 220223
Weather: SUNNY 40'S
Landau Representative:

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.39 Time: 1138 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 23 /2022 1140 End Purge: Date/Time: 2/ 23 /2022 @ 1203 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	
1143	9.9	197.4	0.51	6.09	64.1		6.49		
1146	9.3	181.2	0.53	6.06	55.6		6.49		
1149	9.1	176.5	0.52	6.11	47.2		6.49		
1152	8.8	166.8	0.54	6.13	44.1		6.49		
1155	8.4	155.3	0.53	6.18	39.1		6.49		
1158	8.6	150.1	0.51	6.22	30.1				
1201	8.6	147.7	0.53	6.23	27.8				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR NO LOW TURB 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	8.7	147.1	0.51	6.23	26.3				
2	8.7	147.1	0.52	6.23	26.1				
3	8.7	146.7	0.52	6.23	24.1				
4	8.7	146.3	0.51	6.25	22.3				
Average:	8.7	146.8	0.52	6.24	24.7	#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) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location
Comments:
Signature: AHA Date: 2/23/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 23 /2022@ 959
Sample Number:	RGW207S- 220223	Weather:	SUNNY 40'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.49 Time: 933 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 23/2022 @ 935 End Purge: Date/Time: 2/ 23 /2022 @ 957 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	
938	9.4	342.5	3.64	7.08	105.8		6.45		
941	9.1	330.3	2.22	6.78	97.2		6.45		
944	9.2	327.2	1.59	6.62	90.5		6.45		
947	8.9	322.8	1.51	6.58	87.2		6.45		
950	8.9	320.7	1.45	6.56	85.1		6.45		
953	8.9	319.7	1.47	6.55	82.9				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): 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	8.9	319.9	1.48	6.56	82.8				
2	8.9	318.7	1.48	6.55	81.7				
3	8.8	318.7	1.52	6.55	81.4				
4	8.8	318.7	1.52	6.55	81.1				
Average:	8.9	319.0	1.50	6.55	81.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/23/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 23 /2022@ 1111
Sample Number:	RGW208S- 220223	Weather:	SUNNY 40'S
Landau Representative:			

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.74 Time: 1047 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 23 /2022 1048 End Purge: Date/Time: 2/ 23 /2022 @ 1110 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		
1051	8.9	397.7	0.61	6.40	92.9		7.71		
1054	8.2	385.8	0.64	6.39	87.5		7.71		
1057	7.2	365.5	0.44	6.38	81.5		7.71		
1100	6.7	354.7	0.51	6.37	79.4		7.72		
1103	6.5	344.6	0.47	6.36	76.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	6.5	343.2	0.51	6.36	76.2				
2	6.5	343.2	0.52	6.35	76.1				
3	6.5	342.9	0.53	6.35	75.9				
4	6.5	341.2	0.53	6.36	75.6				
Average:	6.5	342.6	0.52	6.36	76.0	#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) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/23/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21 /2022@ 1407
Sample Number:	RGW211S- 220221	Weather:	SUNNY 50'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 8.12 Time: 1339 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/ 21 /2022 @ 1342 End Purge: Date/Time: 2/ 21 /2022 @ 1405 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1345	9.1	387.8	0.72	6.46	102.2		7.96		
1348	10.9	223.7	0.29	6.68	45.7		7.98		
1351	10.0	201.3	0.27	6.63	32.8		7.99		
1354	9.7	200.1	0.29	6.63	32.3				
1357	9.6	194.8	0.28	6.63	32.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): BROWN, MED-HIGH 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	9.1	194.3	0.26	6.63	32.2				
2	9.1	193.4	0.26	6.63	32.1				
3	9.2	192.8	0.25	6.63	32.1				
4	9.4	192.4	0.26	6.63	32.2				
Average:	9.2	193.2	0.26	6.63	32.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 21 /2022@ 1502
Sample Number: RGW221S- 220221
Weather: 40S SUNNY
Landau Representative: AHA/JAM

WATER LEVEL/WELL/PURGE DATA

Well Conditioı GOOD   Secure (YES)   Damaged (NO)   Describe: FLUSH

DTW Before Purging (ft) 9.03   Time: 1435   Flow through cell vol.   GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 21 /2022 1436   End Purge: Date/Time: 2/ 21 /2022 @ 1500   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	
1439	10.3	162.8	2.25	5.94	41.6		9.04		
1442	9.3	164.7	1.96	5.95	30.8		9.04		
1445	8.5	160.9	1.75	5.96	24.7		9.04		
1448	8.1	158.8	1.64	5.98	22.3		9.04		
1451	7.7	157.4	1.45	5.97	20.0		9.04		
1454	7.2	156.2	1.41	5.97	17.9		9.04		
1457	7.0	155.0	1.39	5.97	16.8		9.04		

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	6.7	155	1.41	5.97	16.6				
2	6.8	154.8	1.40	5.97	16.5				
3	6.8	154.8	1.40	5.97	16.4				
4	6.8	154.6	1.39	5.97	16.3				
Average:	6.8	154.8	1.40	5.97	16.5				

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) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: JAM   Date: 2.23.22

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21 /2022@ 1416
Sample Number:	RGW224S- 220221	Weather:	P SUNNY 40S
Landau Representative:	AHA/JAM		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 9.92 Time: 1348 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 21 /2022 @ 1349 End Purge: Date/Time: 2/ 21 /2022 @ 1413 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	
1352	11.6	134.1	1.37	6.02	38.8		9.97		
1355	11.5	138.2	1.31	5.94	28.9		9.96		
1358	11.4	138.5	1.47	5.93	26.7		9.96		
1401	10.4	136.6	1.44	5.93	23.8		9.96		
1404	9.2	133.6	1.48	5.95	21.2				
1407	8.8	130.8	1.57	5.95	18.7				
1410	8.3	129.1	1.56	5.94	17.1				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.1	128.9	1.57	5.94	16.6				
2	8.1	128.8	1.54	5.94	16.4				
3	8.1	128.5	1.53	5.94	16.4				
4	8	128.4	1.53	5.94	16.1				
Average:	8.1	128.7	1.5	5.9	16.4	#DIV/0!			

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

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

Comments:

Signature: Date:

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 21 /2022@ 1420
Sample Number: RGWDUP3 220221
Weather: 40S P SUNNY
Landau Representative: AHA/JAM

WATER LEVEL/WELL/PURGE DATA

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

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

Begin Purge: Date/Time: 2/ 21 /2022 @ ______ End Purge: Date/Time: 2/ 21 /2022 @ ______ 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 BLADDER

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8	128.2	1.51	5.94	15.8				
2	8	128.2	1.5	5.94	15.6				
3	8	128	1.5	5.94	15.4				
4	7.8	127.8	1.5	5.94	15.3				
Average:	8.0	128.1	1.5	5.9	15.5	#DIV/0!			

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

Duplicate Sample No(s): Duplicate to RGW224S

Comments:

Signature: JAM Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21 /2022@ 1051
Sample Number:	RGW226S- 220221	Weather:	CLOUDY 40'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.79 Time: 1010 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/ 21/2022 @ 1027 End Purge: Date/Time: 2/21 /2022 @ 1050 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	
1030	10.6	232.5	2.59	6.55	78.8		8.12		
1033	9.3	269.2	1.79	6.50	72.9		8.29		
1036	8.6	277.6	1.24	6.51	68.8		8.33		
1039	7.9	278.7	0.94	6.58	60.6		8.39		
1042	7.6	271.4	0.85	6.61	58.3				
1045	7.1	257.7	0.70	6.64	56.8				
1048	6.7	244.9	0.66	6.66	57.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT YELLOW, MED-HIGH 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	6.7	243.6	0.66	6.66	57.6				
2	6.7	242.9	0.67	6.66	57.6				
3	6.7	242.5	0.68	6.66	57.6				
4	6.7	240.6	0.66	6.66	57.5				
Average:	6.7	242.4	0.67	6.66	57.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21/2022@ 1139
Sample Number:	RGW230I- 220221	Weather:	CLOUDY 40'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.29 Time: 1114 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/21 /2022 @ 1115 End Purge: Date/Time: 2/21 /2022 @ 1128 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		
1118	10.5	268.7	0.45	6.37	93.5		6.28		
1121	9.4	254.8	0.50	6.39	87.4		6.28		
1124	9.1	248.7	0.48	6.38	84.8		6.28		
1127	9.1	248.4	0.49	6.41	84.2				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): 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	8.9	246.7	0.49	6.41	84.2				
2	8.9	238.1	0.61	6.42	89.5				
3	8.9	250.6	0.72	6.45	88.5				
4	8.9	256.1	0.74	6.43	87.2				
Average:	8.9	247.9	0.64	6.43	87.4	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 21 /2022@ 945
Sample Number: RGW232S- 220221
Weather: CLOUDY 40'S
Landau Representative: AHA

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.09 Time: 919 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/ 21 /2022 920 End Purge: Date/Time: 2/ 21 /2022 @ 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
923	11.2	427.1	1.86	6.35	78.2		6.43		
926	9.3	395.9	2.63	6.31	75.9		6.45		
929	8.3	368.2	3.37	6.29	79.3		6.49		
932	8.2	361.9	2.88	6.28	80.1		6.51		
935	8.1	356.7	1.86	6.28	79.9		6.54		
938	8.1	354.7	1.39	6.29	78.8		6.55		
941	8.0	352.6	1.31	6.29	78.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO COLOR, LOW TURB, NO ODOR, NMO 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	351.7	1.25	6.29	78.1				
2	8.0	351.7	1.23	6.29	78.0				
3	8.0	351.8	1.22	6.29	77.9				
4	8.0	351.9	1.20	6.29	77.9				
Average:	8.0	351.8	1.23	6.29	78.0	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 21 /2022@ 1048
Sample Number: RGW234S- 220221
Weather: 40S OC
Landau Representative: AHA/JAM

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.62 Time: 1020 Flow through cell vol. GW Meter No.(s HERON #2

Begin Purge: Date/Time: 2/ 21 /2022 1022 End Purge: Date/Time: 2/ 21 /2022 @ 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	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1025	9.9	198.6	3.19	6.20	28.5		6.62		
1028	9.1	182.4	3.10	6.20	10.4		6.62		
1031	8.8	170.0	2.48	6.20	4.8		6.62		
1034	8.6	163.1	1.98	6.20	-0.3		6.62		
1037	8.4	159.1	1.55	6.20	-7.4		6.62		
1040	8.2	157.7	1.45	6.19	-9.6				
1043	7.9	155.8	1.43	6.19	-11.7				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): PALE YELLOW, MEDIUM 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	7.8	155.6	1.42	6.19					
2	7.8	155.4	1.41	6.19					
3	7.8	155.3	1.41	6.19					
4	7.8	155.1	1.41	6.19					
Average:	7.8	155.4	1.41	6.19					

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

Duplicate Sample No(s):

Comments:

Signature: JAM Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21 /2022@ 1150
Sample Number:	RGW235I- 220221	Weather:	40S OC
Landau Representative:	AHA/JAM		

WATER LEVEL/WELL/PURGE DATA

Well Conditioı IRON OXIDI Secure (YES) Damaged (NO) Describe: FLUSH

DTW Before Purging (ft) 6.13 Time: 11:21 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 21 /2022 1125 End Purge: Date/Time: 2/ 21 /2022 @ 1149 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	
1128	10.4	145.5	0.69	6.24	37.7		6.13		
1131	9.5	146.0	0.80	6.28	19.2		6.13		
1134	8.9	144.1	0.84	6.30	9.7		6.13		
1137	8.4	143.1	0.84	6.30	5.3		6.13		
1140	8.1	141.7	0.82	6.31	0.8		6.13		
1143	8.0	141.2	0.81	6.31	-0.9		6.13		
1146	7.8	140.6	0.81	6.31	-2.3		6.13		

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.8	140.5	0.81	6.32	-2.6				
2	7.8	140.5	0.81	6.31	-2.8				
3	7.7	140.4	0.83	6.31	-2.9				
4	7.7	140.3	0.82	6.32	-3.1				
Average:	7.8	140.4	0.82	6.32	-2.9				

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

Duplicate Sample No(s):

Comments:

Signature: JAM Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 21 /2022@ 940
Sample Number: RGW236S- 220221
Weather: 40S OC
Landau Representative: AHA/JAM

WATER LEVEL/WELL/PURGE DATA

Well Conditio IRON OXID. Secure (YES) Damaged (NO) Describe: FLUSH

DTW Before Purging (ft) 5.89 Time: 911 Flow through cell vol. GW Meter No.(s HERON #2

Begin Purge: Date/Time: 2/ 21 /2022 914 End Purge: Date/Time: 2/ 21 /2022 @ 938 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	
917	10.8	217.1	3.13	6.44	101.9		5.91		
920	10.0	211.3	2.68	6.29	70.6		5.90		
923	8.8	202.9	2.55	6.22	54.8		5.90		
926	7.9	195.9	2.33	6.19	46.1				
929	7.4	189.2	2.29	6.17	40.3				
932	6.8	183.1	2.16	6.14	36.4				
935	6.6	180.4	2.09	6.11	36.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): PALE YELLOW MEDIUM 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	6.5	179.8	2.07	6.11	36.5				
2	6.5	179.3	2.08	6.11	36.4				
3	6.4	179.1	2.07	6.10	36.4				
4	6.4	179.0	2.05	6.11	36.5				
Average:	6.5	179.3	2.07	6.11	36.5				

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

Duplicate Sample No(s):

Comments:

Signature: JAM Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Feb. 2022 | Date/Time: 2/ 22 /2022@ 1228
Sample Number: RGW237S- 220222 | Weather: 30S, COLD SNOW
Landau Representative: AHA/JAM/SJL

WATER LEVEL/WELL/PURGE DATA

Well Conditio GOOD | Secure (YES) | Damaged (NO) | Describe: FLUSH

DTW Before Purging (ft) 4.92 | Time: 1157 | Flow through cell vol. | GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/ 22 /2022 1201 | End Purge: Date/Time: 2/ 22 /2022 @ 1225 | 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	
1204	9.3	208.1	1.55	6.31	-4.3		4.92		
1207	8.6	216.0	1.29	6.40	-27.1		4.92		
1210	8.0	212.1	1.22	6.43	-33.3		4.93		
1213	5.8	192.2	1.35	6.44	-38.3				
1216	5.0	179.8	1.32	6.44	-39.1				
1219	4.6	171.1	1.12	6.39	-36.7				
1222	4.6	167.8	1.05	6.36	-35.6				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): NO ODOR YELLOW BROWN MED TURB 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	4.6	167.4	1.04	6.36	-35.4				
2	4.6	167.3	1.03	6.36	-35.3				
3	4.7	167.2	1.01	6.36	-35.1				
4	4.7	166.9	1.00	6.36	-35.0				
Average:	4.7	167.2	1.02	6.36	-35.2	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SJL | Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.099.099
Event: Feb. 2022 | Date/Time: 2/ 22 /2022@ 1052
Sample Number: RGW240D- 220222 | Weather: SNOWING, 30s
Landau Representative: AHA/JAM/SJL

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 6.15 Time: 10:22 Flow through cell vol. GW Meter No.(s SLOPE #2

Begin Purge: Date/Time: 2/ 22 /2022 1025 End Purge: Date/Time: 2/ 22 /2022 @ 1049 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	
1028	9.6	247.7	0.74	6.06	-10.1		6.22		
1031	7.8	240.5	0.75	6.15	-25.9		6.20		
1034	7.3	233.9	0.78	6.19	-35.7		6.17		
1037	7.2	230.3	0.83	6.19	-39.8				
1040	7.3	228.9	0.73	6.20	-44.0				
1043	7.1	226.3	0.77	6.21	-48.3				
1046	7.0	224.5	0.79	6.22	-50.4				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.0	224.2	0.78	6.19	-50.7				
2	7.0	224.0	0.79	6.22	-51.0				
3	7.0	223.9	0.79	6.20	-51.2				
4	7.0	223.5	0.81	6.22	-51.5				
Average:	7.0	223.9	0.79	6.21	-51.1	#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) (Silica
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: SJL Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 23 /2022@ 1008
Sample Number:	RGW247S- 220223	Weather:	SUNNY, 30s
Landau Representative:	SJL/JAM/AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.52 Time: 940 Flow through cell vol. GW Meter No.(s SLOPE #2

Begin Purge: Date/Time: 2/ 23 /2022 942 End Purge: Date/Time: 2/ 23 /2022 @ 1005 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	
945	9.4	389.4	2.42	6.36	13.3		4.56		
948	8.6	394.8	1.81	6.23	-31.0		4.50		
951	8.0	388.9	1.59	6.19	-51.9		4.50		
954	7.8	385.2	1.55	6.18	-54.5				
957	7.5	379.2	1.58	6.16	-58.2				
1000	7.3	375.7	1.72	6.18	-60.6				
1003	7.4	374.3	1.71	6.20	-61.0				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	7.4	372.9	1.74	6.20	-60.6				
2	7.4	373.9	1.74	6.20	-61.0				
3	7.4	374.3	1.74	6.23	-60.9				
4	7.4	374.2	1.72	6.16	-61.1				
Average:	7.4	373.8	1.74	6.20	-60.9	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SJL Date: 2/23/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 23 /2022@ 1042
Sample Number:	RGW248I- 220223	Weather:	30s, SUNNY
Landau Representative:	SJL/JAM/AHA		

WATER LEVEL/WELL/PURGE DATA

Well Conditioi GOOD   Secure (YES)   Damaged (NO)   Describe: FLUSH

DTW Before Purging (ft) 4.32   Time: 1017   Flow through cell vol.   GW Meter No.(s SLOPE #2

Begin Purge: Date/Time: 2/ 23 /2022 1019   End Purge: Date/Time: 2/ 23 /2022 @ 1040   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	
1022	10.1	407.5	0.89	6.07	-15.4		4.33		
1025	10.1	408.8	1.02	6.07	-19.9		4.33		
1028	9.8	410.6	1.41	6.08	-29.1		4.33		
1031	9.3	409.7	1.42	6.08	-35.7				
1034	8.6	405.6	1.62	6.08	-39.4				
1037	7.7	398.7	1.83	6.08	-42.0				
1040	7.0	384.6	1.86	6.08	-42.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

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

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	6.8	383.6	1.88	6.08	-42.5				
2	6.8	383.6	1.90	6.09	-42.5				
3	6.7	380.7	1.90	6.08	-42.6				
4	6.6	380.0	1.91	6.09	-42.6				
Average:	6.7	382.0	1.90	6.09	-42.6	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SJL   Date: 2/23/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 23 /2022@ 1128
Sample Number:	RGW249S- 220223	Weather:	SUNNY, 30s
Landau Representative:	AHA/JAM/SJL		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 4.13 Time: 1106 Flow through cell vol. GW Meter No.(s SLOPE #2

Begin Purge: Date/Time: 2/ 23 /2022 (1106 End Purge: Date/Time: 2/ 23 /2022 @ 1127 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	
1109	11.5	360.1	0.71	6.11	-8.5		4.10		
1112	11.0	365.5	0.98	6.07	-19.2		4.12		
1115	9.9	367.1	1.11	6.06	-26.1		4.12		
1118	9.4	369.0	1.17	6.05	-32.1				
1121	9.4	370.6	1.20	6.05	-34.2				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): VERY PALE YELLOW, SOME FLOATING PARTICULATES, MILD TURBIDITY, 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	9.5	371.0	1.18	6.05	-34.6				
2	9.5	371.2	1.19	6.05	-35.0				
3	9.4	371.2	1.20	6.05	-35.3				
4	9.4	371.8	1.19	6.05	-35.3				
Average:	9.5	371.3	1.19	6.05	-35.1	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: SJL Date: 2/23/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 22/2022@ 937
Sample Number:	RGW250S- 220222	Weather:	CLOUD 30'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 3.87 Time: 910 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/22/2022 (911 End Purge: Date/Time: 2/ /2022 @ 934 Gallons Purged: 0.25

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
914	9.1	103.5	12.98	7.54	98.6		4.04		
917	6.6	99.4	3.92	7.14	97.8		4.03		
920	6.5	99.2	3.85	7.12	97.4		4.03		
923	6.2	98.2	2.68	7.03	92.8		4.03		
926	6.1	97.4	2.29	6.99	88.7		4.03		
929	5.9	96.8	1.95	6.97	83.9				
932	5.9	96.6	1.85	6.96	82.2				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): LIGHT BROWN, MED-HIGH 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	5.9	96.6	1.85	6.96	81.8				
2	5.9	96.6	1.86	6.96	81.6				
3	5.9	96.7	1.86	6.96	81.2				
4	5.9	96.6	1.93	6.96	81.1				
Average:	5.9	96.6	1.88	6.96	81.4	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/22/2022 @ 1301
Sample Number:	RGW253I- 220222	Weather:	CLOIUDY 30'S
Landau Representative:	AHA		

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 5.15 Time: 1236 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 22 /2022 1237 End Purge: Date/Time: 2/ 22 /2022 @ 1300 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	
1240	10.1	266.1	1.29	6.58	106.2		5.15		
1243	9.1	264.5	1.19	6.57	101.6		5.15		
1246	7.7	257.3	1.14	6.57	98.9		5.15		
1249	6.5	249.2	1.17	6.57	98.5		5.15		
1252	6.1	242.3	1.19	6.57	98.5				

SAMPLE COLLECTION DATA

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

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

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

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): 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	6.0	240.8	1.19	6.57	98.7				
2	6.0	240.4	1.17	6.57	98.7				
3	6.1	239.8	1.19	6.57	98.7				
4	6.0	239.5	1.22	6.57	98.7				
Average:	6.0	240.1	1.19	6.57	98.7	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: AHA Date: 2/22/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name:	Boeing Renton	Project Number:	0025217.099.099
Event:	Feb. 2022	Date/Time:	2/ 21 /2022@
Sample Number:	RGW263S- 2202	Weather:	SUNNY 50'S
Landau Representative:			

WATER LEVEL/WELL/PURGE DATA

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

DTW Before Purging (ft) 7.28 Time: 1520 Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 2/ /2022 @ End Purge: Date/Time: 2/ /2022 @ Gallons Purged:

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

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

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

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

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

(By Numerical Order) ☐ Other

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

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

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

Duplicate Sample No(s):

Comments: WATER LEVEL ONLY

Signature: AHA Date: 2/21/2022

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton
Project Number: 0025217.099.099
Event: Feb. 2022
Date/Time: 2/ 21 /2022@ 1602
Sample Number: RGW264S- 220221
Weather: 40S SUNNY WINDY
Landau Representative: AHA/JAM

WATER LEVEL/WELL/PURGE DATA

Well Conditioi GOOD Secure (YES) Damaged (NO) Describe: Flush Mount

DTW Before Purging (ft) 5.70 Time: 15:33 Flow through cell vol. GW Meter No.(s HERON 2

Begin Purge: Date/Time: 2/ 21 /2022 1535 End Purge: Date/Time: 2/ 21 /2022 @ 1559 Gallons Purged: 0.75

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

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft	>/= 1 flow through cell	
1538	12.8	601	0.72	6.07	85.4		6.72		
1541	12.1	591	0.57	6.08	66.4		6.83		
1544	11.7	584	0.49	6.09	58.3		6.87		
1547	11.2	573	0.74	6.1	51.8		6.91		
1550	11.00	570	0.49	6.1	46.6		6.91		
1553	10.8	566	0.47	6.11	42.6		6.85		
1556	10.5	561	0.61	6.11	39.8		6.78		

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type 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.): CLEAR LOW TURB 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	9.1	540	0.49	6.12	40.5				
2	10.3	553	0.45	6.11	38.4				
3	11.7	560	0.45	6.11	36.8				
4	12	565	0.56	6.11	35.3		7.05		
Average:	10.8	554.5	0.5	6.1	37.8	#DIV/0!			

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

Duplicate Sample No(s):

Comments:

Signature: JAM Date: 2/21/2022

Appendix C

Data Validation Memos

Wood Environment & Infrastructure Solutions, Inc.
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Kirkland, Washington 98033
USA
T: 425-368-1000
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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2022
From:	Caitlin Riechmann	c:	Project File
Tel:	206-342-1760		
Fax:	206-342-1761		
Date:	April 1, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
SWMU-168
ARI Work Order Number: 22B0294

This memo presents the summary data quality review of one primary groundwater sample and one trip blank sample collected on February 21, 2022. 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 volatile organic compound 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-220221	22B0294-01	vinyl chloride
Trip Blanks	22B0294-02	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 21, 2022. The temperature of the coolers was recorded upon receipt and both coolers were 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 ARI work order number 22B0294 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-220221	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.

Wood Environment & Infrastructure Solutions, Inc.
4020 Lake Washington Blvd NE, Suite 200
Kirkland, Washington 98033
USA
T: 425-368-1000
www.woodplc.com

Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2022
From:	Caitlin Riechmann	c:	Project File
Tel:	206-342-1760		
Fax:	206-342-1761		
Date:	April 1, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Group Number: 22B0293

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 21, 2022. 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
RGW236S-220221	22B0293-01	all
RGW232S-220221	22B0293-02	all
RGW153S-220221	22B0293-03	all
RGW234S-220221	22B0293-04	all
RGW226S-220221	22B0293-05	all
RGW235I-220221	22B0293-06	all
RGW173S-220221	22B0293-07	all
RGW172S-220221	22B0293-08	all

Sample ID	Laboratory Sample ID	Requested Analyses
RGW152S-220221	22B0293-09	all
RGWDUP1-220221	22B0293-10	all
Trip Blanks	22B0293-11	VOCs

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

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 21, 2022. The temperature of the coolers was recorded upon receipt and both coolers were below the maximum acceptable temperature of 6 degrees Celsius (°C). The laboratory logged the samples with the time on the chain-of-custody and proceeded with analysis. Due to instrument failure, the TOC samples were subcontracted to Spectra Laboratories, located in Tacoma, Washington, who received the samples from ARI on Febrary 22, 2022. The temperature of the cooler was recorded upon receipt and was above the maximum acceptable temperature of 6°C at 8.4°C. The laboratory logged the samples with the time on the chain-of-custody and proceeded with TOC analysis.

Organic analyses

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

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

One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The 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-220221/ RGWDUP1-220221	vinyl chloride	200	219	20	9
	cis-1,2-dichloroethene	1,570	1,590	20	1
	trichloroethene	522	497	20	5
	tetrachloroethene	1,840	1,710	20	7

Abbreviations
ng/L = nanograms per liter
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

1. Preservation and Holding Times – Acceptable except as noted:

   The temperature of the cooler upon receipt at Spectra Laboratories was above the maximum acceptable temperature, at 8.4°C. The detected TOC results are flagged with a "J."

2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable except 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 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, except for total lead. The field duplicate for total lead results were above RPD control limits; primary and duplicate results for total lead are flagged with a "J."

Sample ID/ Field Duplicate ID	Analyte	Primary Result	Duplicate Result	Reporting Limit	RPD (%)
RGW152S-220221/ RGWDUP1-220221	TOC	1.50 mg/L	1.40 mg/L	0.50 mg/L	NC
	total arsenic	2.88 µg/L	2.34 µg/L	0.200 µg/L	21
	total copper	5.07 µg/L	3.88 µg/L	0.500 µg/L	27
	total lead	2.78 µg/L	1.90 µg/L	0.100 µg/L	38

Abbreviations:
µg/L = micrograms per liter
mg/L = milligrams per liter
NC = not calculated
RPD = relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 22B0293 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[1]
RGW236S-220221	TOC	Elevated cooler temperature	1.80 mg/L J
RGW232S-220221	TOC	Elevated cooler temperature	6.20 mg/L J
RGW153S-220221	TOC	Elevated cooler temperature	5.70 mg/L J
RGW234S-220221	TOC	Elevated cooler temperature	1.50 mg/L J
RGW226S-220221	TOC	Elevated cooler temperature	7.80 mg/L J
RGW235I-220221	None	NA	NA
RGW173S-220221	TOC	Elevated cooler temperature	4.73 mg/L J
RGW172S-220221	TOC	Elevated cooler temperature	3.40 mg/L J
RGW152S-220221	TOC	Elevated cooler temperature	1.50 mg/L J
	Total lead	High field duplicate RPD	2.78 µg/L J
RGWDUP1-220221	TOC	Elevated cooler temperature	1.40 mg/L J
	Total lead	High duplicate RPD	1.90 µg/L J
Trip Blanks	none	NA	NA

Notes:
1. Data qualifiers are as follows:
   J = The value is an estimate

Abbreviations
mg/L = milligrams per liter
µg/L = micrograms per liter
NA = not applicable
TOC = total organic carbon
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.

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www.woodplc.com

Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2022
From:	Caitlin Riechmann	c:	Project File
Tel:	206-342-1760		
Fax:	206-342-1761		
Date:	April 4, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Number: 22B0316

This memo presents the summary data quality review of five primary groundwater samples, one field duplicate groundwater samples, and one trip blank sample collected on February 22, 2022. 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 Gx; 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
RGW033S-220222	22B0316-01	All
RGWDUP2-220222	22B0316-02	All
RGW034S-220222	22B0316-03	All
RGW240D-220222	22B0316-04	All
RGW143S-220222	22B0316-05	All
RGW237S-220222	22B0316-06	All
Trip Blank	22B0316-07	VOCs, TPH-G

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

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

ARI received the samples on February 22, 2022. The temperature of the coolers was recorded upon receipt and all coolers were at or below the maximum acceptable temperature of 6 degrees Celsius (°C). Due to instrument failure, the TOC samples were subcontracted to Spectra Laboratories, located in Tacoma, Washington, who received the samples from ARI on February 18 and 23, 2022. Samples were received in good condition. The laboratory logged the samples with the time on the chain-of-custody and proceeded with TOC analysis.

Organic analyses

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

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

   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

Two field duplicates were 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 (%)
RGW033S-220222/ RGWDUP2-220222	vinyl chloride	8.90	9.28	0.20	4
	cis-1,2-dichloroethene	3.82	4.04	0.20	6
	benzene	8.41	8.57	0.20	NC
	trichloroethene	0.20 U	0.20 U	0.20	NC
	TPH-G	168	166	100	NC

<u>Abbreviations</u>
µg/L = micrograms per liter
NC = not calculated
RPD = relative percent difference
TPH-G = total petroleum hydrocarbons as gasoline

7. Reporting Limits and Laboratory Flags – Acceptable

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
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 (%)
RGW033S-220222/ RGWDUP2-220222	TOC	8.10	8.80	0.50	8

<u>Abbreviations:</u>
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 22B0316 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents identified in the introduction to this report. No problems were identified, and analytical performance was within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualifier Reason	Qualified Result (µg/L)
RGW033S-220222	none	NA	none
RGWDUP2-220222	none	NA	none
RGW034S-220222	none	NA	none
RGW240D-220222	none	NA	none
RGW143S-220222	none	NA	none
RGW237S-220222	none	NA	none
Trip Blank	none	NA	none

Notes:
1. Data qualifiers are as follows:
   J = The value is an estimate

Abbreviations:
µg/L = micrograms per liter
J = the value is an estimate
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), 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:	PS20203450.2022
From:	Caitlin Riechmann	c:	Project File
Tel:	206-342-1760		
Fax:	206-342-1761		
Date:	April 1, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
Former Fuel Farm AOC Group
ARI Work Order Number: 22B0296

This memo presents the summary data quality review of three primary groundwater samples and one field duplicate collected on February 21, 2022. 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-220221	22B0296-01	all
RGW224S-220221	22B0296-02	all
RGWDUP3-220221	22B0296-03	all
RGW221S-220221	22B0296-04	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 21, 2022. The temperature of the coolers was recorded upon receipt and both coolers were below 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

   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 except as noted:

   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, except for TPH-D and TPH-Jet A. Primary and duplicate results for TPH-D and TPH-Jet A are flagged with a "J."

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW224S-220221/ RGWDUP3-220221	TPH-D (C12–C24)	0.682	1.01	0.100	39
	TPH-O (C24–C38)	ND	ND	0.200	NC
	TPH-Jet A (C10–C18)	1.04	1.76	0.100	51

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 except as noted:

   Sample RGW211S-220221 was extracted at a volume of 50mL instead of 500mL due to an analyst error. The reporting limits were therefore elevated to levels higher than the cleanup level (0.5 mg/L) in TPH-D (1.00 mg/L), TPH-O (2.00 mg/L), and TPH-J (1.00 mg/L). No data were qualified.

Overall assessment of data

The table below summarizes the data review. The completeness of ARI work order number 22B0296 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	Reason for Qualifier	Qualified Result[1] (mg/L)
RGW211S-220221	None	NA	NA
RGW224S-220221	TPH-D	Lab and field duplicate RPD	0.682 J
	TPH-Jet-A	Lab and field duplicate RPD	1.04 J
RGWDUP3-220221	TPH-D	Lab and field duplicate RPD	1.01 J
	TPH-Jet-A	Lab and field duplicate RPD	1.76 J
RGW221S-220221	none	NA	NA

Notes:
1. Data qualifiers are as follows:
   J = The value is an estimate.

Abbreviations
mg/L = milligrams per liter
NA = not applicable
RPD = relative percent difference
TPH-D = total petroleum hydrocarbons as diesel
TPH-Jet A = total petroleum hydrocarbons in the Jet A range

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.

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2022
From:	Kathleen Goodman, Project Manager	c:	Project File
Tel:	206-342-1760		
Fax:	206-342-1761		
Date:	April 1, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
AOC-001, -002, and -003
ARI Work Order Number: 22B0330

This memo presents the summary data quality review of four primary groundwater samples and one trip blank sample collected on February 22 and 23, 2022. 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-00. The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW188S-220222	22B0330-01	all
RGW247S-220223	22B0330-02	all
RGW248I-220223	22B0330-03	all
RGW249S-220223	22B0330-04	all
Trip Blanks	22B0330-05	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, 2014a and b).

ARI received the samples on February 23, 2022. The temperature of the coolers was recorded upon receipt and one of the coolers was above the maximum acceptable temperature of 6 degrees Celsius (°C). Due to instrument failure, the TOC samples were subcontracted to Spectra Laboratories, located in Tacoma, Washington, who received the samples from ARI on February 24, 2022. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius. The laboratory logged the samples with the time on the chain-of-custody and proceeded with TOC analysis.

Organic analyses

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

1. Preservation and Holding Times – Acceptable except as noted:

   The temperature of the cooler upon receipt at ARI was above the maximum acceptable temperature, at 6.8°C. The vinyl chloride results for all samples are flagged with a "J."

   One sampling vial contained a bubble upon arrival at ARI. We assume that the lab used another vial with acceptable preservation and the samples were able to be analyzed normally with acceptable results. The data is not qualified for use.

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

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
5. Laboratory Duplicates – Acceptable

6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 22B0330 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	Qualifier Reason	Qualified Result (ng/L)
RGW188S-220222	vinyl chloride	Elevated cooler temperature	141 J
RGW247S-220223	vinyl chloride	Elevated cooler temperature	127 J
RGW248I-220223	vinyl chloride	Elevated cooler temperature	598 J
RGW249S-220223	vinyl chloride	Elevated cooler temperature	359 J

Notes:
1. Data qualifiers are as follows:
   J = The value is an estimate.

Abbreviations:
ng/L = nanograms per liter

References

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

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

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

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2022
From:	Kathleen Goodman, Project Manager	c:	Project File
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Date:	April 1, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
AOC-004
ARI Work Order Number: 22B0313

This memo presents the summary data quality review of one primary groundwater sample collected on February 22, 2022. 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-220222	22B0313-01	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 22, 2022. The temperature of the coolers was recorded upon receipt; one was at and one 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 22B0313 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-220222	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.

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Memo

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From:	Caitlin Riechmann	c:	Project File
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Date:	April 4, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
AOC-060
ARI Work Order Numbers: 22B0319

This memo presents the summary data quality review of six primary groundwater samples, one field duplicate, and one trip blank sample collected on February 22, 2022. 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
RGW147S-220222	22B0319-01	all
RGW014S-220222	22B0319-02	all
RGWDUP4S-220222	22B0319-03	all
RGW012S-220222	22B0319-04	all
RGW009S-220222	22B0319-05	all
RGW253I-220222	22B0319-06	all
RGW150S-220222	22B0319-07	all
Trip Blanks	22B0319-08	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 22, 2022. The temperature of the coolers was recorded upon receipt; one cooler was at and one was below the maximum acceptable temperature of 6 degrees Celsius (°C). Due to instrument failure, the TOC samples were subcontracted to Spectra Laboratories, located in Tacoma, Washington, who received the samples from ARI on February 23, 2022. Samples were received in good condition. The laboratory logged the samples with the time on the chain-of-custody and proceeded with TOC analysis.

Organic analyses

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

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

   Extra volume was not submitted for 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

   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-220222/ RGWDUP4S-220222	vinyl chloride	276	286	20.0	4
	cis-1,2-dichloroethene	133	135	20.0	1
	trichloroethene	ND	ND	20.0	NC

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

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

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

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

   The laboratory did not perform duplicate analyses on the samples reviewed in this report.

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 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 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-200811/ RGWDUP4-200811	TOC	2.40	2.30	0.50	NC

Abbreviations
mg/L = milligrams per liter
NC = not calculated
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

A summary of the data assessment is presented in the table below. The completeness of work order number 22B0319 is 100 percent. Evaluation of the usefulness of these data is based on the EPA guidance document listed in the introduction to this report. No problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGW147S-220222	none
RGW014S-220222	none
RGWDUP4S-220222	none
RGW012S-220222	none
RGW009S-220222	none
RGW253I-220222	none
RGW150S-220222	none
Trip Blanks	none

References

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

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA 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:	PS20203450.2022
From:	Caitlin Riechmann	c:	Project File
Tel:	206-342-1760		
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Date:	April 1, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
AOC-090
ARI Work Order Number: 22B0331

This memo summarizes the data quality review of five primary groundwater samples and a trip blank sample collected on February 23, 2022. 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-MO) by Ecology Method NWTPH-Dx (with silica gel cleanup); 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
RGW207S-220223	22B0331-01	Vinyl chloride
RGW176S-220223	22B0331-02	Vinyl chloride
RGW208S-220223	22B0331-03	Vinyl chloride
RGW178S-220223	22B0331-04	Vinyl chloride

Sample ID	Laboratory Sample ID	Requested Analyses
RGW189S-220223	22B0331-05	All except vinyl chloride
Trip Blanks	22B0331-06	All except TPH-D and TOC

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 23, 2022. The temperature of the coolers was recorded upon receipt and one of the coolers was above the maximum acceptable temperature of 6 degrees Celsius (ºC). Due to instrument failure, the TOC samples were subcontracted to Spectra Laboratories, located in Tacoma, Washington, who received the samples from ARI on February 24, 2022. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6°C. The laboratory logged the samples with the time on the chain-of-custody and proceeded with TOC analysis.

Organic analyses

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

1. Preservation and Holding Times – Acceptable except as noted:

   The temperature of one of the coolers upon receipt at ARI was above the maximum acceptable temperature, at 6.8ºC. Detected results from all samples are flagged with a "J."

   Five sample vials contained bubbles upon arrival at ARI. We assume that the laboratory used another vial with acceptable preservation for the associated samples and the samples were able to be analyzed normally with acceptable results. The data is not qualified for use.

2. Blanks – Acceptable except as noted:

   Trichloroethene was detected in the trip blank at a concentration of 20.7 nanograms per liter (ng/L)and in sample RGW189S-220223 at a concentration of 50.5 ng/L and the result will be flagged with a "UJ."

3. Surrogates – Acceptable

4. LCS/LCSD – Acceptable except as noted:

   According to the laboratory's notes, carbon tetrachloride recovery was high in a continuing calibration verification (CCV) associated with analysis of the LCS and LCSD associated with sample RGW189S-220223. Carbon tetrachloride was not detected in sample RGW189S-220223 and no data is qualified for use.

5. MS/MSD – Acceptable except as noted:

   According to the laboratory's notes, carbon tetrachloride recovery was high in a CCV associated with the MS and MSD performed on sample RGW189S-220223. Carbon tetrachloride was not detected in the unspiked native sample RGW189S-220223, and no data is 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 except as noted:

   The reporting limit for 1,1,2,2-tetrachloroethane from sample RGW189S-220223 was raised due to interference. 1,1,2,2-tetrachloroethane was not detected in the sample and no data are qualified 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
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags– Acceptable

Overall assessment of data

The completeness of ARI work order numbers 22B0331 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	Qualifier Reason	Qualified Result
RGW207S-220223	Vinyl chloride	Elevated cooler temperature	356 ng/L J
RGW176S-220223	Vinyl chloride	Elevated cooler temperature	311 ng/L J
RGW208S-220223	Vinyl chloride	Elevated cooler temperature	404 ng/L J
RGW178S-220223	Vinyl chloride	Elevated cooler temperature	361 ng/L J
RGW189S-220223	Trichloroethene	Detection in trip blank/ Elevated cooler temperature	50.5 ng/L UJ
	Toluene	Elevated cooler temperature	0.47 µg/L J
	GRO	Elevated cooler temperature	370 J µg/L
	Vinyl chloride	Elevated cooler temperature	86.7 ng/L J
	DRO	Elevated cooler temperature	0.192 mg/L J
	RRO	Elevated cooler temperature	0.263 mg/L J
Trip Blanks	None	NA	NA

Abbreviations:
µg/L = micrograms per liter
mg/L = milligrams per liter
NA = not applicable
ng/L = nanograms per liter
GRO = gasoline range organics
DRO = diesel range organics
RRO = motor oil range organics

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:	PS20203450.2022
From:	Caitlin Riechmann	c:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	April 1, 2022		

Subject: Summary Data Quality Review
February 2022 Boeing Renton Groundwater Sampling
Apron A
ARI Work Order Number: 22B0290

This memo presents the summary data quality review of one primary groundwater sample and one trip blank sample collected on February 21, 2022. The samples were submitted to Analytical Resources, Inc., (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (vinyl chloride and cis-1,2-dichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260D; 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
RGW264S-220221	22B0290-01	all
Trip Blanks-	22B0290-02	VOCs

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

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 21, 2022. The temperature of the coolers was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (°C). The laboratory logged the samples with the time on the chain-of-custody and proceeded with analysis. Due to instrument failure, the TOC sample was subcontracted to Spectra Laboratories, located in Tacoma, Washington, who received the sample from ARI on February 22, 2022. The temperature of the cooler was recorded upon receipt and was above the maximum acceptable temperature, at 6.3°C. The laboratory logged the samples with the time on the chain-of-custody and proceeded with TOC analysis.

Organic analyses

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

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

   Field duplicates were not collected at this site during this sampling event. 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 except as noted:

   The temperature of the cooler upon receipt at Spectra Laboratories was high at 6.3°C. The result for sample RGW264S-220221 is flagged with a "J."
2. Blanks – Acceptable
3. LCS/LCSD – Acceptable
4. MS/MSD – Acceptable

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

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event

7. Reporting Limits and Laboratory Flags – Acceptable.

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 22B0290 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[1] (mg/L)
RGW264S-220221	Total Organic Carbon	Elevated cooler temperature	25.5 J
Trip Blanks-	none	NA	NA

Notes:
1. Data qualifiers are as follows:
   J = The value is an estimate

Abbreviations
mg/L = milligrams per liter
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), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

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

Appendix D

Historical Groundwater Data Tables

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							
		8/13/2018	3/4/2019	8/12/2019	3/9/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022
Volatile Organic Compounds (µg/L)									
Vinyl Chloride	0.11	**0.14**	0.0566	**0.336**	0.087	**0.162**	0.076	0.359 J	**0.164**

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							
		11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	2/21/2022	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.530**	**0.892**	**0.719**	**1.66**	**0.144**	**1.330**	**1.57**	**1.59**	**0.278**	**0.204**	**0.0736**	**0.0789**	**0.0551**	**0.077**	**0.0582 J**	**0.0517**
Tetrachloroethene	0.02	**0.384**	**1.12**	**2.38**	**0.319**	**0.081**	**0.0872**	**1.84**	**1.71**	**0.0544**	**0.164**	**0.024**	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U
Trichloroethene	0.02	**0.145**	**0.278**	**0.412**	**0.579**	0.020 U	**0.129**	**0.522**	**0.497**	**0.0326**	**0.131**	0.02 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U
Vinyl Chloride	0.11	0.0366	**0.15**	0.0463	**0.284**	0.0378	**0.506**	**0.200**	**0.219**	**0.153**	0.0859	**0.249**	**0.266**	**0.135**	**0.220**	**0.193 J**	**0.174**
Total Metals (µg/L)																	
Arsenic	1.0	**7.48**	**3.84**	**1.95**	**6.72**	**7.67**	**16.3**	**2.88**	**2.34**	**4.72**	**11.9**	**5.48**	**3.85**	**4.05**	**32.8**	**32.8**	**4.98**
Copper	3.5	**16.6**	**8.03**	2.76	**7.45 J**	**17.2 J**	**9.08 J**	**5.07**	**3.88**	1.58	**10.2**	3.09	1.73	1.68	**33.9**	**33.9**	1.45
Lead	1.0	**12.1**	**6.13**	**1.09**	**3.89**	**12.5 J**	**5.38 J**	**2.78 J**	**1.90 J**	0.351	**2.76**	0.712	0.372	0.326	**5.80**	**5.80**	0.302

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Downgradient Plume Area															
		GW172S								GW173S							
		5/6/2019	8/12/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.0581**	0.027	**0.305**	**0.214**	**0.0561**	**0.108**	**0.0746**	**0.0532**	0.022	**0.0378**	**0.0504**	**0.0488**	**0.0313**	**0.0505**	**0.0424 J**	0.0280
Tetrachloroethene	0.02	0.020 U	**0.0451**	**0.976**	**0.0625**	**0.0603**	**0.0624**	0.020 U	**0.0677**	**0.0561**	**0.0246**	**0.0224**	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U
Trichloroethene	0.02	0.020 U	0.020 U	**0.384**	**0.028**	0.020 U	0.020 U	0.020 U	**0.0201**	**0.0256**	**0.0379**	**0.0305**	**0.0215**	**0.0239**	0.020 U	0.020 UJ	0.0200 U
Vinyl Chloride	0.11	0.0808	0.0376	**0.209**	**0.369**	0.0628	**0.219**	**0.155**	**0.137**	0.0613	0.072	0.144	0.126	0.0455	**0.183**	**0.176 J**	0.0696
Total Metals (µg/L)																	
Arsenic	1.0	**7.71**	**10.6**	**32.8**	**7.03**	**10.8**	**10.8**	**7.18**	**11.2**	**12.2**	**15.6**	**11.8**	**6.72**	**7.00**	**9.94**	**11.4**	**13.8**
Copper	3.5	2.13	**3.86**	**27.6**	**2.2**	**6.12**	**3.89**	**2.86**	2.86	1.39	**4.68**	1.51	0.875	3.19	3.11	**5.96**	2.58
Lead	1.0	0.991	**1.02**	**15.1**	**1.07**	**2.58**	**1.98**	**1.33**	**1.37**	0.290	**1.36**	0.442	0.215	0.470	0.850	**1.65**	0.788

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Downgradient Plume Area								CPOC Area							
		GW226S								GW232S							
		5/6/2019	8/12/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	0.0223	0.0259	**0.0396**	**0.0305**	0.0218	0.020 U	**0.0335 J**	**0.0363**	**0.378**	**0.659**	**0.221**	**0.352**	**0.482**	**0.219**	**0.464 J**	**0.197**
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	**0.0279**	0.020 U	**0.0202 J**	0.0200 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U
Vinyl Chloride	0.11	0.0459	0.029	0.038	0.0594	0.0415	0.0519	0.0516 J	0.0414	**0.412**	**0.860**	**0.264**	**0.337**	**0.425**	**0.263**	**0.653 J**	**0.307**
Total Metals (µg/L)																	
Arsenic	1.0	**2.97**	**2.85**	**4.88**	**3.33**	**4.93**	**8.12**	**5.57**	**7.33**	**6.29**	**8.09**	**2.73**	**4.71**	**3.83**	**4.78**	**6.19**	**3.75**
Copper	3.5	0.500 U	0.626	**5.00**	0.704	1.48	**3.92**	1.48	2.40	0.878	**3.85**	2.22	0.539	0.627	2.09	1.79	1.09
Lead	1.0	0.100 U	0.100 U	0.500	0.190	0.136	0.513	0.124	0.237	0.102	0.378	0.354	0.100 U	0.100 U	0.318	0.262	0.234

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							
		5/6/2019	8/12/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.03	**0.0630**	**0.0738**	**0.0984**	**0.092**	**0.0914**	0.020 U	**0.0892**	**0.0591**	**0.0638**	**0.109**	**0.127**	**0.156**	**0.104**	**0.128**	**0.179**	**0.175**
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0200 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.0292**	0.020 U	0.0200 U
Trichloroethene	0.02	0.020 U	0.020 U	**0.0297**	0.020 U	0.020 U	0.020 U	0.020 U	0.0200 U	0.020 U	**0.0287**	**0.0336**	**0.031**	**0.0227**	0.020 U	**0.0285**	**0.0253**
Vinyl Chloride	0.11	0.0235	0.0252	0.0302	0.032	0.0279	0.020 U	0.0497	0.0318	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.24**	0.0259
Total Metals (µg/L)																	
Arsenic	1.0	**2.22**	**1.31**	**27.4**	**5.31**	**3.26**	**6.29**	**1.18**	**1.76**	0.292	0.237	0.251	0.289	0.288	0.200 U	0.200 U	0.200 U
Copper	3.5	1.93	0.869	**32.9**	2.43	3.21	**11.4**	2.58	2.13	0.714	0.573	0.935	1.08	1.30	0.727	0.689	0.687
Lead	1.0	0.843	0.280	**11.8**	0.671	**1.25**	**4.13**	**1.01**	0.930	0.182	0.127	0.235	0.223	0.304	0.174	0.179	0.159

Analyte	Current Cleanup Level[4]	Well ID [3]							
		CPOC Area							
		GW236S							
		5/6/2019	8/12/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022
Volatile Organic Compounds (µg/L)									
cis-1,2-Dichloroethene	0.03	0.0281	**0.0468**	0.0241	**0.036**	**0.0881**	0.020 U	**0.0791**	0.0200 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	**0.0206**
Trichloroethene	0.02	**0.0206**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0200 U
Vinyl Chloride	0.11	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0223	0.0200 U
Total Metals (µg/L)									
Arsenic	1.0	**2.10**	**3.70**	**6.29**	**2.10**	**10.1**	**2.89**	**5.49**	**1.97**
Copper	3.5	2.17	0.893	**21.2**	**4.24**	**10.8**	**9.70**	2.47	**5.27**
Lead	1.0	**1.90**	**1.53**	**18.7**	**2.61**	**10.8**	**6.31**	**1.79**	**3.32**

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							
		5/7/2019	8/13/2019	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/16/2021	8/11/2021	2/22/2022	2/22/2022
Volatile Organic Compounds (µg/L)																	
Benzene	0.80	**7.13**	**3.47**	**4.77**	**37.1**	**17.6**	**1.72 J**	**18.8 J**	**1.08**	**11.5**	**10.2**	**9.75**	**12.5**	**11.0**	**14.5**	**8.41**	**8.57**
cis-1,2-Dichloroethene	0.70	0.43	0.47	0.40	0.61	0.40 J	0.67 J	0.31 J	0.20 U	**2.78**	**21.4**	**39.5**	**188**	**1.64**	0.55	**3.82**	**4.04**
Trichloroethene	0.23	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	**0.25**	0.20 U	0.20 U	0.200 U	0.200 U
Vinyl Chloride	0.20	**0.29**	**0.21**	**0.25**	0.20 U	0.20 U	**0.32 J**	0.20 UJ	0.20 U	**13.0**	**52.2**	**87.3**	**310**	**5.31**	**2.31**	**8.90**	**9.28**
Total Petroleum Hydrocarbons (µg/L)																	
TPH-G (C7-C12)	800	**1020**	**1390**	**1540**	**2,980**	**1,880**	**1,160**	**2,340**	**1,540**	347	296	301	255	323	360	168	166

Analyte	Current Cleanup Level[4]	Well ID[3]															
		Source Area															
		GW034S								GW244S							
		8/13/2019	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	2/22/2022	5/7/2019	8/13/2019	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021
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	0.200 U	**1.47**	**1.77**	**0.87**	0.52	0.46	0.43	0.46	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	0.200 U	**2.03**	0.37	0.20 U	0.68	**1.06**	**1.12**	0.68	0.22
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U	0.20 U	0.23	0.20 U	0.20 U	**0.29**	0.20 U
Vinyl Chloride	0.20	**0.39**	**0.39**	0.20 U	**0.21**	**0.41**	**0.25**	**1.20**	**0.330**	**1.45**	**0.71**	**0.35**	**0.7**	**0.85**	**0.98**	**0.64**	**0.37**
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							
		8/13/2019	11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	2/22/2022	8/13/2019	11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/16/2021	8/11/2021	2/22/2022
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	0.200 U	0.43	0.66	**3.48**	**1.03**	0.24	**6.79 J**	0.20 U	**3.73**
cis-1,2-Dichloroethene	0.70	**2.20**	0.20 U	0.21	0.20 U	**1.17**	0.26	0.65	0.430	0.25	0.22	**1.00 U**	0.20 U	0.20 U	0.20 UJ	0.20 U	0.200 U
Trichloroethene	0.23	**1.05**	0.20 U	0.20 U	0.20 U	0.23	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U	**1.00 U**	0.20 U	0.20 U	0.20 UJ	0.20 U	0.200 U
Vinyl Chloride	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	**0.38**	**0.34**	**1.00 U**	0.20 U	0.20 U	**0.31 J**	0.20	0.200 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	329	100 U	**961**	729	100 U	100 UJ	360	664

TABLE D-3: BUILDING 4-78/79 SWMU/AOC GROUP HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3]							
		CPOC Area							
		GW240D							
		8/13/2019	11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	2/22/2022
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	0.200 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	0.200 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	0.200 U
Vinyl Chloride	0.20	**0.26**	**0.24**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U
Total Petroleum Hydrocarbons (µg/L)									
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   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							
		11/12/2018	5/7/2019	11/11/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	11/12/2018	5/7/2019	11/11/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022
Total Petroleum Hydrocarbons (mg/L)																	
TPH-D (C12-C24)	0.5	0.341	0.124	0.120	0.282	0.192	0.284	0.140	1.00 U	**1.50**	**0.630**	**1.65**	**1.58**	**7.67**	**1.22**	**1.02**	**0.575**
Jet A	0.5	0.191	0.117	0.117	0.267	0.155	0.262	0.100 U	1.00 U	**0.863**	**0.397**	**1.09**	**1.09**	**5.70**	**0.89**	**0.718**	0.460

Analyte	Current Cleanup Level[3]	Well ID[2]							
		CPOC Area							
		GW224S							
		5/7/2019	11/11/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	2/21/2022
Total Petroleum Hydrocarbons (mg/L)									
TPH-D (C12-C24)	0.5	**0.256**	**1.46**	**0.675**	**1.08**	**0.584**	**1.08**	**0.682**	**1.01**
Jet A	0.5	**0.388**	**1.80**	**0.918 J**	**1.42**	**1.04**	**1.47**	**1.04**	**1.76**

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							
		11/13/2018	3/5/2019	8/14/2019	3/12/2020	8/10/2020	2/16/2021	8/12/2021	2/23/2022	11/13/2018	3/5/2019	8/14/2019	3/12/2020	8/10/2020	2/16/2021	8/12/2021	2/22/2022
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.78	0.0829	0.079	0.0526	0.0604	NA	NA	NA	NA	0.0636	0.0493	0.0361	0.0362	NA	NA	NA	NA
Tetrachloroethene	0.02	0.020 U	0.0105	0.020 U	0.020 U	NA	NA	NA	NA	0.020 U	0.0107	0.020 U	0.0244	NA	NA	NA	NA
Trichloroethene	0.16	0.020 U	0.0157	0.020 U	0.020 U	NA	NA	NA	NA	0.020 U	0.0125	0.020 U	0.020 U	NA	NA	NA	NA
Vinyl Chloride	0.24	**0.629**	**0.424**	**0.367**	**0.334**	**0.261**	**0.366**	**0.517**	**0.359 J**	**0.813**	**0.537**	**0.545**	**0.235**	**0.288**	**0.107**	**0.698**	0.141 J

Analyte	Current Cleanup Level[4]	Well ID [3]															
		CPOC Area															
		GW247S								GW248I							
		8/14/2019	11/12/2019	3/12/2020	5/13/2020	8/10/2020	2/16/2021	8/11/2021	2/23/2022	8/14/2019	11/12/2019	3/12/2020	5/13/2020	8/10/2020	2/16/2021	8/11/2021	2/23/2022
Volatile Organic Compounds (µg/L)																	
cis-1,2-Dichloroethene	0.78	0.065	0.0635	0.039	0.584	NA	NA	NA	NA	0.020 U	0.020 U	0.02 U	0.020 U	NA	NA	NA	NA
Tetrachloroethene	0.02	0.020 U	0.020 U	0.02 U	0.020 U	NA	NA	NA	NA	0.020 U	0.020 U	0.020 U	0.020 U	NA	NA	NA	NA
Trichloroethene	0.16	0.020 U	0.148	0.02 U	0.020 U	NA	NA	NA	NA	0.020 U	0.0514	0.020 U	0.020 U	NA	NA	NA	NA
Vinyl Chloride	0.24	**0.613**	**0.504**	**0.305**	**0.409**	**0.392**	**0.405**	**0.678**	0.127 J	**0.541**	**0.62**	**0.499**	**0.546**	**0.383**	**0.426**	**0.711**	**0.598 J**

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 8/17/2017	3/6/2018	8/15/2018	3/5/2019	8/14/2019	3/9/2020	8/12/2020	2/16/2021	8/12/2021	2/22/2022
Metals (mg/L)											
Lead	0.001	0.00026	0.000941	**0.00107**	**0.00154**	0.000714	**0.00119**	**0.000611**	**0.000564**	**0.000663**	0.000588

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								Downgradient Plume Area							
		GW009S								GW012S							
		8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022
Volatile Organic Compounds (µg/L)																	
cis -1,2-Dichloroethene	0.08	**0.126**	**0.107**	**0.127**	**0.093**	**0.124**	**0.139**	**0.368**	**0.15**	**1.29**	**1.23**	**0.798**	**0.482**	**0.508**	**1.260**	**2.210**	**0.693**
Trichloroethene	0.02	**0.0238**	**0.0239**	0.020 U	**0.0242**	**0.0324**	**0.0294**	**0.0316**	**0.0284**	**0.656**	**0.0546**	**0.0471**	**0.0505**	**0.0518**	**0.0454**	**0.0908**	**0.0506**
Vinyl Chloride	0.26	**0.318**	**0.285**	**0.300**	0.183	0.219	**0.300**	0.160	**0.434**	**0.605**	**1.35**	**0.893**	**0.603**	**0.387**	0.180	**0.795**	**1.57**

Analyte	Current Cleanup Levels[4]	Well ID[3]															
		Downgradient Plume Area															
		GW014S								GW147S							
		8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022
Volatile Organic Compounds (µg/L)																	
cis -1,2-Dichloroethene	0.08	**0.122**	**0.119**	**0.143**	**0.151**	**0.0932**	**0.130**	**0.147**	**0.133**	**4.63**	**0.955**	**4.11**	**0.287**	**0.931**	**0.180**	**0.180**	**0.679**
Trichloroethene	0.02	**0.0273**	**0.0254**	0.020 U	**0.0419**	0.020 U	**0.035**	**0.0227**	0.020 U	**4.23**	**0.475**	**1.46**	**1.20**	**3.37**	**0.498**	**0.498**	**0.425**
Vinyl Chloride	0.26	0.232 J	0.214	**0.365**	0.195	0.190	0.207	**0.367**	**0.276**	**1.07 J**	0.0514	0.215	0.020 U	0.0643	0.020 U	0.020 U	**0.0623**

Analyte	Current Cleanup Levels[4]	Well ID[3]															
		CPOC Area															
		GW150S								GW253I							
		8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/14/2018	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022
Volatile Organic Compounds (µg/L)																	
cis -1,2-Dichloroethene	0.08	0.0506	0.0737	**0.0824**	0.0525	**0.0935**	0.0393	**0.0991**	**0.0547**	0.0796	**0.127**	**0.0917**	**0.0915**	**0.0879**	**0.140**	**0.106**	**0.0846**
Trichloroethene	0.02	**0.0305**	0.020 U	**0.0228**	0.02 U	**0.0291**	0.020 U	0.020 U	0.020 U	**0.0204**	**0.0221**	0.020 U	**0.0212**	**0.0211**	**0.0272**	**0.0202**	0.020 U
Vinyl Chloride	0.26	0.0203	0.103	0.020 U	0.0541	0.0619	0.0455	0.122	0.0969	0.113	0.143	0.131	0.184	0.100	0.243	0.146	0.177

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							
		8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/12/2021	2/23/2022	8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/17/2021	2/23/2022
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	0.24 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM
1,1,2-Trichloroethane	0.2	**2.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	0.020 U	0.0529	0.020 U	0.020 U	0.0200 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM
Acetone	300	70	5.00 U	5.0 U	5.0 U	5.00 U	10.6 J	5.00 U	5.00 U	5.00 U	5.00 U	5.0 U	5.0 U	NM	NM	NM	NM
Benzene	0.8	**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	NM	NM
Carbon Tetrachloride	0.23	**2.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
Chloroform	2	**2.23**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
cis-1,2-Dichloroethene	2.4	**22.3**	0.92	**6.87**	0.20 U	1.93	0.47	**3.15**	0.20 U	0.27	0.25	0.27	0.25	NM	NM	NM	NM
Methylene Chloride	2	**10.9 UJ**	1.00 U	1.0 U	1.0 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U	NM	NM	NM	NM
Tetrachloroethene	0.05	**0.20 U**	0.028	0.020 U	0.0263	0.020 U	0.0283	0.020 U	0.0200 U	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM
Toluene	75	21.7	4.96	3.11	0.20 U	1.05	5.21	2.42	0.47 J	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
trans-1,2-Dichloroethene	53.9	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	NM	NM
Trichloroethene	0.08	**2.38**	**0.156**	**0.414**	0.0745	**0.324**	**0.143**	**0.386**	0.0505 UJ	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM
Vinyl Chloride	0.13	**2.09 J**	**0.50**	**1.20**	0.020 U	**0.369**	0.0405	**0.575**	0.0867 J	**0.230**	**0.294**	**0.301**	**0.207**	**0.232**	**0.138**	**0.431**	**0.311 J**
Total Petroleum Hydrocarbons (µg/L)																	
TPH-G (C7-C12)	800	**9,440**	**1,070**	**943**	189	699	507	504	370 J	100 U	100 U	100 U	100 U	NM	NM	NM	NM
TPH-D (C12-C24)	500	**4,120**	362	432	100 U	150	**2160**	390	192 J	100 U	100 UJ	100 U	100 U	NM	NM	NM	NM
TPH-O (C24-C40)	500	**2,000 U**	**522**	**853**	200 U	379	**3990**	**689**	263 J	200 U	200 UJ	200 U	200 U	NM	NM	NM	NM

Analyte	Current Cleanup Levels[4]	Well ID[3]																							
		Shallow Zone CPOC Area																							
		GW178S								GW207S								GW208S							
		8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/12/2021	2/23/2022	8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/12/2021	2/23/2022	8/13/2018	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/12/2021	2/23/2022
Volatile Organic Compounds (µg/L)																									
1,1,2,2-Tetrachloroethane	0.17	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM
1,1,2-Trichloroethane	0.2	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	0.023	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM
Acetone	300	5.00 U	5.54	5.0 U	5.0 U	NM	NM	NM	NM	5.00 U	5.00 U	5.0 U	5.0 U	NM	NM	NM	NM	5.00 U	5.00 U	5.0 U	5.0 U	NM	NM	NM	NM
Benzene	0.8	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
Carbon Tetrachloride	0.23	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
Chloroform	2	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
cis-1,2-Dichloroethene	2.4	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.21	0.20 U	0.20 U	NM	NM	NM	NM
Methylene Chloride	2	1.00 U	1.00 U	1.00 U	1.00 U	NM	NM	NM	NM	1.00 U	1.00 U	1.00 U	1.00 U	NM	NM	NM	NM	1.00 U	1.00 U	1.0 U	1.0 U	NM	NM	NM	NM
Tetrachloroethene	0.05	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM
Toluene	75	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
trans-1,2-Dichloroethene	53.9	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM
Trichloroethene	0.08	0.0213	0.0213	0.020 U	0.021	NM	NM	NM	NM	0.0388	0.020 U	0.0305	0.020 U	NM	NM	NM	NM	0.0234	0.020 U	0.0293	0.020 U	NM	NM	NM	NM
Vinyl Chloride	0.13	**0.378**	**0.392**	**0.3840**	**0.1840**	**0.141**	**0.224**	**0.182**	**0.361 J**	**0.311 J**	0.0692	0.020 U	0.020 U	**0.377**	0.066	**0.232**	**0.356 J**	0.097	**0.437**	**0.245**	**0.419**	**0.343**	**0.349**	**0.313**	**0.404 J**
Total Petroleum Hydrocarbons (µg/L)																									
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	NM	NM	NM	NM	100 U	100 U	100 U	100 U	NM	NM	NM	NM	100 U	100 U	100 U	100 U	NM	NM	NM	NM
TPH-D (C12-C24)	500	100 U	100 UJ	100 U	100 U	NM	NM	NM	NM	100 U	100 UJ	100 U	100 U	NM	NM	NM	NM	100 U	100 UJ	100 U	100 U	NM	NM	NM	NM
TPH-O (C24-C40)	500	200 U	200 UJ	200 U	200 U	NM	NM	NM	NM	200 U	200 UJ	200 U	200 U	NM	NM	NM	NM	200 U	200 UJ	200 U	200 U	NM	NM	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							
	11/13/2018	5/7/2019	11/11/2019	5/12/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022
Volatile Organic Compounds (µg/L)								
cis-1,2-Dichloroethene	0.20 U	0.20 U	0.20 U	0.20 U	0.52	0.20 U	0.20 U	0.200 U
Vinyl Chloride	0.55	1.39	0.38	1.48	0.20 U	1.49	1.37	2.54

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
Summary of Remedial Actions

APPENDIX E

Summary of Remedial Actions at the Boeing Renton Facility
November 2021 – April 2022

Boeing Renton Site
Renton, Washington

Prepared for:
The Boeing Company
EHS Remediation

Prepared by:
CALIBRE Systems, Inc.
Project No. T0014538

May 25, 2022

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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 November 1, 2021 and April 30, 2022. The ongoing remedial actions include:

1. Operation of a 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 (including SWMU-172/174, Building 4-78/79, AOC-001/002, AOC-003, AOC-060, AOC-090, and Apron A), and;
3. Anaerobic biodegradation of benzene by nitrate/sulfate injections at the Building 4-78/79.

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 Building 4-78/79 (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, a summary of the ongoing biological treatment in multiple areas, and related groundwater monitoring associated with remedial actions in the following areas:

SWMU-172/174
Building 4-78/4-79 SWMU/AOC Group (Building 4-78/79)
AOC-001/002
AOC-003
AOC-060
AOC-090
Apron A

This Tech Memo is organized as follows:
Section 1 – Introduction and Background
Section 2 – SVE System Operation and Monitoring

Section 3 – Ongoing Groundwater Treatment
Section 4 – Conclusions and Recommendations
Section 5 – References

Attachment A – Field Data Sheets
Attachment B - Laboratory Data Package

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).

During the prior May 2021 to October 2021 operating period, PID monitoring results from the SWMU-172/174 SVE system had shown VOC concentrations removed at asymptotically low levels. Given these recent performance data, a rebound test for the system was started on December 20, 2021 and continued through January 24, 2022. The following sections summarize the SVE operation and rebound monitoring results for the SVE system at SWMU-172/174.

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 for vapor treatment was originally included in the design to treat potential vinyl chloride that, if present, would not be effectively captured in the 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. As stated above, the system was intentionally shut down between December 20, 2021 and January 24, 2022 to monitor for system rebound. The system has continued to operate since restart in January 2022. 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. Table 2-1 summarizes the TO-15 detections for the SWMU-172/174 SVE system for prior TO-15 sampling events[1] that have been implemented since system startup. 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.

2.1.1 Mass Removal Estimate

Between April 17, 2015 and April 27, 2022 the SWMU-172/174 SVE system has recovered an estimated 24.6 pounds of VOCs (primarily PCE), as shown in Table 2-3. Approximately 0.8 pounds of VOCs were removed during the current reporting period (November 2021 to April 2022) based on the PID measurements collected while the system was operating. The PID results from February 17, 2022 and April 27, 2022 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. While no noticeable paint odors were observed during these site visits, 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. The change in SVE system influent concentrations since the time of system startup is presented in Figure 2-3.

2.2 SVE Rebound Test Summary

This section presents a summary of the rebound test procedures and data collected for the SWMU-172/174 SVE system. The SVE system was monitored with a calibrated PID and sampled for VOCs via TO-15 analysis for baseline data on December 2, 2021 prior to the planned shutdown period. The system was shutdown December 20, 2022 and remained off for a period of 35 days. On January 24, 2022, following the 35-day rest period, the SVE system was restarted, and vapor concentrations were monitored at the same baseline locations with a calibrated PID and sampled for TO-15 analysis to determine if vapor concentrations had rebounded. Based on prior rebound tests for the system, some level of rebounding was expected with the shutdown and restart of the SVE system. The key operational question to be evaluated with the rebound period was whether sufficient vapor accumulated to make further mass recovery via SVE effective. After the 35-day rest period, the system was started and monitored for approximately 2 hours prior to sample collection. Additional samples were collected after approximately 24 hours of operation and again on day sixteen of operation (approximately 380 hours later) after the system restart.

The vapor monitoring points tested in the SWMU-172/174 SVE area included SVE-2, SVE-3 and the system inlet (refer to Figure 2-1). Selected samples were also collected for laboratory TO-15 analysis for VOCs (gas chromatography mass spectrometry analysis) from the system inlet and SVE-3, the laboratory data sheets are presented in Attachment B.

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

2.2.1 TO-15 Laboratory Analysis of Vapor Samples

On December 2, 2021 well SVE-3 and the system influent were sampled for TO-15 analysis and paired PID measurements to provide baseline data for the planned rebound testing. Subsequent samples were collected from the same locations upon restart on January 24, 2022, then again on January 25, 2022, and February 9, 2022, and included PID measurements from these locations.

The CVOCs and other VOCs detected in the TO-15 samples collected during the SVE operations and rebound periods for the SWMU-172/174 area SVE system are shown in Table 2-1. Table 2-4 summarizes the rebound test data for the SWMU-172/174 area SVE system and provides a comparison of historical PCE concentrations at system start in 2015 and present day PCE concentrations at the site. As described in the rebound procedures above, measurements were taken following system restart to determine if and how quickly the initial rebound concentrations declined during operation.

At the beginning of the rebound test in December 2021, concentrations at SVE-3 were down 99 percent from SVE startup levels measured in April 2015. Concentrations remained at levels 98.5 percent below SVE startup levels after the 35-day rest period and 98.4 percent after one day of operation. After 16 days of operation, SVE-3 was back at pre-rebound asymptotic levels (see Table 2-4). The system influent concentrations showed a similar reduction in PCE concentrations and was back at asymptotic levels after 16-days of operation following the rebound test.

Table 2-5 presents a mass removal estimate comparison from the startup of SVE operation along with the rebound monitoring period. The baseline condition (asymptote prior to the start of the rebound period) for the SWMU-172/174 area SVE system indicated an influent concentration of approximately 39 parts per billion by volume (ppbv) PCE (from TO-15 results) and a mass removal rate of approximately 0.003 lbs/day. Following the 35-day rest period, the influent concentration increased marginally to approximately 58 ppbv PCE with a mass removal rate of 0.004 lbs/day. After 16 days of operation, the mass removal rate had reduced to the baseline asymptotic levels, which is approximately 4% of the peak mass removal rate when the system was started in 2015. This meets the performance goal for system shutdown (after rebound testing) established in the EDR (AMEC, 2014).

2.3 Data Evaluation

A key question used to evaluate continued operation after the rebound test is:

1. *Is the increased mass removal rate sustained for any significant time period after a rest/rebound period and is any increased mass removed sufficient to justify prolonged SVE system operation?*

Tables 2-4 and 2-5 presents TO-15 results from samples collected before and after the rebound test. These data indicate that the mass removal rate increased marginally over the first 24 hours after system restart from 0.004 lbs/day to 0.005 lbs/day. However, after 16 days of operation the mass removal rate was diminished to asymptotic levels and do not provide justification for continued SVE operation.

A second key question used to evaluate continued operation after the rebound test is:

2. *Are there data to indicate that continued SVE system operation is having a measurable improvement on the groundwater system, over and beyond what is being accomplished with the groundwater ERD system?*

Data collected during regular SVE operation indicate PCE is the primary compound detected and recovered with the SWMU-172/174 SVE system. The rebound data show very low remaining concentrations of the compound in soil vapor. Concentrations of this compound in groundwater have declined with the ERD treatment; PCE concentrations have been significantly reduced or eliminated from virtually all wells at this SWMU-172/174 area.

At the SWMU-172/174 area, the two source-area wells are both under 2.0 µg/L PCE (one well at 1.84 µg/L and one at <0.02 µg/L) and all conditional point of compliance wells are at or below 0.02 µg/L for PCE. These current groundwater monitoring data indicate that continued SVE system operation in the SWMU-172/174 area will not have a measurable impact on the groundwater remediation.

These combined performance monitoring data from SVE operations (asymptotically low mass removal) and ERD treatment indicate that SVE operations have been effective for source removal and support the recommendations of ending SVE operations.

3.0 Ongoing Groundwater Treatment

Groundwater treatment is currently being implemented at the following AOCs/SWMUs at the Renton Facility.

- SWMU-172/174
- Building 4-78/4-79 SWMU/AOC Group,
- AOC-003,
- AOC-060,
- AOC-090, and
- Apron A.

The primary remedy being implemented is ERD of chlorinated solvents in targeted areas. The ERD treatment involves substrate injection using sucrose/fructose as a carbon source to stimulate biological degradation of the chlorinated solvents and nitrate/sulfate to anaerobically degrade benzene. Continued treatment is evaluated on a semi-annual basis following review of groundwater sampling results. 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 3-1 presents a summary of those groundwater monitoring results, by area, related to groundwater treatment/ERD implementation.

During the current reporting period, no ERD injection activities were not conducted in AOC-060, AOC-090 and Apron A. Bioremediation injection activities are planned for these areas in the 2[nd] half of 2022.

Building 4-78/79

Beginning in late 2017, anaerobic biodegradation of benzene using nitrate and sulfate injections was implemented for a small area in the vicinity of Building 4-78/79. Boeing has continued additional nitrate/sulfate injections in the area; the most recent injection was completed in November 2021 (tenth event). Boeing planned a removal action of petroleum hydrocarbon-contaminated soil at the Building 4-78/79 area in a work plan “Soil Excavation at Building 4-78/79 Area, Boeing Renton” submitted to the Washington Department of Ecology in January 2021 and approved on February 2, 2021 (CALIBRE 2021a). The removal action was completed in September 2021, in accordance with that work plan and summarized in a Tech Memo submitted to Ecology in October 2021 (CALIBRE 2021b). The soil excavation work required the decommissioning of wells previously used for benzene treatment in this area and two new horizontal injection wells were installed within the excavation footprint following completion of the removal action. The November 2021 injection event utilized the two new horizontal injection wells and upgradient well B78-11 (see Figure 11 in main text of this report). Injections were completed with a target concentration of 1,600 mg/L for nitrate and 800 mg/L for sulfate per well (similar to prior events) to provide additional nitrate and sulfate to the impacted area. The injection volumes and mass of nitrate/sulfate are included in Table 3-2.

Performance monitoring data were collected in this area and other areas throughout the site in February 2022 to evaluate substrate availability and need for continued injection and those results are summarized in Table 3-3. The data for the Building 4-78/79 area show reduced nitrate/sulfate concentrations in well GW-210S which is downgradient of the benzene treatment horizontal injection wells. Benzene in this well was 0.56 µg/L which is below the cleanup level of 0.80 µg/L (see Table 3-3). While benzene is reduced in this area it is recommended that additional nitrate and sulfate be injected upgradient of this well (in the horizontal injection wells) to continue benzene treatment.

ERD injection well B78-16, which is upgradient of the VOC treatment area, showed TOC concentrations nearing background levels (at 13.4 mg/L with background typically <10 mg/L). However, this well showed the presence of TCE daughter products cis-1,2-DCE and VC indicating continued degradation of TCE with the VC present above the AOC CULs. Additional ERD treatment is recommended in this area, including bio-augmentation, to increase TOC concentrations and continue TCE treatment. The substrate injection wells to include B78-9, B78-10, B78-11, B78-12, B78-14 and B78-16 (see Figure 11 in the main text of this report) This work is planned for the 2nd half of 2022.

SWMU-172/174

Injection well B172-08 located upgradient of the VOC treatment area and near monitoring well GW-152S, showed PCE at 1.62 µg/L and cis-1,2-DCE at 0.3 µg/L (see Figure 4 in main text of this report). The other injection well, B172-01, showed CVOC concentrations at non-detect levels and TOC is reduced in both injection wells. Additional ERD treatment is recommended for selected wells in the area of B172-08 and GW-152S to increase TOC concentrations and continue PCE degradation, this work is planned for the 2nd half of 2022.

AOC-003

Injection well B003-01, which is upgradient of the VOC treatment area (see Figure 21 in the main text of this report), showed VC at <0.2 µg/L and TOC concentrations near background. While VC is non-detect at this well, other nearby monitoring wells sampled during the bi-annual monitoring event in the area show estimated VC concentrations at 0.60 µg/L slightly above the VC CUL of 0.24 ug/L. Therefore, one additional injection is recommended for this area. All four injection wells in the area should be used (B003-01, B003-02, B003-03 and B003-04) pending access around aircraft in the immediate areas.

4.0 Conclusions and Recommendations

4.1 Recommended Shutdown of SVE Operations

Asymptotic low levels of vapor concentrations were observed at the SWMU 172/174 operating SVE wells and system influent during the November 2021 to April 2022 operating period (see Figure 2-3). Rebound testing was completed during this monitoring period to evaluate whether SVE operations should be discontinued. The rebound results show marginal increases in PCE concentrations and estimated mass removal after a 35-day rest period; with mass removal increasing from 0.003 lbs/day prior to rebound start to 0.005 lbs/day after the rest period. The slight increase in PCE mass removal was diminished back to prior asymptote levels after 16 days of operation. SVE system shutdown is recommended as the system continues to show asymptotic low-level vapor concentrations following rebound testing.

Boeing seeks Ecology's concurrence to discontinue SVE system operations at SWMU 172/174. Boeing intends to continue implementing its bioremediation and monitored natural attenuation remedies for this area.

4.2 Recommendations for Continued Biological Treatment

Additional nitrate/sulfate injections were completed for benzene treatment at the two new horizontal injection wells located at the Building 4-78/79 area in November 2021. Performance monitoring data collected downgradient of this area in February 2022 show nitrate/sulfate concentrations have been consumed therefore additional substrate is recommended for this area (i.e., the benzene plume area at Building 4-78/79).

Based on evaluation of the biannual monitoring data and additional performance monitoring data (see Table 3-1 and 3-3), continued ERD treatment for VOCs in groundwater is planned in 2022 for the following areas:

- SWMU-172/174,
- Building 4-78/4-79 SWMU/AOC Group,
- AOC-003,
- AOC-060,
- AOC-090, and
- Apron A.

Upon completion of the Apron R (AOC-001/002) construction work estimated in 2023, the well monitoring network replacement is currently anticipated for late 2023. After the replacement wells are installed and sampled in 2024, Boeing will evaluate if continued ERD treatment is needed for VOCs in groundwater in AOC 001/002.

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

5.0 References

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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
12/2/2021	39	3.3	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44	44
1/24/2022	58	4.9	1.6	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	66	66
1/25/2022	71	5.1	2.2	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	80	80
2/9/2022	38	2.7	1	ND	ND	ND	ND	9.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	42	51

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
12/2/2021	70	5.7	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	79	79
1/24/2022	110	8.9	2.8	ND	ND	3.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	125	125
1/25/2022	120	7.7	3.2	ND	ND	2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	133	133
2/9/2022	68	4.5	1.8	ND	ND	ND	ND	ND	ND	ND	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	74	76

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.

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
10/29/2021	2,157	Vent	27	304	236		0	2 gallons condensate
11/17/2021	2,176	Vent						Stopped by system to check oil and drain condensate, 7 gallons removed.
11/23/2021	2,182	Vent	81	253	247		0	Picked up new cal gas can from national safety, 2 gal condensate
12/2/2021	2,191	Vent	42	124	80		0	Collected TO-15 samples from influent and SVE-3.
12/13/2021	2,202	Vent	2	108	77		0	10 gal condensate removed
12/20/2021	2,209	Vent						Shut system down for Boeing Christmas break and rebound rest period.
1/24/2022	2,244	Vent	49	194	147		0	Startup system after rest period and take initial readings
1/24/2022	2,244	Vent	30	154	129		0	Readings at 1 hr
1/24/2022	2,244	Vent	52	181	127		0	Readings at 2 hr, collect TO-15 samples from SVE-3 and influent.
1/25/2022	2,245	Vent	46	229	150		0	TO-15 samples at ~24 hrs.
2/9/2022	2,260	Vent	52	189	153			TO-15 samples at 15 days
2/17/2022	2,268	Vent	594	1,105	1,004	129	0	1 gal condensate
3/4/2022	2,283	Vent	13	326	258		0	2 gal condensate, changed oil.
3/17/2022	2,296	Vent	4	164	111		0	
4/5/2022	2,315	Vent	0	390	147		0	
4/27/2022	2,337	Vent	0	244	1,185		0	

Notes:

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

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)
10/29/2021	236	137	105	42,953	0.118	23.79
11/17/2021	Check oil and drain condensate			43,409		23.79
11/23/2021	247	141	105	43,555	0.217	24.01
12/2/2021	80	46	105	43,768	0.025	24.04
12/13/2021	77	44	105	44,031	0.030	24.07
12/20/2021		0	105	44,199	0.000	24.07
1/24/2022	147	84	105	44,199	0.000	24.07
1/24/2022	129	74	105	44,200	0.000	24.07
1/24/2022	127	73	105	44,201	0.000	24.07
1/25/2022	150	86	105	44,226	0.005	24.07
2/9/2022	153	88	105	44,582	0.080	24.15
2/17/2022[3]	153	88	105	44,778	0.044	24.20
3/4/2022	258	148	105	45,134	0.134	24.33
3/17/2022	111	63	105	45,444	0.050	24.38
4/5/2022	147	84	105	45,903	0.099	24.48
4/27/2022[3]	147	84	105	46,430	0.113	24.59

Notes:
PID = photoionization detector
ppbv = parts per billion by volume
cfm = cubic feet per minute
lbs = pounds
[1] A correction factor of 0.57 has been applied to the PID vapor measurement for VOCs based on the mixture of analytes detected in the TO-15 analysis at the influent sample point from 12/2/21. This number is much higher than the TO-15 results.

[2] These are based solely on the PID measurements collected this period; the prior TO-15 analyses indicates much lower mass.
TO-15 analysis results showed Tetrachloroethene made up 89% of the total VOCs removed at the influent on 12/2/21.
[3] 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 2-4 PCE Baseline and Rebound Data Comparison - SWMU-172/174 SVE System

	PCE Concentration at initial startup of SVE Operation (4/17/15) (ppbv)[1]	PCE Concentration Prior to Rebound Start (12/2/21, ppbv)[2]	PCE Concentration after 35-Day rest period (1/24/22, ppbv)[2]	PCE Concentration after 24-Hours operation (1/25/22, ppbv)[2]	PCE Concentration after 16 days operation (2/9/22, ppbv)[2]	% Reduction from start of SVE to baseline asymptote for rebound test	% Reduction from start of SVE to after 35-Day rest period	% Reduction after 1-Day rebound test	% Reduction after 16-Day rebound test
SVE-3	7,353	70	110	120	68	99.0%	98.5%	98.4%	99.1%
System Inlet	1,500 [2]	39	58	71	38	97.4%	96.1%	95.3%	97.5%

[1]Listed values are corrected field measurements taken at time of system startup, 0.57 for PCE.

[2]Values listed are from TO-15 analytical data for PCE.

Unless otherwise noted data points are corrected PID measurements, 0.57 for PCE.

Table 2-5 Rebound Mass Removal Results - SWMU-172/174 SVE System Influent

SWMU-172/174 Influent	Date	PID Reading (ppbv)[1]	Influent TO-15 Results - PCE (ppbv)	System Flow (cfm)	Mass removal (lbs/day)[3]	Percent of Peak Removal
Peak Mass Removal	4/17/2015	NA	1,500	73	0.068	
Baseline prior to Rebound Start [2]	12/2/2021	80	39	105	0.003	4%
After 35-Day Rest Period	1/24/2022	126.5	58	105	0.004	6%
1-Day of Operation	1/25/2022	150	71	105	0.005	7%
16-Days of Operation	2/9/2022	153	38	105	0.002	4%

[1] PID uncorrected

[2] System changes included a new blower before this test with an increased flow rate so direct comparison of mass removal needs to consider increased flow rate

[3] Based on TO-15 results for PCE

Table 3-1 Groundwater Monitoring Results Summary February 2022 and Recommended ERD Treatment

GW Treatment Area	Source and down gradient MWs	CPOC wells	Treatment IWs	ERD Treatment Recommendation
SWMU-172/174	PCE, TCE and cisDCE showed slight increases from prior monitoring at GW-152S; all results are below 2.0 ug/L.; VC less than 0.22 ug/L.	All detections are at or below 0.31 ug/L	North IW B172-01 is ND for CVOCs, South IW B172-08 near GW-152S show PCE at 1.6 ug/L and cisDCE at 0.3 ug/L. TOC near background.	**Recommend additional injections in area of GW-152S to continue driving CVOCs down.**
Building 4-78/4-79 SWMU/AOC Group	TCE is nondetect, cisDCE is under near 4.0 ug/L; VC at 9.0 ug/L. Benzene reduced in source well GW033S (14.5 ug/L to 8.6 ug/L).	All samples are ND or below cleanup levels with the exception of GW-237S with benzene at 3.73 ug/L	B78-16 showed TCE less than 1.0 ug/L and elevated cisDCE at 300 ug/L and VC at 290 ug/L.	**Recommend substrate injection in selected IWs/areas around GW033S for ERD, Nitrate/sulfate injections in two new injection galleries near former GW031S.**
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.*	**Site still not accessible due to construction**
AOC-003	VC estimated at less than 0.4 ug/L.	VC estimated at less than 0.6 ug/L.	B003-01 showed VC at <0.2 ug/L and TOC near background	**Recommend additional injections to continue driving CVOCs down.**
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 2.2 ug/L, other MWs with total CVOCs less than 0.62 ug/L, primarily cis-1,2DCE and VC.	MW's with total CVOCs less than 0.30 ug/L, primarily as cis-1,2DCE and VC.	-	**Recommend additional injections to continue driving CVOCs down.**
AOC – 90	Source with VC of 0.09 ug/L, all other VOCs are ND; down gradient well with VC at 0.31 ug/L.	VC less than 0.40 ug/L.	-	**Recommend additional injections to continue driving CVOCs down.**
Apron A	cis-1,2DCE is nondetect and VC reduced to 2.54 ug/L	-	-	**Recommend additional injections to continue driving CVOCs down.**
SWMU-168	-	VC reduced to 0.16 ug/L.	-	**No action at this time.**
Building 4-70	-	*Prior data March 2020, total CVOCs less than 0.63 ug/L.*	-	**No action at this time.**

Table 3-2 - November 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	Injection Gallery A	2000	36.5	16.7	21.4	1,599	803
	Injection Gallery B	1000	18.2	8.4	10.7	1,599	803
	B78-11	250	4.6	2.1	2.7	1,599	803

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

Table 3-3 – Renton Performance Monitoring February 2022
with historical data (prior to the February 2022 sampling) in shaded cells

AOC/SWMU Area	Well	Date	TCE (µg/L)	cis-1,2-DCE (µg/L)	VC (µg/L)	Benzene (µg/L)	Nitrate-N (mg/L)	Nitrite-N (mg/L)	Sulfate (mg/L)	TOC (mg/L)
4-78/79 CULs			0.23	0.7	0.2	0.8	--	--	--	--
4-78/79	GW-210S	3/3/2017	< 0.2	< 0.2	< 0.2	< 0.2	--	--	--	40.9
4-78/79	GW-210S	5/11/2017	< 0.2	< 0.2	< 0.2	< 0.2	--	--	--	41.9
4-78/79	GW-210S	8/16/2017	< 0.2	< 0.2	< 0.2	24	--	--	--	12.6
4-78/79	GW-210S	11/14/2017	< 0.20	< 0.20	< 0.20	8.45	--	--	--	10.1
4-78/79	GW-210S	3/6/2018	< 0.20	< 0.20	< 0.20	1.12	--	--	--	59.05
4-78/79	GW-210S	5/7/2018	< 0.20	< 0.20	< 0.20	< 0.20	--	--	--	9.98
4-78/79	GW-210S	8/14/2018	< 0.20	< 0.20	< 0.20	0.28	--	--	--	11.63
4-78/79	GW-210S	11/13/2018	< 0.20	< 0.20	< 0.20	< 0.20	--	--	--	7.22
4-78/79	GW-210S	3/5/2019	< 0.20	< 0.20	< 0.20	< 0.20	--	--	--	14.47
4-78/79	GW-210S	5/7/2019	< 0.20	< 0.20	< 0.20	< 0.20	--	--	--	6.37
4-78/79	GW-210S	8/13/2019	< 0.20	< 0.20	< 0.20	< 0.20	--	--	--	79.1
4-78/79	GW-210S	11/12/2019	< 0.20	< 0.20	< 0.20	< 0.20	--	--	--	126.6
4-78/79	GW-210S	3/11/2020	< 0.20	< 0.20	< 0.20	< 0.20	--	--	--	219.9
4-78/79	GW-210S	5/12/2020	< 0.20	< 0.20	< 0.20	< 0.20	--	--	--	226.1
4-78/79	GW-210S	**2/17/2022**	<0.2	<0.2	<0.2	0.56	<0.1	<0.1	5.73	--
4-78/79	B78-16	11/26/2014	0.6	0.6	0.4	14	--	--	--	11.3
4-78/79	B78-16	11/10/2015	< 0.2	1.7	4	28	--	--	--	--
4-78/79	B78-16	**2/17/2022**	0.94	288	280	8.3	--	--	--	13.4
4-78/79	B78-16	**2/17/2022**	0.9	299	293	7.9	--	--	--	--

AOC/SWMU Area	Well	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	VC (µg/L)				TOC (mg/L)
SWMU-172/174 CULs			0.02	0.02	0.03	0.11	--	--	--	--
SWMU-172/1	B172-01	12/3/2014	--	0.4	0.2	< 0.2	--	--	--	--
SWMU-172/1	B172-01	**2/17/2022**	<0.2	<0.2	<0.2	<0.2	--	--	--	1.3
SWMU-172/1	B172-08	12/2/2014	--	8.8	32	< 0.2	--	--	--	--
SWMU-172/1	B172-08	**2/17/2022**	1.62	<0.2	0.3	<0.2	--	--	--	1.6

AOC/SWMU Area	Well	Date				VC (µg/L)				TOC (mg/L)
AOC-003 CULs			--	--	--	0.24	--	--	--	--
AOC-003	B003-01	12/1/2014	--	--	--	0.3	--	--	--	11.7
AOC-003	B003-01	2/11/2016	--	--	--	0.28	--	--	--	18.8
AOC-003	B003-01	5/11/2017	--	--	--	0.27	--	--	--	15.1
AOC-003	B003-01	**2/17/2022**	--	--	--	<0.2	--	--	--	31.5

Notes

PCE = Tetrachloroethene — VC = Vinyl Chloride

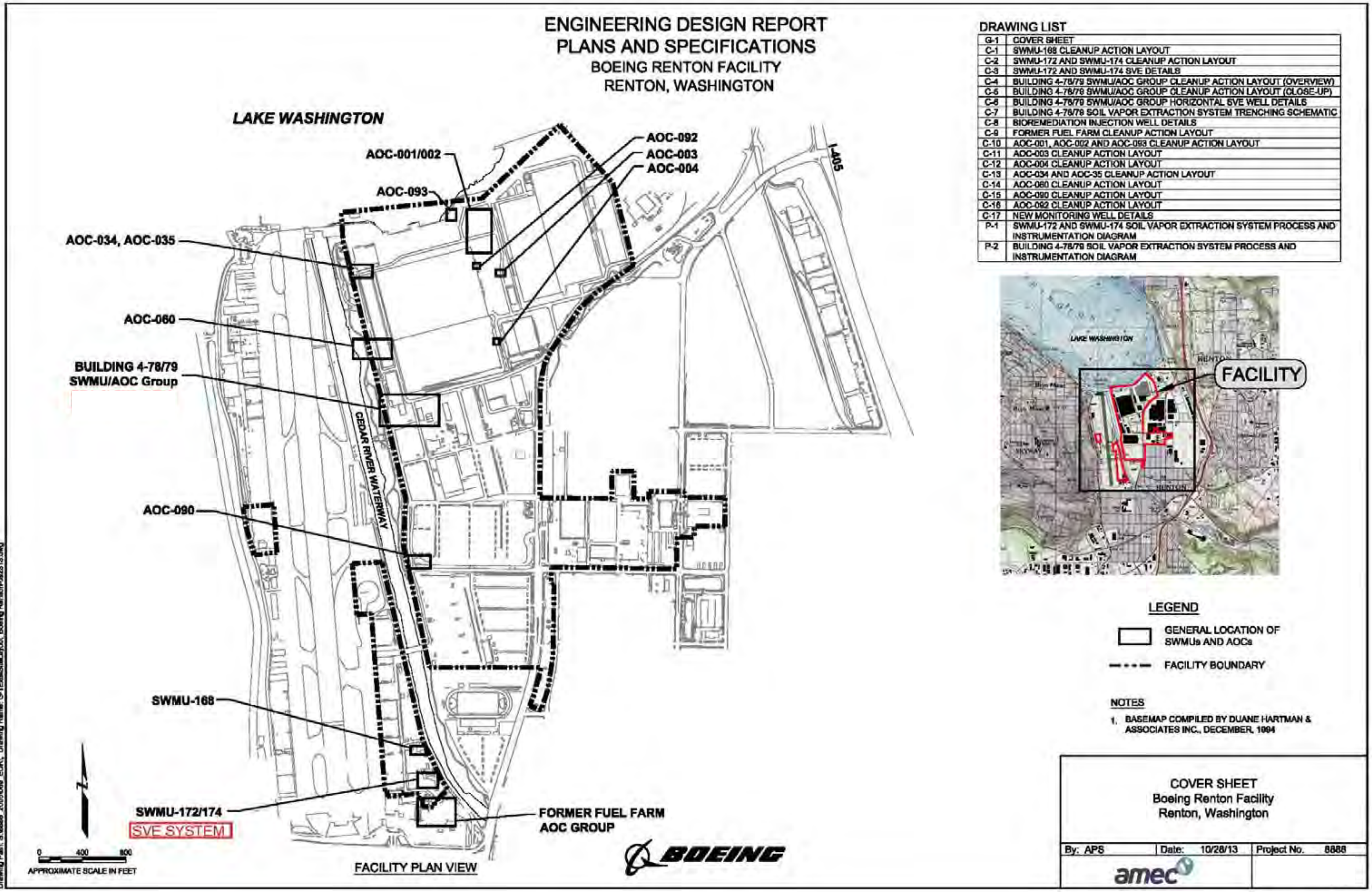
TCE = Trichloroethene — µg/L = microgram/liter

cis-1,2-DCE = cis-1,2-Dichloroethene — mg/L = milligram/liter

-- = not analyzed — CULs = cleanup levels

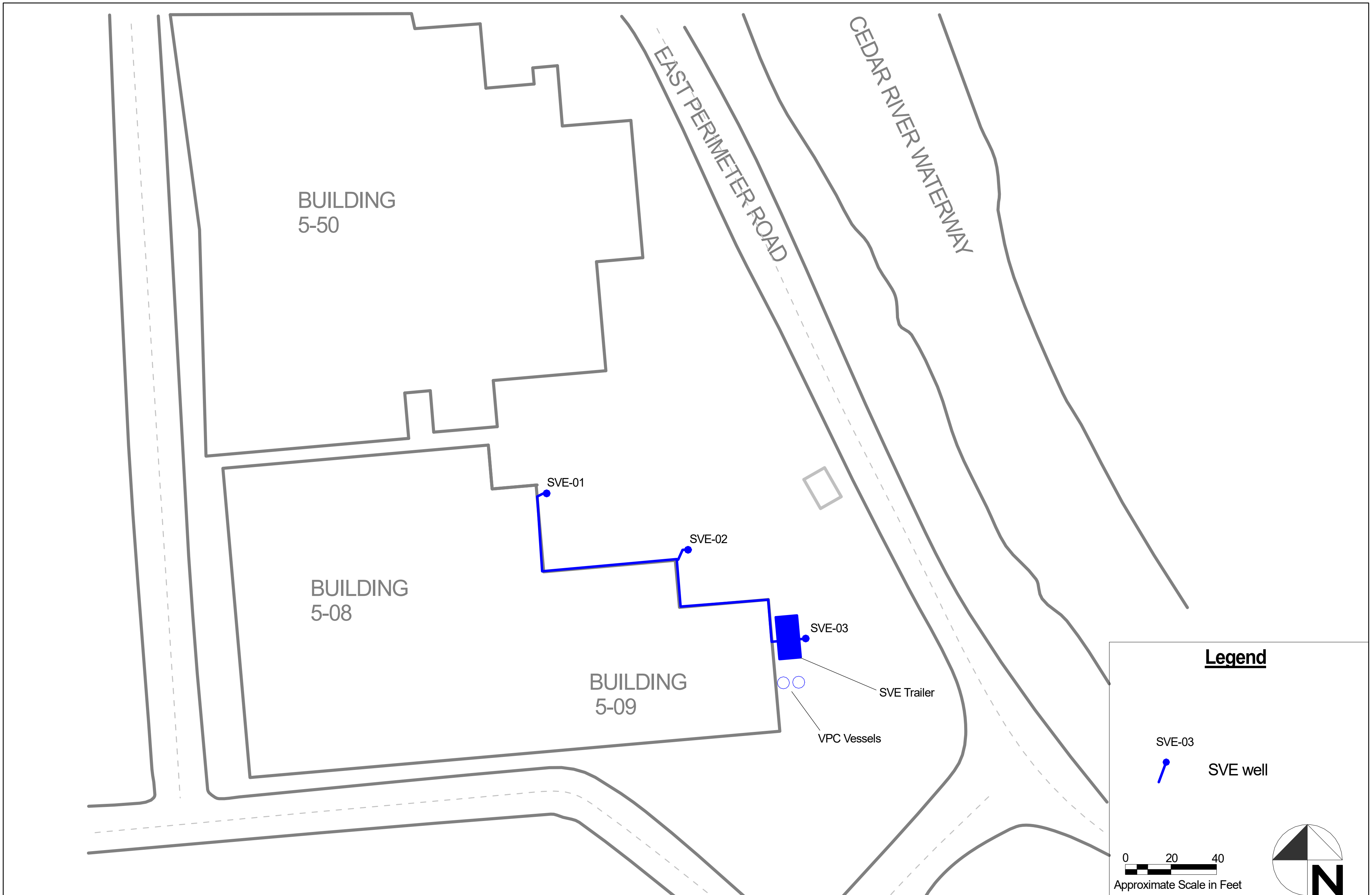
shaded cells are historical data (prior to the February 2022 sampling)

FIGURES



CALIBRE Systems, Inc.

Figure 1-1 Site Location/ AOC Outlines



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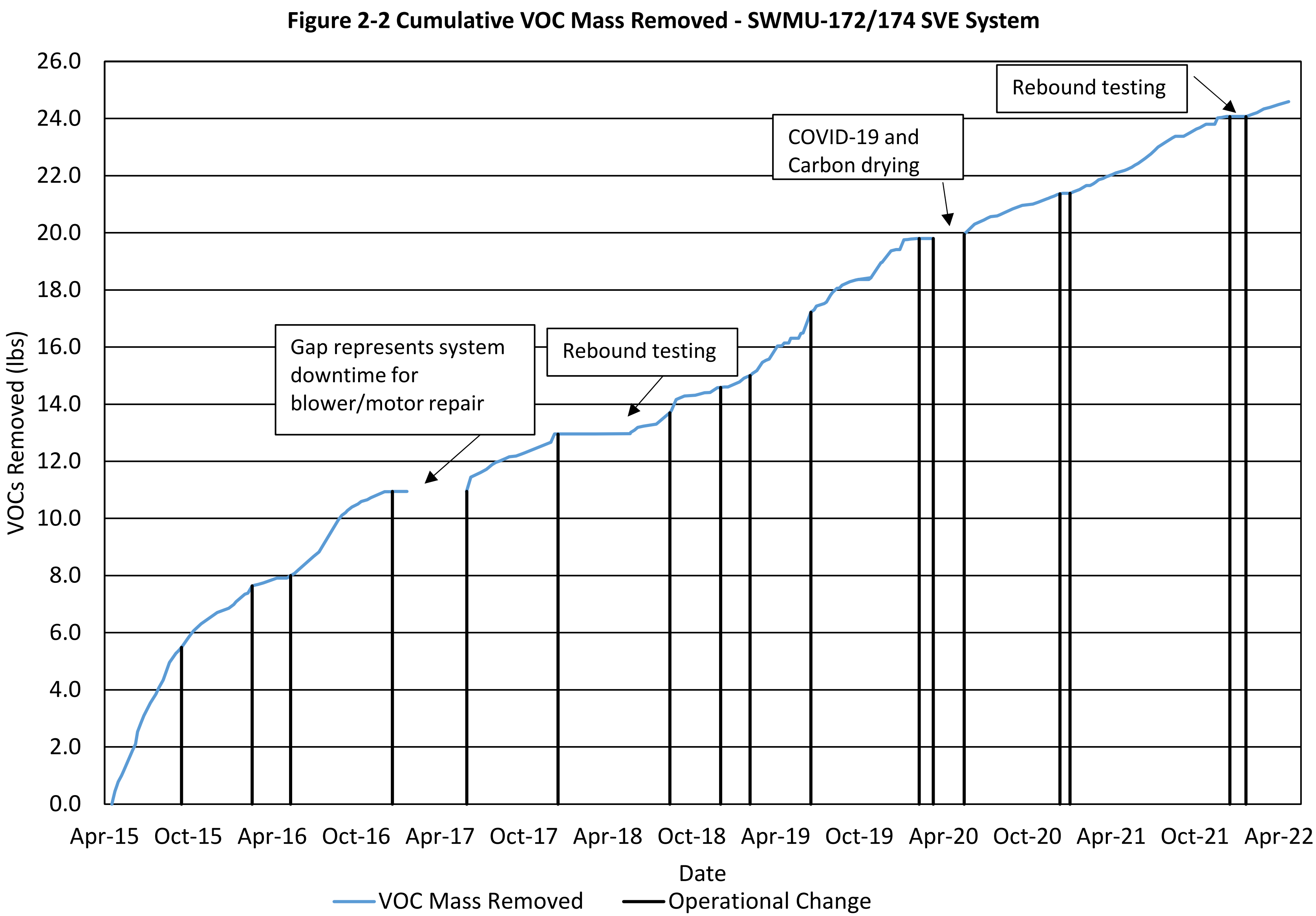
CALIBRE Systems Inc.

Boeing Renton
Spring 2017 SVE Quarterly Summary Report

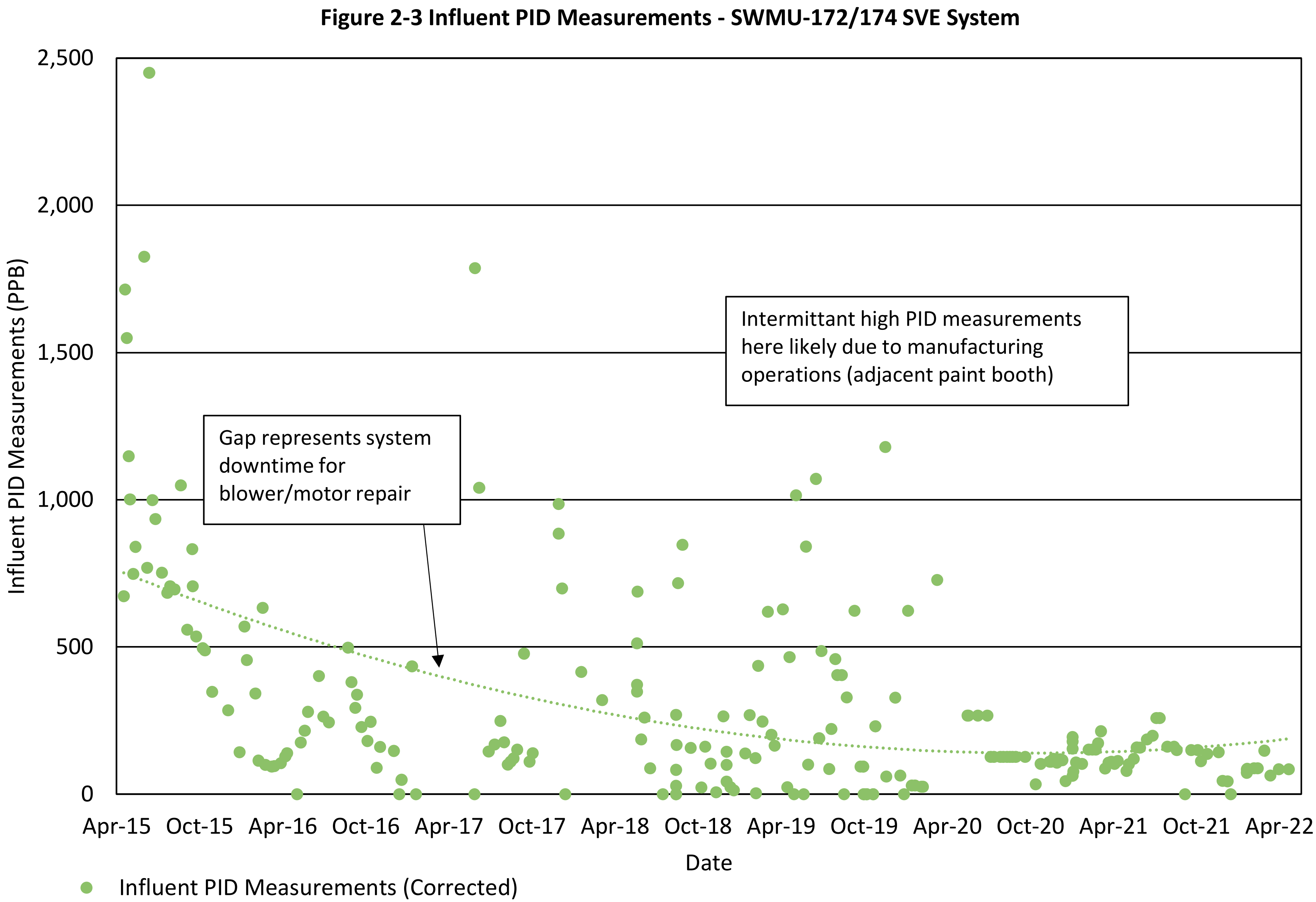
Figure 2-1 SWMU-172/174 Area
SVE System Layout



*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



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

Attachment A: Field Log Forms

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

Inspection Date: 11/17/21 Date of last inspection: 10/29/21

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:	1300	Motor Hours: JNRL
Blower	**Current Value**	**Other Notes**
Vacuum gauge		Stopped system to add oil to blower & empty condensate. ~7 gal removed. No Readings collected
Pressure gauge		
System flow rate		
Blower Temperature		
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 $Flow\ Rate\ (cfm) = 12.24 \times \sqrt{differential}\ pressure$.

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature Justin Neste (Printed Name) [signature] (Signature) 11/17/21 (Date)

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

Inspection Date: 11/23/21 Date of last inspection: 11/17/21

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: 1149		Motor Hours: 4774.8
Blower	**Current Value**	**Other Notes**
Vacuum gauge	34" H2O	2 gal condensate removed Picked up new cal gas can @ National Safety
Pressure gauge	10" H2O	
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: 1 ppb / 10.09 ppm
Calibration time/ date: 11/23/21 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	NA						
SVE-02	1230	94 ppb	68 ppb				
SVE-03	1220	246 ppb	260 ppb				
VPC Inlet	1215	250 ppb	243 ppb				
VPC Midpoint							
VPC Outlet	1210	0	0				
Other vapor point ______							

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

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

Signature

Justin Neste	[signature]	11/23/21
Printed Name	Signature	Date

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

Inspection Date: 12/2/21 Date of last inspection: 11/23/21

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: 0847		Motor Hours: 4987.4
Blower	**Current Value**	**Other Notes**
Vacuum gauge	32" H2O	No condensate water collected TO-15 sample SVEIN-120221 @ 0931 can# 34000754 SVE3-120221 @ 0935 can# 1L2193
Pressure gauge	10" H2O	
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: PPBRAE 3000	Details: 0 / 10.01 ppm
Calibration time/ date: 12/2/21 0900	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	Closed						
SVE-02	0925	42 ppb	41 ppb				
SVE-03	0932	115 ppb	~~1~~83 ppb				
VPC Inlet	0910	78 ppb	81 ppb				
VPC Midpoint							
VPC Outlet	0905	0	0				
Other vapor point ______							

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

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At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature Justin Neste (Printed Name) [signature] (Signature) 12/2/21 (Date)

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

Inspection Date: 12/13/21 Date of last inspection: 12/2/21

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: 0759		Motor Hours: 5250.5
Blower	**Current Value**	**Other Notes**
Vacuum gauge	35 "H2O	~10 gal condensate removed Added oil to blower
Pressure gauge	10 "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: PPBRAE 3000	Details: 0 / 10.0 ppm
Calibration time/ date: 12/13/21 0805	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	0823	4 ppb	0				
SVE-03	0830	101 ppb	115 ppb				
VPC Inlet	0816	80 ppb	74 ppb				
VPC Midpoint							
VPC Outlet	0810	0	0				
Other vapor point ______							

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

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

Signature Justin Neste (Printed Name) [signature] (Signature) 12/13/21 (Date)

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

Inspection Date: 12/20/21 Date of last inspection: 12/13/21

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: 0815		Motor Hours: 54180
Blower	**Current Value**	**Other Notes**
Vacuum gauge	35" H2O	~~1~~0 gal condensate removed Shut system down for Boeing Holiday Break
Pressure gauge	10" H2O	
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: PPB RAE 3000				Details: 0/10.00 PPM			
Calibration time/ date: 12/20/21 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	—						
SVE-02	0835	35 ppb	41 ppb				
SVE-03	0840	232 ppb	202 ppb				
VPC Inlet	0830	193 ppb	191 ppb				
VPC Midpoint							
VPC Outlet	0825	0	0				
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: 1/24/22 Date of last inspection: 12/20/21

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: 0915		Motor Hours: 5418.7
Blower	**Current Value**	**Other Notes**
Vacuum gauge	35" H2O	Start up system after rest period for rebound testing
Pressure gauge	10" H2O	1HR: Out - 0/0 1035; IN - 126/132 ppb 1039; 2 - 30/29 ppb 1042; 3 - 148/160 ppb 1046. 2HR: 1128 OUT - 0/0 ppb; 1132 IN - 121/132 ppb; 1136 2 - 51/53 ppb; 1140 3 - 181/180 ppb
System flow rate	105 SFM	
Blower Temperature	64°F	TO15 samples
Temp.at lag VPC discharge		SVE 3-012422 @ 1143 IL2846; Influent - 012422 @ 1148 IL2875

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

PID Model: PPBRAE 3000	Details: 0 / 10.01 ppm
Calibration time/ date: 1/24/22 0940	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	off						
SVE-02	0955	43 ppb	54 ppb		> 30 SCFM	>5" H2O	
SVE-03	1002	199 ppb	189 ppb		> 30" SCFM	>5" H2O	
VPC Inlet	0947	143 ppb	151 ppb				
VPC Midpoint							
VPC Outlet	0943	0 ppb	0 ppb				
Other vapor point ____							

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

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

Signature Justin Neste (Printed Name) [signature] (Signature) 1/24/21 (Date)

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

Inspection Date: 1/25-22 Date of last inspection: 1/24-22

Periodic systems check:

1) Check flowrate, vacuum, pressure, moisture separator, water storage drums
2) Check each SVE well, VPC inlet, and VPC outlet with PID.

Operational Parameters - Monitoring interval is variable.		
Inspection Time: 1240		Motor Hours: 5445.7
Blower	**Current Value**	**Other Notes**
Vacuum gauge	34" H_2O	TO-15 samples SVE3-012522 1303 1L3073 Inflow .012522 1309 1L1679
Pressure gauge	5" H_2O	
System flow rate	105 SCFM	
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 3000	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	Off						
SVE-02	1253	48 PPB	44 PPB		>30 SCFM	>5" H_2O	
SVE-03	1250	222	236		>30 SCFM	>5 H_2O	
VPC Inlet	1245	149	151				
VPC Midpoint							
VPC Outlet	1248	0	0				
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 Rune Lassen (Printed Name) [signature] (Signature) ____ (Date)

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

Inspection Date: 2/9/22 Date of last inspection: 1/25/22

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: 5801.6
Blower	**Current Value**	**Other Notes**
Vacuum gauge	32"H2O	Sample SVE3 + Influent
Pressure gauge	5"H2O	SVE3-020922 @0904 1L3242
System flow rate	1055 cfm	SVEIN-020922 @ 0916 1L3181
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 3000	Details: 0 / 10.04 ppm
Calibration time/ date: 2/9/22 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	off						
SVE-02	0845	56 ppb	47 ppb				
SVE-03	0855	190 ppb	187 ppb				
VPC Inlet	0850	152 ppb	154 ppb				
VPC Midpoint							
VPC Outlet	0840	0	0				
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 Nes (Printed Name) [signature] (Signature) 2/9/22 (Date)

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

Inspection Date: 2/17/22 Date of last inspection: 2/9/22

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: 1220		Motor Hours: 5997.2
Blower	**Current Value**	**Other Notes**
Vacuum gauge	33" H_2O	1 gallon of condensate
Pressure gauge	5" H_2O	
System flow rate	105 SCFM	
Blower Temperature	104°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: 0.0 / 10.05 PPM			
Calibration time/ date: 2/17/22 1220				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	1287	583	604				
SVE-03	1235	1037	1172				
VPC Inlet	1233	~~125/124~~ 108	~~227~~ 980				
VPC Midpoint	1231	125	127				
VPC Outlet	1229	6	0				
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 Rune Larsen (Printed Name) [signature] (Signature) 2/17/22 (Date)

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

Inspection Date: 3/4/22 Date of last inspection: 2/17/22

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: 0814		Motor Hours: 6353.0
Blower	**Current Value**	**Other Notes**
Vacuum gauge	34" H2O	2gal condensate Changed blower oil
Pressure gauge	5" H2O	
System flow rate	105scfm	
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: PPBRAE 3000	Details: 0 / 10.03 ppm
Calibration time/ date: 3/4/22 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	off						
SVE-02	835	10 ppb	15 ppb				
SVE-03	839	303 ppb	348 ppb				
VPC Inlet	0830	255 ppb	260 ppb				
VPC Midpoint							
VPC Outlet	0825	0	0				
Other vapor point ______							

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

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature Justin Neste [signature] 3/4/22

Printed Name Signature Date

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

Inspection Date: 3/17/22 Date of last inspection: 3/4/22

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: 0842		Motor Hours: 6663.9
Blower	**Current Value**	**Other Notes**
Vacuum gauge	33" H2O	No condensate
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 3000				Details: 0 / 10.02 ppm			
Calibration time/ date: 3/17/22 0842				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	0900	2 ppb	5 ppb				
SVE-03	0905	155 ppb	172 ppb				
VPC Inlet	0915	107 ppb	114 ppb				
VPC Midpoint							
VPC Outlet	0855	0	0				
Other vapor point ______							

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

Questions? Call Justin Neste @ (360) 981-5606

At the Completion of a monitoring event scan monitoring forms and email to Justin Neste: Justin.Neste@calibresys.com

Signature Justin Neste (Printed Name) [signature] (Signature) 3/17/22 (Date)

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

Inspection Date: 4/5/22 Date of last inspection: 3/17/22

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.

Inspection Time: 1151		Operational Parameters - Monitoring interval is variable. Motor Hours: 7122.9
Blower	**Current Value**	**Other Notes**
Vacuum gauge	32" H_2O	added oil
Pressure gauge	5" H_2O	
System flow rate	1055 CFM	
Blower Temperature	111°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: 0/9.99 PPM
Calibration time/ date: 4/5/22 1151	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	1155	0	0				
SVE-03	1200	378 PPb	401 PPb				
VPC Inlet	1205	148 PPb	145 PPb				
VPC Midpoint							
VPC Outlet	1207	0	0				
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 Rune Lassen (Printed Name) [signature] (Signature) 4/5/22 (Date)

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

Inspection Date: 4/27/22 Date of last inspection: 4/15/22

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: 1042		Motor Hours: 7649.5
Blower	**Current Value**	**Other Notes**
Vacuum gauge	32" H_2O	added oil
Pressure gauge	5" H_2O	
System flow rate	105 SCFM	
Blower Temperature	111 °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: 0/10.1 PPM
Calibration time/ date: 4/27/22 1140	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	1045	0 PPb	0 PPb				
SVE-03	1050	341 PPb	147 PPb				
VPC Inlet	1055	1230 PPb	1131 PPb				
VPC Midpoint							
VPC Outlet	1057	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 Rune Lasker (Printed Name) [signature] (Signature) 4/27/22 (Date)

Well Sampling Data Sheet

Date	12/17/2022	Site Location	Renton 172/174
Samplers	RC	Well ID	B172-08
Casing Material	PVC	Constructed Depth	14
Casing Diameter	2"	Condition of Well	good

Field Measurements:

Time	1120
Depth to Water	8.30

Depth Measured From:	
	Top of access port
X	Mark on PVC casing
	Mark of protective casing
	Other

Purging Information:

Pump:		Dedicated		Non-dedicated	X	Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time			Purge End Time			
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged (gal)	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1125	0	13.29	0.200	2.66	6.41	-12	1000
1130	0.5	12.97	0.158	3.01	6.40	-13	440
1135	1.0	13.01	0.154	2.27	6.42	23	35.7
1140	1.5	13.40	0.168	1.25	6.38	39	24.5
1145	2.0	13.83	0.179	0.49	6.37	52	16.0
1150	2.5	14.10	0.184	0.09	6.35	59	10.4
1155	3.0	14.28	0.187	0.0	6.35	66	0.0

Sampling Data:

Time	1157
Vol. Purged (gal)	3.25
Temperature (°C)	14.34
Conductivity (mS/cm)	0.188
D.O. (mg/L)	0.0
pH	6.34
ORP (mV)	68
Turbidity (NTU)	8.0

Sample ID	B172-08-121722
Duplicates	
QA/QC Volumes	

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1	X	Other	

Sampling Notes:

PCE, TCE, cis 1,2-DCE, VC

Clear, no odor

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	2/17/22	Site Location	Renyon 172/174
Samplers	JN	Well ID	B172-C1
Casing Material	PVC	Constructed Depth	14'
Casing Diameter	2"	Condition of Well	Ok

Field Measurements:

Time	1125
Depth to Water	8.65

Depth Measured From:	
	Top of access port
	Mark on PVC casing
	Mark of protective casing
N side of cast	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged (gal)	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1130	0	12.65	0.226	1.92	6.41	2	147
1135	0.5	13.42	0.204	0.97	6.18	-8	45.7
1140	1.0	13.50	0.202	0.86	5.99	-6	11.0
1145	2.0	~~14~~13.45	0.201	0.84	5.96	-5	3.6
1150	3.0	13.40	0.201	0.83	6.01	-7	1.2

Sampling Data:

Time	1152
Vol. Purged (gal)	3.5
Temperature (°C)	13.43
Conductivity (mS/cm)	0.201
D.O. (mg/L)	0.83
pH	6.05
ORP (mV)	-9
Turbidity (NTU)	0.3

Sample ID	B172-C1-021722
Duplicates	
QA/QC Volumes	

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1	X	Other	

Sampling Notes:

PCE, TCE, Cis12DCE, Vinyl Chloride

Clear: no odor

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	12/17/2022	Site Location	Renton, 4-28/29
Samplers	RL	Well ID	GW-2105
Casing Material	PVC	Constructed Depth	
Casing Diameter	2"	Condition of Well	good

Field Measurements:

Time	1005	Depth Measured From:	
Depth to Water	5.38		Top of access port
		X	Mark on PVC casing
			Mark of protective casing
			Other

Purging Information:

Pump:		Dedicated		Non-dedicated	X	Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged (gal)	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1011	0	10.75	0.365	1.14	6.57	-83	625
1017	0.5	11.60	0.320	0.0	6.58	-105	1000
1022	1.0	11.93	0.348	0.0	6.55	-103	1000
1027	1.5	12.29	0.364	0.0	6.54	-100	1000
1032	2.0	12.61	0.381	0.0	6.52	-98	~~1000~~ ~~440~~ 10

Sampling Data:

Time	1035	Sample ID	GW-2105-021722
Vol. Purged (gal)	2.25	Duplicates	
Temperature (°C)	13.38	QA/QC Volumes	
Conductivity (mS/cm)	0.381		
D.O. (mg/L)	0.0		
pH	6.51		
ORP (mV)	-97		
Turbidity (NTU)	20		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump	X	Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1		Other	

Sampling Notes:

very silty first gallon

TCE, cis12DCE, VC, Benzene

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	2 / 17 / 22	Site Location	4-78/79
Samplers	JN	Well ID	B78-16
Casing Material	~3" steel	Constructed Depth	25'
Casing Diameter	case	Condition of Well	ok

Field Measurements:

Time	1010	Depth Measured From:	
Depth to Water	4.68		Top of access port
			Mark on PVC casing
			Mark of protective casing
		Nside of case	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic
Bailer:		PVC		Stainless Steel		Other:
Purge Start Time		Purge End Time				
Approximate Volume Purged						

Water Monitoring Conditions:

Time	Vol. Purged (gal)	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
1015	0	11.70	0.591	2.47	5.84	89	~~999~~
1021	0.5	12.68	0.559	1.22	5.85	14	140
1026	1.0	12.94	0.558	~~2.200~~.82	5.78	-2	135
1031	2.0	13.09	0.555	0.70	5.70	-21	112
1036	3.0	13.14	0.554	0.65	5.89	-33	84.9

Sampling Data:

Time	1041	Sample ID	B78-16-021722
Vol. Purged (gal)	4.0	Duplicates	Dup01-021722
Temperature (°C)	13.14	QA/QC Volumes	;
Conductivity (mS/cm)	0.553		
D.O. (mg/L)	0.57		
pH	5.97		
ORP (mV)	-44		
Turbidity (NTU)	61.3		

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1	X	Other	

Sampling Notes:

TCE, cis12DCE, VC + Benzene

Red particulate, maybe rust from steel case. Slight reducing odor.

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Well Sampling Data Sheet

Date	2 / 17 / 22	Site Location	Demo Hoc [illegible]
Samplers	JN RL	Well ID	~~AO~~ B003-01
Casing Material	PVC	Constructed Depth	10'
Casing Diameter	2"	Condition of Well	OK

Field Measurements:

Time	0900	Depth Measured From:	
Depth to Water	2.17		Top of access port
			Mark on PVC casing
			Mark of protective casing
		N side of case	Other

Purging Information:

Pump:		Dedicated		Non-dedicated		Peristaltic	
Bailer:		PVC		Stainless Steel		Other:	
Purge Start Time			Purge End Time				
Approximate Volume Purged							

Water Monitoring Conditions:

Time	Vol. Purged (gal)	Temperature (°C)	Conductivity (mS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)
0901	0	11.74	1.64	1.81	6.53	-162	530
0906	0.5	11.25	1.18	0.77	6.33	-147	171
0911	1.0	9.06	0.246	4.15 (Bubbles)	6.30	-53	213
0921	1.5	9.54	0.475	1.34	6.18	-72	106
0930	2.5	10.18	1.02	0.33	6.33	-105	118

Sampling Data:

Time	0933	Sample ID	B003-01-021722
Vol. Purged (gal)	2.55	Duplicates	
Temperature (°C)	10.12	QA/QC Volumes	
Conductivity (mS/cm)	1.08		
D.O. (mg/L)	8.07 *	* air bubbles	
pH	6.26		
ORP (mV)	-99		
Turbidity (NTU)	124		

C0093

Sampling Device:

PVC Bailer		SS Bailer		Dedicated Pump		Teflon Bailer	

Analyses to be Performed:

Volatile Organics	X	VOCs 8260	SVOCs by 8270C		Sulfate 375.2	
Total Metals		RCRA 8 or Priority Pollutants	SVOCs by 8270C/SIM		RSK-175 (methane, ethane, ethene)	
Dissolved Metals			Total Organic Carbon 415.1	X	Other	

Sampling Notes:

VC only for VOCs

pumped dry x2

Well Diameter	Well Volume (Gal/ft)
1 inch	0.041
2 inch	0.163
4 inch	0.653
6 inch	1.469

Or:(total depth(ft) - DTW(ft)) x Well Dia^2 x 0.0408 = 1 Well Volume

Attachment B: Laboratory Data Packages

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12/16/2021
Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Renton 5-09
Project #:
Workorder #: 2112107

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 12/3/2021 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: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Monica Tran

Monica Tran
Project Manager

WORK ORDER #: 2112107

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:	12/03/2021	**CONTACT:**	Monica Tran
DATE COMPLETED:	12/16/2021		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SVE IN-120221	TO-15	3.5 "Hg	10 psi
02A	SVE 3-120221	TO-15	2.4 "Hg	10 psi
03A	Lab Blank	TO-15	NA	NA
04A	CCV	TO-15	NA	NA
05A	LCS	TO-15	NA	NA
05AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 12/16/21

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209221, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-21-17, UT NELAP – CA009332021-13, VA NELAP - 10615, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-015, Effective date: 10/18/2021, Expiration date: 10/17/2022.
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

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LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 2112107

Two 1 Liter Summa Canister samples were received on December 03, 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.

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: SVE IN-120221

Lab ID#: 2112107-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.95	1.7	3.8	6.6
Trichloroethene	0.95	3.3	5.1	18
Tetrachloroethene	0.95	39	6.4	260

Client Sample ID: SVE 3-120221

Lab ID#: 2112107-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.92	2.8	3.6	11
Trichloroethene	0.92	5.7	4.9	31
Tetrachloroethene	0.92	70	6.2	480

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Client Sample ID: SVE IN-120221

Lab ID#: 2112107-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121308**	**Date of Collection:**	**12/2/21 09:12:00**
Dil. Factor:	**1.90**	**Date of Analysis:**	**12/13/21 02:59 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.5	Not Detected	20	Not Detected
Vinyl Chloride	0.95	Not Detected	2.4	Not Detected
Freon 113	0.95	Not Detected	7.3	Not Detected
1,1-Dichloroethene	0.95	Not Detected	3.8	Not Detected
Acetone	9.5	Not Detected	22	Not Detected
Carbon Disulfide	3.8	Not Detected	12	Not Detected
Methylene Chloride	9.5	Not Detected	33	Not Detected
trans-1,2-Dichloroethene	0.95	Not Detected	3.8	Not Detected
Hexane	0.95	Not Detected	3.3	Not Detected
1,1-Dichloroethane	0.95	Not Detected	3.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.8	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.95	1.7	3.8	6.6
Chloroform	0.95	Not Detected	4.6	Not Detected
1,1,1-Trichloroethane	0.95	Not Detected	5.2	Not Detected
Benzene	0.95	Not Detected	3.0	Not Detected
Trichloroethene	0.95	3.3	5.1	18
Toluene	0.95	Not Detected	3.6	Not Detected
1,1,2-Trichloroethane	0.95	Not Detected	5.2	Not Detected
Tetrachloroethene	0.95	39	6.4	260
Chlorobenzene	0.95	Not Detected	4.4	Not Detected
Ethyl Benzene	0.95	Not Detected	4.1	Not Detected
m,p-Xylene	0.95	Not Detected	4.1	Not Detected
o-Xylene	0.95	Not Detected	4.1	Not Detected
Styrene	0.95	Not Detected	4.0	Not Detected
Cumene	0.95	Not Detected	4.7	Not Detected
Propylbenzene	0.95	Not Detected	4.7	Not Detected
1,3,5-Trimethylbenzene	0.95	Not Detected	4.7	Not Detected
1,2,4-Trimethylbenzene	0.95	Not Detected	4.7	Not Detected
TPH ref. to Gasoline (MW=100)	95	Not Detected	390	Not Detected
Acetonitrile	9.5	Not Detected	16	Not Detected
Vinyl Acetate	3.8	Not Detected	13	Not Detected
Octane	3.8	Not Detected	18	Not Detected
Pentane	3.8	Not Detected	11	Not Detected
Butylbenzene	3.8	Not Detected	21	Not Detected
Decane	3.8	Not Detected	22	Not Detected
Dodecane	9.5	Not Detected	66	Not Detected
sec-Butylbenzene	3.8	Not Detected	21	Not Detected
p-Cymene	3.8	Not Detected	21	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: SVE IN-120221

Lab ID#: 2112107-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121308**	**Date of Collection: 12/2/21 09:12:00**
Dil. Factor:	**1.90**	**Date of Analysis: 12/13/21 02:59 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: SVE 3-120221

Lab ID#: 2112107-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121309**	**Date of Collection: 12/2/21 09:36:00**
Dil. Factor:	**1.83**	**Date of Analysis: 12/13/21 03:26 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.2	Not Detected	19	Not Detected
Vinyl Chloride	0.92	Not Detected	2.3	Not Detected
Freon 113	0.92	Not Detected	7.0	Not Detected
1,1-Dichloroethene	0.92	Not Detected	3.6	Not Detected
Acetone	9.2	Not Detected	22	Not Detected
Carbon Disulfide	3.7	Not Detected	11	Not Detected
Methylene Chloride	9.2	Not Detected	32	Not Detected
trans-1,2-Dichloroethene	0.92	Not Detected	3.6	Not Detected
Hexane	0.92	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.92	Not Detected	3.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.7	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.92	2.8	3.6	11
Chloroform	0.92	Not Detected	4.5	Not Detected
1,1,1-Trichloroethane	0.92	Not Detected	5.0	Not Detected
Benzene	0.92	Not Detected	2.9	Not Detected
Trichloroethene	0.92	5.7	4.9	31
Toluene	0.92	Not Detected	3.4	Not Detected
1,1,2-Trichloroethane	0.92	Not Detected	5.0	Not Detected
Tetrachloroethene	0.92	70	6.2	480
Chlorobenzene	0.92	Not Detected	4.2	Not Detected
Ethyl Benzene	0.92	Not Detected	4.0	Not Detected
m,p-Xylene	0.92	Not Detected	4.0	Not Detected
o-Xylene	0.92	Not Detected	4.0	Not Detected
Styrene	0.92	Not Detected	3.9	Not Detected
Cumene	0.92	Not Detected	4.5	Not Detected
Propylbenzene	0.92	Not Detected	4.5	Not Detected
1,3,5-Trimethylbenzene	0.92	Not Detected	4.5	Not Detected
1,2,4-Trimethylbenzene	0.92	Not Detected	4.5	Not Detected
TPH ref. to Gasoline (MW=100)	92	Not Detected	370	Not Detected
Acetonitrile	9.2	Not Detected	15	Not Detected
Vinyl Acetate	3.7	Not Detected	13	Not Detected
Octane	3.7	Not Detected	17	Not Detected
Pentane	3.7	Not Detected	11	Not Detected
Butylbenzene	3.7	Not Detected	20	Not Detected
Decane	3.7	Not Detected	21	Not Detected
Dodecane	9.2	Not Detected	64	Not Detected
sec-Butylbenzene	3.7	Not Detected	20	Not Detected
p-Cymene	3.7	Not Detected	20	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: SVE 3-120221

Lab ID#: 2112107-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121309**	**Date of Collection: 12/2/21 09:36:00**
Dil. Factor:	**1.83**	**Date of Analysis: 12/13/21 03:26 PM**

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: Lab Blank

Lab ID#: 2112107-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121307a**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/13/21 12:30 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

Client Sample ID: Lab Blank

Lab ID#: 2112107-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121307a**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/13/21 12:30 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: CCV
Lab ID#: 2112107-04A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121302**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/13/21 09:38 AM**

Compound	%Recovery
Chloromethane	89
Vinyl Chloride	94
Freon 113	92
1,1-Dichloroethene	95
Acetone	97
Carbon Disulfide	94
Methylene Chloride	97
trans-1,2-Dichloroethene	92
Hexane	96
1,1-Dichloroethane	95
2-Butanone (Methyl Ethyl Ketone)	97
cis-1,2-Dichloroethene	98
Chloroform	97
1,1,1-Trichloroethane	93
Benzene	92
Trichloroethene	95
Toluene	94
1,1,2-Trichloroethane	92
Tetrachloroethene	93
Chlorobenzene	96
Ethyl Benzene	101
m,p-Xylene	101
o-Xylene	101
Styrene	102
Cumene	99
Propylbenzene	96
1,3,5-Trimethylbenzene	96
1,2,4-Trimethylbenzene	98
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	95
Vinyl Acetate	104
Octane	94
Pentane	96
Butylbenzene	97
Decane	97
Dodecane	92
sec-Butylbenzene	99
p-Cymene	99

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

Client Sample ID: CCV

Lab ID#: 2112107-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121302**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/13/21 09:38 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCS

Lab ID#: 2112107-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121303**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/13/21 10:03 AM**

Compound	%Recovery	Method Limits
Chloromethane	89	70-130
Vinyl Chloride	91	70-130
Freon 113	91	70-130
1,1-Dichloroethene	94	70-130
Acetone	96	70-130
Carbon Disulfide	94	70-130
Methylene Chloride	93	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	94	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	93	70-130
cis-1,2-Dichloroethene	97	70-130
Chloroform	93	70-130
1,1,1-Trichloroethane	93	70-130
Benzene	94	70-130
Trichloroethene	95	70-130
Toluene	93	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	92	70-130
Chlorobenzene	93	70-130
Ethyl Benzene	100	70-130
m,p-Xylene	98	70-130
o-Xylene	96	70-130
Styrene	99	70-130
Cumene	96	70-130
Propylbenzene	96	70-130
1,3,5-Trimethylbenzene	93	70-130
1,2,4-Trimethylbenzene	97	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

Client Sample ID: LCS

Lab ID#: 2112107-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121303**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/13/21 10:03 AM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 2112107-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/13/21 10:29 AM**	

Compound	%Recovery	Method Limits
Chloromethane	89	70-130
Vinyl Chloride	89	70-130
Freon 113	92	70-130
1,1-Dichloroethene	95	70-130
Acetone	96	70-130
Carbon Disulfide	97	70-130
Methylene Chloride	95	70-130
trans-1,2-Dichloroethene	97	70-130
Hexane	94	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	95	70-130
cis-1,2-Dichloroethene	100	70-130
Chloroform	95	70-130
1,1,1-Trichloroethane	95	70-130
Benzene	93	70-130
Trichloroethene	95	70-130
Toluene	93	70-130
1,1,2-Trichloroethane	96	70-130
Tetrachloroethene	93	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	102	70-130
m,p-Xylene	99	70-130
o-Xylene	100	70-130
Styrene	101	70-130
Cumene	98	70-130
Propylbenzene	97	70-130
1,3,5-Trimethylbenzene	95	70-130
1,2,4-Trimethylbenzene	99	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	122	60-140
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

Client Sample ID: LCSD

Lab ID#: 2112107-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a121304**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/13/21 10:29 AM**

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	100	70-130

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2/8/2022
Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Renton 5-09
Project #:
Workorder #: 2201681

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 1/26/2022 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: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Monica Tran

Monica Tran
Project Manager

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WORK ORDER #: 2201681

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:	01/26/2022	**CONTACT:**	Monica Tran
DATE COMPLETED:	02/08/2022		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SVE3-012422	TO-15	1.2 "Hg	10 psi
02A	Influent-012422	TO-15	0.3 psi	9.7 psi
03A	Inflow-012522	TO-15	3.7 "Hg	9.7 psi
04A	SVE3-012522	TO-15	4.3 "Hg	9.6 psi
05A	Lab Blank	TO-15	NA	NA
06A	CCV	TO-15	NA	NA
07A	LCS	TO-15	NA	NA
07AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes (signature) DATE: 02/08/22

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209221, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-21-17, UT NELAP – CA009332021-13, VA NELAP - 10615, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-015, Effective date: 10/18/2021, Expiration date: 10/17/2022.
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# 2201681

Four 1 Liter Summa Canister samples were received on January 26, 2022. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

Receiving Notes

The Chain of Custody (COC) information for sample SVE3-012422 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Analytical Notes

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SVE3-012422

Lab ID#: 2201681-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.88	2.8	3.5	11
1,1,1-Trichloroethane	0.88	3.1	4.8	17
Trichloroethene	0.88	8.9	4.7	48
Tetrachloroethene	0.88	110	5.9	740

Client Sample ID: Influent-012422

Lab ID#: 2201681-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.82	1.6	3.2	6.5
1,1,1-Trichloroethane	0.82	1.6	4.4	8.7
Trichloroethene	0.82	4.9	4.4	26
Tetrachloroethene	0.82	58	5.5	400

Client Sample ID: Inflow-012522

Lab ID#: 2201681-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.94	2.2	3.7	8.6
1,1,1-Trichloroethane	0.94	1.2	5.2	6.3
Trichloroethene	0.94	5.1	5.1	27
Tetrachloroethene	0.94	71	6.4	480

Client Sample ID: SVE3-012522

Lab ID#: 2201681-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.96	3.2	3.8	13
1,1,1-Trichloroethane	0.96	2.0	5.3	11
Trichloroethene	0.96	7.7	5.2	41
Tetrachloroethene	0.96	120	6.5	810

Client Sample ID: SVE3-012422

Lab ID#: 2201681-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020711**	**Date of Collection:**	**1/24/22 11:44:00 AM**
Dil. Factor:	**1.75**	**Date of Analysis:**	**2/7/22 04:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	8.8	Not Detected	18	Not Detected
Vinyl Chloride	0.88	Not Detected	2.2	Not Detected
Freon 113	0.88	Not Detected	6.7	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Acetone	8.8	Not Detected	21	Not Detected
Carbon Disulfide	3.5	Not Detected	11	Not Detected
Methylene Chloride	8.8	Not Detected	30	Not Detected
trans-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Hexane	0.88	Not Detected	3.1	Not Detected
1,1-Dichloroethane	0.88	Not Detected	3.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.5	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	0.88	2.8	3.5	11
Chloroform	0.88	Not Detected	4.3	Not Detected
1,1,1-Trichloroethane	0.88	3.1	4.8	17
Benzene	0.88	Not Detected	2.8	Not Detected
Trichloroethene	0.88	8.9	4.7	48
Toluene	0.88	Not Detected	3.3	Not Detected
1,1,2-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Tetrachloroethene	0.88	110	5.9	740
Chlorobenzene	0.88	Not Detected	4.0	Not Detected
Ethyl Benzene	0.88	Not Detected	3.8	Not Detected
m,p-Xylene	0.88	Not Detected	3.8	Not Detected
o-Xylene	0.88	Not Detected	3.8	Not Detected
Styrene	0.88	Not Detected	3.7	Not Detected
Cumene	0.88	Not Detected	4.3	Not Detected
Propylbenzene	0.88	Not Detected	4.3	Not Detected
1,3,5-Trimethylbenzene	0.88	Not Detected	4.3	Not Detected
1,2,4-Trimethylbenzene	0.88	Not Detected	4.3	Not Detected
TPH ref. to Gasoline (MW=100)	88	Not Detected	360	Not Detected
Acetonitrile	8.8	Not Detected	15	Not Detected
Vinyl Acetate	3.5	Not Detected	12	Not Detected
Octane	3.5	Not Detected	16	Not Detected
Pentane	3.5	Not Detected	10	Not Detected
Butylbenzene	3.5	Not Detected	19	Not Detected
Decane	3.5	Not Detected	20	Not Detected
Dodecane	8.8	Not Detected	61	Not Detected
sec-Butylbenzene	3.5	Not Detected	19	Not Detected
p-Cymene	3.5	Not Detected	19	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: SVE3-012422

Lab ID#: 2201681-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020711**	**Date of Collection: 1/24/22 11:44:00 AM**
Dil. Factor:	**1.75**	**Date of Analysis: 2/7/22 04:54 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: Influent-012422

Lab ID#: 2201681-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020712**	**Date of Collection: 1/24/22 11:49:00 AM**
Dil. Factor:	**1.63**	**Date of Analysis: 2/7/22 05:23 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	8.2	Not Detected	17	Not Detected
Vinyl Chloride	0.82	Not Detected	2.1	Not Detected
Freon 113	0.82	Not Detected	6.2	Not Detected
1,1-Dichloroethene	0.82	Not Detected	3.2	Not Detected
Acetone	8.2	Not Detected	19	Not Detected
Carbon Disulfide	3.3	Not Detected	10	Not Detected
Methylene Chloride	8.2	Not Detected	28	Not Detected
trans-1,2-Dichloroethene	0.82	Not Detected	3.2	Not Detected
Hexane	0.82	Not Detected	2.9	Not Detected
1,1-Dichloroethane	0.82	Not Detected	3.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.3	Not Detected	9.6	Not Detected
cis-1,2-Dichloroethene	0.82	1.6	3.2	6.5
Chloroform	0.82	Not Detected	4.0	Not Detected
1,1,1-Trichloroethane	0.82	1.6	4.4	8.7
Benzene	0.82	Not Detected	2.6	Not Detected
Trichloroethene	0.82	4.9	4.4	26
Toluene	0.82	Not Detected	3.1	Not Detected
1,1,2-Trichloroethane	0.82	Not Detected	4.4	Not Detected
Tetrachloroethene	0.82	58	5.5	400
Chlorobenzene	0.82	Not Detected	3.8	Not Detected
Ethyl Benzene	0.82	Not Detected	3.5	Not Detected
m,p-Xylene	0.82	Not Detected	3.5	Not Detected
o-Xylene	0.82	Not Detected	3.5	Not Detected
Styrene	0.82	Not Detected	3.5	Not Detected
Cumene	0.82	Not Detected	4.0	Not Detected
Propylbenzene	0.82	Not Detected	4.0	Not Detected
1,3,5-Trimethylbenzene	0.82	Not Detected	4.0	Not Detected
1,2,4-Trimethylbenzene	0.82	Not Detected	4.0	Not Detected
TPH ref. to Gasoline (MW=100)	82	Not Detected	330	Not Detected
Acetonitrile	8.2	Not Detected	14	Not Detected
Vinyl Acetate	3.3	Not Detected	11	Not Detected
Octane	3.3	Not Detected	15	Not Detected
Pentane	3.3	Not Detected	9.6	Not Detected
Butylbenzene	3.3	Not Detected	18	Not Detected
Decane	3.3	Not Detected	19	Not Detected
Dodecane	8.2	Not Detected	57	Not Detected
sec-Butylbenzene	3.3	Not Detected	18	Not Detected
p-Cymene	3.3	Not Detected	18	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

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Client Sample ID: Influent-012422

Lab ID#: 2201681-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020712**	**Date of Collection: 1/24/22 11:49:00 AM**
Dil. Factor:	**1.63**	**Date of Analysis: 2/7/22 05:23 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: Inflow-012522

Lab ID#: 2201681-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020713**	**Date of Collection:**	**1/25/22 1:04:00 PM**
Dil. Factor:	**1.89**	**Date of Analysis:**	**2/7/22 05:53 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.4	Not Detected	20	Not Detected
Vinyl Chloride	0.94	Not Detected	2.4	Not Detected
Freon 113	0.94	Not Detected	7.2	Not Detected
1,1-Dichloroethene	0.94	Not Detected	3.7	Not Detected
Acetone	9.4	Not Detected	22	Not Detected
Carbon Disulfide	3.8	Not Detected	12	Not Detected
Methylene Chloride	9.4	Not Detected	33	Not Detected
trans-1,2-Dichloroethene	0.94	Not Detected	3.7	Not Detected
Hexane	0.94	Not Detected	3.3	Not Detected
1,1-Dichloroethane	0.94	Not Detected	3.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.8	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.94	2.2	3.7	8.6
Chloroform	0.94	Not Detected	4.6	Not Detected
1,1,1-Trichloroethane	0.94	1.2	5.2	6.3
Benzene	0.94	Not Detected	3.0	Not Detected
Trichloroethene	0.94	5.1	5.1	27
Toluene	0.94	Not Detected	3.6	Not Detected
1,1,2-Trichloroethane	0.94	Not Detected	5.2	Not Detected
Tetrachloroethene	0.94	71	6.4	480
Chlorobenzene	0.94	Not Detected	4.4	Not Detected
Ethyl Benzene	0.94	Not Detected	4.1	Not Detected
m,p-Xylene	0.94	Not Detected	4.1	Not Detected
o-Xylene	0.94	Not Detected	4.1	Not Detected
Styrene	0.94	Not Detected	4.0	Not Detected
Cumene	0.94	Not Detected	4.6	Not Detected
Propylbenzene	0.94	Not Detected	4.6	Not Detected
1,3,5-Trimethylbenzene	0.94	Not Detected	4.6	Not Detected
1,2,4-Trimethylbenzene	0.94	Not Detected	4.6	Not Detected
TPH ref. to Gasoline (MW=100)	94	Not Detected	390	Not Detected
Acetonitrile	9.4	Not Detected	16	Not Detected
Vinyl Acetate	3.8	Not Detected	13	Not Detected
Octane	3.8	Not Detected	18	Not Detected
Pentane	3.8	Not Detected	11	Not Detected
Butylbenzene	3.8	Not Detected	21	Not Detected
Decane	3.8	Not Detected	22	Not Detected
Dodecane	9.4	Not Detected	66	Not Detected
sec-Butylbenzene	3.8	Not Detected	21	Not Detected
p-Cymene	3.8	Not Detected	21	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: Inflow-012522

Lab ID#: 2201681-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020713**	**Date of Collection: 1/25/22 1:04:00 PM**
Dil. Factor:	**1.89**	**Date of Analysis: 2/7/22 05:53 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	109	70-130

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Client Sample ID: SVE3-012522
Lab ID#: 2201681-04A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020714**	**Date of Collection:**	**1/25/22 1:10:00 PM**
Dil. Factor:	**1.93**	**Date of Analysis:**	**2/7/22 06:22 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.6	Not Detected	20	Not Detected
Vinyl Chloride	0.96	Not Detected	2.5	Not Detected
Freon 113	0.96	Not Detected	7.4	Not Detected
1,1-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Acetone	9.6	Not Detected	23	Not Detected
Carbon Disulfide	3.9	Not Detected	12	Not Detected
Methylene Chloride	9.6	Not Detected	34	Not Detected
trans-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Hexane	0.96	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.96	Not Detected	3.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.9	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.96	3.2	3.8	13
Chloroform	0.96	Not Detected	4.7	Not Detected
1,1,1-Trichloroethane	0.96	2.0	5.3	11
Benzene	0.96	Not Detected	3.1	Not Detected
Trichloroethene	0.96	7.7	5.2	41
Toluene	0.96	Not Detected	3.6	Not Detected
1,1,2-Trichloroethane	0.96	Not Detected	5.3	Not Detected
Tetrachloroethene	0.96	120	6.5	810
Chlorobenzene	0.96	Not Detected	4.4	Not Detected
Ethyl Benzene	0.96	Not Detected	4.2	Not Detected
m,p-Xylene	0.96	Not Detected	4.2	Not Detected
o-Xylene	0.96	Not Detected	4.2	Not Detected
Styrene	0.96	Not Detected	4.1	Not Detected
Cumene	0.96	Not Detected	4.7	Not Detected
Propylbenzene	0.96	Not Detected	4.7	Not Detected
1,3,5-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,2,4-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
TPH ref. to Gasoline (MW=100)	96	Not Detected	390	Not Detected
Acetonitrile	9.6	Not Detected	16	Not Detected
Vinyl Acetate	3.9	Not Detected	14	Not Detected
Octane	3.9	Not Detected	18	Not Detected
Pentane	3.9	Not Detected	11	Not Detected
Butylbenzene	3.9	Not Detected	21	Not Detected
Decane	3.9	Not Detected	22	Not Detected
Dodecane	9.6	Not Detected	67	Not Detected
sec-Butylbenzene	3.9	Not Detected	21	Not Detected
p-Cymene	3.9	Not Detected	21	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: SVE3-012522

Lab ID#: 2201681-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020714**	**Date of Collection:**	**1/25/22 1:10:00 PM**
Dil. Factor:	**1.93**	**Date of Analysis:**	**2/7/22 06:22 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	109	70-130

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Client Sample ID: Lab Blank

Lab ID#: 2201681-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020706d**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/7/22 01:09 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

Client Sample ID: Lab Blank

Lab ID#: 2201681-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020706d**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/7/22 01:09 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	109	70-130

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Client Sample ID: CCV

Lab ID#: 2201681-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020702**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/7/22 10:20 AM**

Compound	%Recovery
Chloromethane	94
Vinyl Chloride	80
Freon 113	99
1,1-Dichloroethene	86
Acetone	79
Carbon Disulfide	82
Methylene Chloride	80
trans-1,2-Dichloroethene	85
Hexane	79
1,1-Dichloroethane	86
2-Butanone (Methyl Ethyl Ketone)	87
cis-1,2-Dichloroethene	88
Chloroform	103
1,1,1-Trichloroethane	102
Benzene	92
Trichloroethene	102
Toluene	101
1,1,2-Trichloroethane	109
Tetrachloroethene	120
Chlorobenzene	106
Ethyl Benzene	99
m,p-Xylene	97
o-Xylene	95
Styrene	96
Cumene	99
Propylbenzene	102
1,3,5-Trimethylbenzene	101
1,2,4-Trimethylbenzene	101
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	72
Vinyl Acetate	84
Octane	95
Pentane	78
Butylbenzene	100
Decane	92
Dodecane	63
sec-Butylbenzene	103
p-Cymene	103

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

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Client Sample ID: CCV

Lab ID#: 2201681-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/7/22 10:20 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: LCS

Lab ID#: 2201681-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020703**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/7/22 10:48 AM**

Compound	%Recovery	Method Limits
Chloromethane	100	70-130
Vinyl Chloride	83	70-130
Freon 113	104	70-130
1,1-Dichloroethene	90	70-130
Acetone	88	70-130
Carbon Disulfide	94	70-130
Methylene Chloride	90	70-130
trans-1,2-Dichloroethene	94	70-130
Hexane	85	70-130
1,1-Dichloroethane	93	70-130
2-Butanone (Methyl Ethyl Ketone)	86	70-130
cis-1,2-Dichloroethene	88	70-130
Chloroform	101	70-130
1,1,1-Trichloroethane	108	70-130
Benzene	94	70-130
Trichloroethene	104	70-130
Toluene	99	70-130
1,1,2-Trichloroethane	107	70-130
Tetrachloroethene	116	70-130
Chlorobenzene	105	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	98	70-130
o-Xylene	98	70-130
Styrene	100	70-130
Cumene	103	70-130
Propylbenzene	111	70-130
1,3,5-Trimethylbenzene	114	70-130
1,2,4-Trimethylbenzene	114	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	105	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#: 2201681-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020703**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/7/22 10:48 AM**

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	114	70-130

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Client Sample ID: LCSD

Lab ID#: 2201681-07AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020704**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/7/22 11:16 AM**

Compound	%Recovery	Method Limits
Chloromethane	91	70-130
Vinyl Chloride	76	70-130
Freon 113	98	70-130
1,1-Dichloroethene	85	70-130
Acetone	79	70-130
Carbon Disulfide	87	70-130
Methylene Chloride	87	70-130
trans-1,2-Dichloroethene	91	70-130
Hexane	86	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	87	70-130
cis-1,2-Dichloroethene	89	70-130
Chloroform	99	70-130
1,1,1-Trichloroethane	106	70-130
Benzene	96	70-130
Trichloroethene	104	70-130
Toluene	99	70-130
1,1,2-Trichloroethane	107	70-130
Tetrachloroethene	116	70-130
Chlorobenzene	104	70-130
Ethyl Benzene	99	70-130
m,p-Xylene	100	70-130
o-Xylene	98	70-130
Styrene	100	70-130
Cumene	102	70-130
Propylbenzene	104	70-130
1,3,5-Trimethylbenzene	106	70-130
1,2,4-Trimethylbenzene	106	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	
Vinyl Acetate	108	60-140
Octane	Not Spiked	
Pentane	Not Spiked	
Butylbenzene	Not Spiked	
Decane	Not Spiked	
Dodecane	Not Spiked	
sec-Butylbenzene	Not Spiked	
p-Cymene	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

Client Sample ID: LCSD

Lab ID#: 2201681-07AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/7/22 11:16 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	112	70-130

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2/24/2022
Mr. Justin Neste
CALIBRE, Environmental Technology Solutions
20926 Pugh Rd NE

Poulsbo WA 98370

Project Name: Renton 5-09
Project #:
Workorder #: 2202294

Dear Mr. Justin Neste

The following report includes the data for the above referenced project for sample(s) received on 2/11/2022 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: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Monica Tran

Monica Tran
Project Manager

WORK ORDER #: 2202294

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:	02/11/2022	**CONTACT:**	Monica Tran
DATE COMPLETED:	02/24/2022		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SVE3-020922	TO-15	3.9 "Hg	10 psi
02A	SVEIN-020922	TO-15	2.6 "Hg	10 psi
03A	Lab Blank	TO-15	NA	NA
04A	CCV	TO-15	NA	NA
05A	LCS	TO-15	NA	NA
05AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 02/24/22

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209221, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-21-17, UT NELAP – CA009332021-13, VA NELAP - 10615, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-015, Effective date: 10/18/2021, Expiration date: 10/17/2022.
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

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LABORATORY NARRATIVE
EPA Method TO-15
CALIBRE, Environmental Technology Solutions
Workorder# 2202294

Two 1 Liter Summa Canister samples were received on February 11, 2022. 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.

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: SVE3-020922

Lab ID#: 2202294-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.96	1.8	3.8	7.3
Chloroform	0.96	1.5	4.7	7.4
Trichloroethene	0.96	4.5	5.2	24
Tetrachloroethene	0.96	68	6.5	460

Client Sample ID: SVEIN-020922

Lab ID#: 2202294-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	9.2	9.6	22	23
cis-1,2-Dichloroethene	0.92	1.0	3.6	4.0
Trichloroethene	0.92	2.7	4.9	14
Tetrachloroethene	0.92	38	6.2	260

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Client Sample ID: SVE3-020922

Lab ID#: 2202294-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021715**	**Date of Collection:**	**2/9/22 9:05:00 AM**
Dil. Factor:	**1.93**	**Date of Analysis:**	**2/17/22 11:24 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.6	Not Detected	20	Not Detected
Vinyl Chloride	0.96	Not Detected	2.5	Not Detected
Freon 113	0.96	Not Detected	7.4	Not Detected
1,1-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Acetone	9.6	Not Detected	23	Not Detected
Carbon Disulfide	3.9	Not Detected	12	Not Detected
Methylene Chloride	9.6	Not Detected	34	Not Detected
trans-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Hexane	0.96	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.96	Not Detected	3.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.9	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.96	1.8	3.8	7.3
Chloroform	0.96	1.5	4.7	7.4
1,1,1-Trichloroethane	0.96	Not Detected	5.3	Not Detected
Benzene	0.96	Not Detected	3.1	Not Detected
Trichloroethene	0.96	4.5	5.2	24
Toluene	0.96	Not Detected	3.6	Not Detected
1,1,2-Trichloroethane	0.96	Not Detected	5.3	Not Detected
Tetrachloroethene	0.96	68	6.5	460
Chlorobenzene	0.96	Not Detected	4.4	Not Detected
Ethyl Benzene	0.96	Not Detected	4.2	Not Detected
m,p-Xylene	0.96	Not Detected	4.2	Not Detected
o-Xylene	0.96	Not Detected	4.2	Not Detected
Styrene	0.96	Not Detected	4.1	Not Detected
Cumene	0.96	Not Detected	4.7	Not Detected
Propylbenzene	0.96	Not Detected	4.7	Not Detected
1,3,5-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,2,4-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
TPH ref. to Gasoline (MW=100)	96	Not Detected	390	Not Detected
Acetonitrile	9.6	Not Detected	16	Not Detected
Vinyl Acetate	3.9	Not Detected	14	Not Detected
Octane	3.9	Not Detected	18	Not Detected
Pentane	3.9	Not Detected	11	Not Detected
Butylbenzene	3.9	Not Detected	21	Not Detected
Decane	3.9	Not Detected	22	Not Detected
Dodecane	9.6	Not Detected	67	Not Detected
sec-Butylbenzene	3.9	Not Detected	21	Not Detected
p-Cymene	3.9	Not Detected	21	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

Client Sample ID: SVE3-020922

Lab ID#: 2202294-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021715**	**Date of Collection: 2/9/22 9:05:00 AM**
Dil. Factor:	**1.93**	**Date of Analysis: 2/17/22 11:24 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: SVEIN-020922

Lab ID#: 2202294-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021716**	**Date of Collection:**	**2/9/22 9:17:00 AM**
Dil. Factor:	**1.84**	**Date of Analysis:**	**2/17/22 11:53 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloromethane	9.2	Not Detected	19	Not Detected
Vinyl Chloride	0.92	Not Detected	2.4	Not Detected
Freon 113	0.92	Not Detected	7.0	Not Detected
1,1-Dichloroethene	0.92	Not Detected	3.6	Not Detected
Acetone	9.2	9.6	22	23
Carbon Disulfide	3.7	Not Detected	11	Not Detected
Methylene Chloride	9.2	Not Detected	32	Not Detected
trans-1,2-Dichloroethene	0.92	Not Detected	3.6	Not Detected
Hexane	0.92	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.92	Not Detected	3.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.7	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.92	1.0	3.6	4.0
Chloroform	0.92	Not Detected	4.5	Not Detected
1,1,1-Trichloroethane	0.92	Not Detected	5.0	Not Detected
Benzene	0.92	Not Detected	2.9	Not Detected
Trichloroethene	0.92	2.7	4.9	14
Toluene	0.92	Not Detected	3.5	Not Detected
1,1,2-Trichloroethane	0.92	Not Detected	5.0	Not Detected
Tetrachloroethene	0.92	38	6.2	260
Chlorobenzene	0.92	Not Detected	4.2	Not Detected
Ethyl Benzene	0.92	Not Detected	4.0	Not Detected
m,p-Xylene	0.92	Not Detected	4.0	Not Detected
o-Xylene	0.92	Not Detected	4.0	Not Detected
Styrene	0.92	Not Detected	3.9	Not Detected
Cumene	0.92	Not Detected	4.5	Not Detected
Propylbenzene	0.92	Not Detected	4.5	Not Detected
1,3,5-Trimethylbenzene	0.92	Not Detected	4.5	Not Detected
1,2,4-Trimethylbenzene	0.92	Not Detected	4.5	Not Detected
TPH ref. to Gasoline (MW=100)	92	Not Detected	380	Not Detected
Acetonitrile	9.2	Not Detected	15	Not Detected
Vinyl Acetate	3.7	Not Detected	13	Not Detected
Octane	3.7	Not Detected	17	Not Detected
Pentane	3.7	Not Detected	11	Not Detected
Butylbenzene	3.7	Not Detected	20	Not Detected
Decane	3.7	Not Detected	21	Not Detected
Dodecane	9.2	Not Detected	64	Not Detected
sec-Butylbenzene	3.7	Not Detected	20	Not Detected
p-Cymene	3.7	Not Detected	20	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: SVEIN-020922

Lab ID#: 2202294-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021716**	**Date of Collection:**	**2/9/22 9:17:00 AM**
Dil. Factor:	**1.84**	**Date of Analysis:**	**2/17/22 11:53 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	108	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2202294-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021707f**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/17/22 04:00 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

Client Sample ID: Lab Blank

Lab ID#: 2202294-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021707f**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/17/22 04:00 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	108	70-130

Client Sample ID: CCV

Lab ID#: 2202294-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3021702	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 2/17/22 12:33 PM

Compound	%Recovery
Chloromethane	93
Vinyl Chloride	89
Freon 113	106
1,1-Dichloroethene	90
Acetone	93
Carbon Disulfide	91
Methylene Chloride	107
trans-1,2-Dichloroethene	88
Hexane	95
1,1-Dichloroethane	96
2-Butanone (Methyl Ethyl Ketone)	93
cis-1,2-Dichloroethene	89
Chloroform	96
1,1,1-Trichloroethane	101
Benzene	96
Trichloroethene	102
Toluene	99
1,1,2-Trichloroethane	96
Tetrachloroethene	112
Chlorobenzene	99
Ethyl Benzene	101
m,p-Xylene	101
o-Xylene	100
Styrene	99
Cumene	100
Propylbenzene	103
1,3,5-Trimethylbenzene	102
1,2,4-Trimethylbenzene	95
TPH ref. to Gasoline (MW=100)	100
Acetonitrile	100
Vinyl Acetate	99
Octane	96
Pentane	99
Butylbenzene	98
Decane	101
Dodecane	93
sec-Butylbenzene	96
p-Cymene	91

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 2202294-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/17/22 12:33 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	109	70-130

Client Sample ID: LCS

Lab ID#: 2202294-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/17/22 01:00 PM**	

Compound	%Recovery	Method Limits
Chloromethane	95	70-130
Vinyl Chloride	92	70-130
Freon 113	103	70-130
1,1-Dichloroethene	87	70-130
Acetone	94	70-130
Carbon Disulfide	91	70-130
Methylene Chloride	102	70-130
trans-1,2-Dichloroethene	87	70-130
Hexane	94	70-130
1,1-Dichloroethane	94	70-130
2-Butanone (Methyl Ethyl Ketone)	92	70-130
cis-1,2-Dichloroethene	86	70-130
Chloroform	94	70-130
1,1,1-Trichloroethane	99	70-130
Benzene	97	70-130
Trichloroethene	103	70-130
Toluene	99	70-130
1,1,2-Trichloroethane	99	70-130
Tetrachloroethene	112	70-130
Chlorobenzene	100	70-130
Ethyl Benzene	103	70-130
m,p-Xylene	102	70-130
o-Xylene	100	70-130
Styrene	98	70-130
Cumene	101	70-130
Propylbenzene	103	70-130
1,3,5-Trimethylbenzene	101	70-130
1,2,4-Trimethylbenzene	96	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	70-130
Vinyl Acetate	Not Spiked	70-130
Octane	Not Spiked	70-130
Pentane	Not Spiked	70-130
Butylbenzene	Not Spiked	70-130
Decane	Not Spiked	70-130
Dodecane	Not Spiked	70-130
sec-Butylbenzene	Not Spiked	70-130
p-Cymene	Not Spiked	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

Client Sample ID: LCS

Lab ID#: 2202294-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021703**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/17/22 01:00 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	108	70-130

Client Sample ID: LCSD

Lab ID#: 2202294-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021704**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/17/22 01:27 PM**

Compound	%Recovery	Method Limits
Chloromethane	94	70-130
Vinyl Chloride	90	70-130
Freon 113	102	70-130
1,1-Dichloroethene	87	70-130
Acetone	94	70-130
Carbon Disulfide	90	70-130
Methylene Chloride	102	70-130
trans-1,2-Dichloroethene	88	70-130
Hexane	92	70-130
1,1-Dichloroethane	94	70-130
2-Butanone (Methyl Ethyl Ketone)	94	70-130
cis-1,2-Dichloroethene	86	70-130
Chloroform	94	70-130
1,1,1-Trichloroethane	97	70-130
Benzene	96	70-130
Trichloroethene	102	70-130
Toluene	98	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	112	70-130
Chlorobenzene	100	70-130
Ethyl Benzene	103	70-130
m,p-Xylene	101	70-130
o-Xylene	99	70-130
Styrene	98	70-130
Cumene	100	70-130
Propylbenzene	101	70-130
1,3,5-Trimethylbenzene	101	70-130
1,2,4-Trimethylbenzene	95	70-130
TPH ref. to Gasoline (MW=100)	Not Spiked	
Acetonitrile	Not Spiked	70-130
Vinyl Acetate	Not Spiked	70-130
Octane	Not Spiked	70-130
Pentane	Not Spiked	70-130
Butylbenzene	Not Spiked	70-130
Decane	Not Spiked	70-130
Dodecane	Not Spiked	70-130
sec-Butylbenzene	Not Spiked	70-130
p-Cymene	Not Spiked	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits

Client Sample ID: LCSD

Lab ID#: 2202294-05AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3021704**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 2/17/22 01:27 PM**

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	108	70-130

Analytical Resources, LLC
Analytical Chemists and Consultants

29 March 2022

Nick Garson
The Boeing Company
PO Box 3707 M/S 1W-12
Seattle, WA 98124

RE: Boeing Renton Regional GW Building 4-78/79 (Boeing Renton Regional GW Building 4-78/79)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
22B0253	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Kelly Bottem, Client Services Manager

Cert# 100006-012

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, LLC
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: 22B0253	Turn-around Requested: Standard	Page: 1	of 1
ARI Client Company: Boeing	Phone: 425-269-7866	Date: 2/17/22	Ice Present? Y
Client Contact: Nick Garson		No. of Coolers: 1	Cooler Temps: 2.6
Client Project Name: Renton			
Client Project #:	Samplers: R Lassen J Noble		

Sample ID	Date	Time	Matrix	No. Containers	VOCs	TOC	Nitrate/Nitrite Sulfate						Notes/Comments
B003-01-021722	2/17/22	0933	GW	4	X	X							VC only
GW210S-021722		1035		4	X		X						TCE, cis12DCE, VC Benzene
B318-16-021722		1041		4	X	X							TCE, cis12DCE, VC Benzene
Dup01-021722		0800		3	X								TCE cis12DCE, VC Benzene
B172-08-021722		1157		4	X	X							PCE, TCE, cis12DCE VC
B172-01-021722		1152		4	X	X							PCE, TCE, cis12DCE VC
Trip Blank	2/17/22		Aq	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
CC Tom Mckeon Jennifer Parson	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Rune Lassen	Printed Name: Raven Barbera	Printed Name:	Printed Name:
	Company: Calibre	Company: ARI	Company:	Company:
	Date & Time: 2/17/22 1320	Date & Time: 2/17/22 1320	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B003-01-021722	22B0253-01	Water	17-Feb-2022 09:33	17-Feb-2022 13:20
GW2105-021722	22B0253-02	Water	17-Feb-2022 10:35	17-Feb-2022 13:20
B78-16-021722	22B0253-03	Water	17-Feb-2022 10:41	17-Feb-2022 13:20
Dup01-021722	22B0253-04	Water	17-Feb-2022 08:00	17-Feb-2022 13:20
B172-08-021722	22B0253-05	Water	17-Feb-2022 11:57	17-Feb-2022 13:20
B172-01-021722	22B0253-06	Water	17-Feb-2022 11:52	17-Feb-2022 13:20
TripBlank	22B0253-07	Water	17-Feb-2022 09:33	17-Feb-2022 13:20

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Work Order Case Narrative

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times with the exception of sample 22B0253-02 for nitrate and nitrite. The sample was originally analyzed within hold and due to a autosampler malfunction the closing CCV did not inject. The sample was re-analyzed out of hold and both sets of data have been reported.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Samples were subcontracted for TOC due to instrument failure.

Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 2/17/2022 3:27:25PM

WORK ORDER

22B0253

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: The Boeing Company **Project Manager: Kelly Bottem**

Project: Boeing Renton Regional GW Building 4-78/79 **Project Number: Boeing Renton Regional GW Building 4-78/79**

Preservation Confirmation

Container ID	Container Type	pH	
22B0253-01 A	Glass NM, Amber, 250 mL, 9N H2SO4	>2	Fail
22B0253-01 B	VOA Vial, Clear, 40 mL, HCL		
22B0253-01 C	VOA Vial, Clear, 40 mL, HCL		
22B0253-01 D	VOA Vial, Clear, 40 mL, HCL		
22B0253-02 A	HDPE NM, 500 mL		
22B0253-02 B	VOA Vial, Clear, 40 mL, HCL		
22B0253-02 C	VOA Vial, Clear, 40 mL, HCL		
22B0253-02 D	VOA Vial, Clear, 40 mL, HCL		
22B0253-03 A	Glass NM, Amber, 250 mL, 9N H2SO4	<2	Pass (P)
22B0253-03 B	VOA Vial, Clear, 40 mL, HCL		
22B0253-03 C	VOA Vial, Clear, 40 mL, HCL		
22B0253-03 D	VOA Vial, Clear, 40 mL, HCL		
22B0253-04 A	VOA Vial, Clear, 40 mL, HCL		
22B0253-04 B	VOA Vial, Clear, 40 mL, HCL		
22B0253-04 C	VOA Vial, Clear, 40 mL, HCL		
22B0253-05 A	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
22B0253-05 B	VOA Vial, Clear, 40 mL, HCL		
22B0253-05 C	VOA Vial, Clear, 40 mL, HCL		
22B0253-05 D	VOA Vial, Clear, 40 mL, HCL		
22B0253-06 A	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
22B0253-06 B	VOA Vial, Clear, 40 mL, HCL		
22B0253-06 C	VOA Vial, Clear, 40 mL, HCL		
22B0253-06 D	VOA Vial, Clear, 40 mL, HCL		
22B0253-07 A	VOA Vial, Clear, 40 mL, HCL		
22B0253-07 B	VOA Vial, Clear, 40 mL, HCL		
22B0253-07 C	VOA Vial, Clear, 40 mL, HCL		

RM
Preservation Confirmed By

2/17/22
Date

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing

Project Name: Renton

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: 22B0253

Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES **NO**

Were custody papers included with the cooler? **YES** NO

Were custody papers properly filled out (ink, signed, etc.) **YES** NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1320 2.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 2565

Cooler Accepted by: RM Date: 2/17/22 Time: 1320

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES **NO**

What kind of packing material was used? ... **Bubble Wrap** **Wet Ice** Gel Packs Baggies Foam Block Paper Other:

Was sufficient ice used (if appropriate)? NA **YES** NO

How were bottles sealed in plastic bags? Individually Grouped **Not**

Did all bottles arrive in good condition (unbroken)? **YES** NO

Were all bottle labels complete and legible? **YES** NO

Did the number of containers listed on COC match with the number of containers received? RM 2/17/22 ~~YES~~ **NO**

Did all bottle labels and tags agree with custody papers? **YES** NO

Were all bottles used correct for the requested analyses? **YES** NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA **YES** NO

Were all VOC vials free of air bubbles? NA **YES** NO

Was sufficient amount of sample sent in each bottle? **YES** NO

Date VOC Trip Blank was made at ARI NA 2/15/22

Were the sample(s) split by ARI? **NA** YES Date/Time: Equipment: Split by:

Samples Logged by: RM Date: 2/17/22 Time: 1519 Labels checked by:

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

Only 1 Tripblank listed on COC but 3 vials were received.

By: RM Date: 2/17/22

SPECTRA Laboratories ...Where experience matters
2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

Spectra Labs - Tacoma received samples from Analytical Resources, LLC on Friday, February 18, 2022 at 2:33 pm. Unless otherwise noted, all samples were received in good condition and were tested in accordance with the laboratory's quality control procedures. A summary of the samples received are outlined below.

Sample No.	Description	Location	Sampled
300526-01		22B0253-01	02/17/2022 9:33
300526-02		22B0253-03	02/17/2022 10:41
300526-03		22B0253-05	02/17/2022 11:57
300526-04		22B0253-06	02/17/2022 11:52

This report package contains laboratory sample results and any attachments listed below. If you have any questions please call (253) 272-4850 or email us at office@spectra-lab.com.

Attachments

01) TOC Batch QC
02) Chain of Custody

Approved By

Ben Frans
Lab Operations Manager

SPECTRA Laboratories ...Where experience matters
2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

Analytical Report

Analytical Resources, LLC
4611 South 134th Place
Suite 100
Tukwila, WA 98168

Project 22B0253
PO Number Kelly Bottem
Date Received 02/18/2022

Client ID: 22B0253-01 **Lab No: 300526-01** **Sample Date: 02/17/22 09:33**

Analyte	Method	Result	Units	PQL	Qualifiers	Analysis Date	Analyst
TOC	SM 5310 B	31.5	mg/L	0.5	---	3/7/2022	SCJ

Client ID: 22B0253-03 **Lab No: 300526-02** **Sample Date: 02/17/22 10:41**

Analyte	Method	Result	Units	PQL	Qualifiers	Analysis Date	Analyst
TOC	SM 5310 B	13.4	mg/L	0.5	---	3/7/2022	SCJ

Client ID: 22B0253-05 **Lab No: 300526-03** **Sample Date: 02/17/22 11:57**

Analyte	Method	Result	Units	PQL	Qualifiers	Analysis Date	Analyst
TOC	SM 5310 B	1.60	mg/L	0.5	---	3/7/2022	SCJ

Client ID: 22B0253-06 **Lab No: 300526-04** **Sample Date: 02/17/22 11:52**

Analyte	Method	Result	Units	PQL	Qualifiers	Analysis Date	Analyst
TOC	SM 5310 B	1.30	mg/L	0.5	---	3/7/2022	SCJ

Lab Qualifiers Comments:

March 7, 2022

Analytical Resources, Inc.		Units:	mg/L
4611 South 134th Place		Spectra Project:	300526
Suite 100		Applies to Spectra #'s:	1-4
Tukwila, WA. 98168			

QUALITY CONTROL RESULTS

Total Organic Carbon in Water - SM 5310B

Method Blank

Date Analyzed: 3/7/2022

	Blank
Total Organic Carbon	< 0.5

Laboratory Control Sample (LCS)

Date Analyzed: 3/7/2022

	Spike Added	LCS Conc.	LCS %Rec
Total Organic Carbon	10.0	10.12	101.2

LCS Recovery limits 75-125%

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Date Analyzed: 3/7/2022
Sample Spiked: 300354-1

	Sample Conc.	Spike Conc.	MS Conc.	MS %Rec	MSD Conc	MSD %Rec	RPD
Total Organic Carbon	16.79	10.0	25.67	88.8	25.96	91.7	3.2

Comment:
Recovery Limits 75-125%
RPD Limit 20

Spectra Laboratories

Analytical Resources, LLC
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Spectra Laboratories
ARI Work Order:22B0253

300524

SENDING LABORATORY:

Analytical Resources, LLC
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6202
Project Manager: Kelly Bottem
E-Mail: kelly.bottem@arilabs.com

RECEIVING LABORATORY:

Spectra Laboratories
2221 Ross Way
Tacoma, WA 98421
Phone :253-272-4850
Fax: -

PLEASE SEND DATA TO subdata@arilabs.com

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 22B0253-01 **Sampled: 02/17/22 09:33** **Matrix: Water**				
Carbon, Organic Total, SM 5310 B-00	03/04/22	03/17/22 09:33		
Containers Supplied: **22B0253-01 A** Glass NM, Amber, 250 mL, 9N				
Sample ID: 22B0253-03 **Sampled: 02/17/22 10:41** **Matrix: Water**				
Carbon, Organic Total, SM 5310 B-00	03/04/22	03/17/22 10:41		
Containers Supplied: **22B0253-03 A** Glass NM, Amber, 250 mL, 9N				
Sample ID: 22B0253-05 **Sampled: 02/17/22 11:57** **Matrix: Water**				
Carbon, Organic Total, SM 5310 B-00	03/04/22	03/17/22 11:57		
Containers Supplied: **22B0253-05 A** Glass NM, Amber, 250 mL, 9N				
Sample ID: 22B0253-06 **Sampled: 02/17/22 11:52** **Matrix: Water**				
Carbon, Organic Total, SM 5310 B-00	03/04/22	03/17/22 11:52		
Containers Supplied: **22B0253-06 A** Glass NM, Amber, 250 mL, 9N				

Released By	Date	Received By	Date
ARI AFaist 1433	2/18/22	Lori Smith	2-18-22 1433

Printed: 2/17/2022 3:27:52PM

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B003-01-021722

22B0253-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 09:33

Instrument: NT2 Analyst: PKC — Analyzed: 02/18/2022 18:15

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-01 B

Preparation Batch: BKB0448 — Sample Size: 10 mL

Prepared: 02/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*99.1*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*96.7*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*96.8*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*100*	*%*	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B003-01-021722

22B0253-01 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 02/17/2022 09:33

Instrument: SLAB Analyst: — Analyzed: 03/07/2022 00:00

Analysis by: Spectra Laboratories

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22B0253-01

Preparation Batch: B030722

Prepared: 02/17/2022 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.5	0.5	31.5	mg/L	

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

GW2105-021722

22B0253-02 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 10:35

Instrument: NT2 Analyst: PKC — Analyzed: 02/18/2022 18:36

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-02 C

Preparation Batch: BKB0448 — Sample Size: 10 mL

Prepared: 02/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	0.56	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*101*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*98.9*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*95.3*	*%*	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

GW2105-021722

22B0253-02 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/17/2022 10:35

Instrument: IC930 Analyst: CKI — Analyzed: 02/18/2022 14:22

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22B0253-02 A

Preparation Batch: BKB0447 — Sample Size: 10 mL

Prepared: 02/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	ND	mg/L	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/L	U

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

GW2105-021722

22B0253-02RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 02/17/2022 10:35

Instrument: IC930 Analyst: CKI — Analyzed: 02/22/2022 17:00

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22B0253-02RE1 A

Preparation Batch: BKB0505 — Sample Size: 10 mL

Prepared: 02/22/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	ND	mg/L	H, U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/L	H, U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	5.73	mg/L	

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B78-16-021722

22B0253-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 10:41

Instrument: NT2 Analyst: PKC — Analyzed: 02/18/2022 18:56

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-03 D

Preparation Batch: BKB0448 — Sample Size: 10 mL

Prepared: 02/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	293	ug/L	E
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	301	ug/L	E
Benzene	71-43-2	1	0.05	0.20	8.30	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	0.94	ug/L	
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*103*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*97.9*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*98.7*	*%*	

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B78-16-021722

22B0253-03 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 02/17/2022 10:41

Instrument: SLAB Analyst: — Analyzed: 03/07/2022 00:00

Analysis by: Spectra Laboratories

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22B0253-03

Preparation Batch: B030722

Prepared: 02/17/2022 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.5	0.5	13.4	mg/L	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B78-16-021722

22B0253-03RE1 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 10:41

Instrument: NT2 Analyst: PKC — Analyzed: 02/21/2022 16:44

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-03RE1 B

Preparation Batch: BKB0458 — Sample Size: 1 mL

Prepared: 02/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.82	2.00	280	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.81	2.00	288	ug/L	
Benzene	71-43-2	1	0.53	2.00	7.36	ug/L	
Trichloroethene	79-01-6	1	0.70	2.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*102*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*97.8*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*95.9*	*%*	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Dup01-021722

22B0253-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 08:00

Instrument: NT2 Analyst: PKC — Analyzed: 02/18/2022 19:17

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-04 C

Preparation Batch: BKB0448 — Sample Size: 10 mL

Prepared: 02/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	278	ug/L	E
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	294	ug/L	E
Benzene	71-43-2	1	0.05	0.20	7.90	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	0.90	ug/L	
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*106*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*96.4*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*98.3*	*%*	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Dup01-021722

22B0253-04RE1 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 08:00

Instrument: NT2 Analyst: PKC — Analyzed: 02/21/2022 17:07

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-04RE1 A

Preparation Batch: BKB0458 — Sample Size: 1 mL

Prepared: 02/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.82	2.00	293	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.81	2.00	299	ug/L	
Benzene	71-43-2	1	0.53	2.00	7.23	ug/L	
Trichloroethene	79-01-6	1	0.70	2.00	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*111*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*97.5*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*90.3*	*%*	

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B172-08-021722

22B0253-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 11:57

Instrument: NT2 Analyst: PKC — Analyzed: 02/21/2022 17:27

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-05 D

Preparation Batch: BKB0458 — Sample Size: 10 mL

Prepared: 02/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.30	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	1.62	ug/L	
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*111*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*97.1*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*93.0*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B172-08-021722

22B0253-05 (Water)

Wet Chemistry

Method: SM 5310 B-00 Sampled: 02/17/2022 11:57

Instrument: SLAB Analyst: Analyzed: 03/07/2022 00:00

Analysis by: Spectra Laboratories

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 22B0253-05

Preparation Batch: B030722

Prepared: 02/17/2022 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.5	0.5	1.60	mg/L	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B172-01-021722

22B0253-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 11:52

Instrument: NT2 Analyst: PKC — Analyzed: 02/21/2022 17:49

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-06 C

Preparation Batch: BKB0458 — Sample Size: 10 mL

Prepared: 02/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*110*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*97.4*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*92.6*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

B172-01-021722

22B0253-06 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 02/17/2022 11:52

Instrument: SLAB Analyst: — Analyzed: 03/07/2022 00:00

Analysis by: Spectra Laboratories

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22B0253-06

Preparation Batch: B030722

Prepared: 02/17/2022 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.5	0.5	1.30	mg/L	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

TripBlank

22B0253-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 02/17/2022 09:33

Instrument: NT2 Analyst: PKC — Analyzed: 02/21/2022 13:31

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 22B0253-07 B

Preparation Batch: BKB0458 — Sample Size: 10 mL

Prepared: 02/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*97.2*	*%*	
Surrogate: Toluene-d8				*80-120 %*	*97.4*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*95.7*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BKB0448 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKB0448-BLK2)					Prepared: 18-Feb-2022	Analyzed: 18-Feb-2022 12:38					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.13			ug/L	*5.00*		*103*	*80-129*			
Surrogate: Toluene-d8	4.91			ug/L	*5.00*		*98.1*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.77			ug/L	*5.00*		*95.4*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.91			ug/L	*5.00*		*98.1*	*80-120*			
LCS (BKB0448-BS2)					Prepared: 18-Feb-2022	Analyzed: 18-Feb-2022 11:14					
Vinyl Chloride	11.8	0.08	0.20	ug/L	10.0		118	66-133			
cis-1,2-Dichloroethene	9.62	0.08	0.20	ug/L	10.0		96.2	80-121			
Benzene	9.70	0.05	0.20	ug/L	10.0		97.0	80-120			
Trichloroethene	9.70	0.07	0.20	ug/L	10.0		97.0	80-120			
Surrogate: 1,2-Dichloroethane-d4	5.40			ug/L	*5.00*		*108*	*80-129*			
Surrogate: Toluene-d8	4.99			ug/L	*5.00*		*99.8*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.12			ug/L	*5.00*		*102*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.82			ug/L	*5.00*		*96.4*	*80-120*			
LCS Dup (BKB0448-BSD2)					Prepared: 18-Feb-2022	Analyzed: 18-Feb-2022 11:56					
Vinyl Chloride	11.6	0.08	0.20	ug/L	10.0		116	66-133	1.24	30	
cis-1,2-Dichloroethene	9.95	0.08	0.20	ug/L	10.0		99.5	80-121	3.40	30	
Benzene	10.2	0.05	0.20	ug/L	10.0		102	80-120	4.91	30	
Trichloroethene	10.3	0.07	0.20	ug/L	10.0		103	80-120	6.33	30	
Surrogate: 1,2-Dichloroethane-d4	5.05			ug/L	*5.00*		*101*	*80-129*			
Surrogate: Toluene-d8	5.00			ug/L	*5.00*		*99.9*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.29			ug/L	*5.00*		*106*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.01			ug/L	*5.00*		*100*	*80-120*			

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BKB0458 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKB0458-BLK2)					Prepared: 21-Feb-2022 Analyzed: 21-Feb-2022 12:50						
Vinyl Chloride	ND	0.08	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	4.99			ug/L	*5.00*		*99.8*	*80-129*			
Surrogate: Toluene-d8	4.76			ug/L	*5.00*		*95.1*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.95			ug/L	*5.00*		*99.0*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.15			ug/L	*5.00*		*103*	*80-120*			
LCS (BKB0458-BS2)					Prepared: 21-Feb-2022 Analyzed: 21-Feb-2022 11:46						
Vinyl Chloride	9.42	0.08	0.20	ug/L	10.0		94.2	66-133			
cis-1,2-Dichloroethene	9.62	0.08	0.20	ug/L	10.0		96.2	80-121			
Benzene	9.74	0.05	0.20	ug/L	10.0		97.4	80-120			
Trichloroethene	9.91	0.07	0.20	ug/L	10.0		99.1	80-120			
Tetrachloroethene	9.59	0.09	0.20	ug/L	10.0		95.9	80-120			
Surrogate: 1,2-Dichloroethane-d4	4.89			ug/L	*5.00*		*97.9*	*80-129*			
Surrogate: Toluene-d8	5.00			ug/L	*5.00*		*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.07			ug/L	*5.00*		*101*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.13			ug/L	*5.00*		*103*	*80-120*			
LCS Dup (BKB0458-BSD2)					Prepared: 21-Feb-2022 Analyzed: 21-Feb-2022 12:07						
Vinyl Chloride	10.2	0.08	0.20	ug/L	10.0		102	66-133	7.57	30	
cis-1,2-Dichloroethene	9.83	0.08	0.20	ug/L	10.0		98.3	80-121	2.23	30	
Benzene	10.2	0.05	0.20	ug/L	10.0		102	80-120	4.61	30	
Trichloroethene	10.3	0.07	0.20	ug/L	10.0		103	80-120	3.39	30	
Tetrachloroethene	9.75	0.09	0.20	ug/L	10.0		97.5	80-120	1.62	30	
Surrogate: 1,2-Dichloroethane-d4	4.68			ug/L	*5.00*		*93.7*	*80-129*			
Surrogate: Toluene-d8	5.01			ug/L	*5.00*		*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.33			ug/L	*5.00*		*107*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.98			ug/L	*5.00*		*99.6*	*80-120*			

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKB0447 - No Prep Wet Chem

Instrument: IC930 Analyst: CKI

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKB0447-BLK1)					Prepared: 18-Feb-2022	Analyzed: 18-Feb-2022 13:42					
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
LCS (BKB0447-BS1)					Prepared: 18-Feb-2022	Analyzed: 18-Feb-2022 14:02					
Nitrate-N	5.00	0.100	0.100	mg/L	5.00		99.9	90-110			
Nitrite-N	5.29	0.100	0.100	mg/L	5.00		106	90-110			
Duplicate (BKB0447-DUP1)	**Source: 22B0253-02**				Prepared: 18-Feb-2022	Analyzed: 18-Feb-2022 14:42					
Nitrate-N	ND	0.100	0.100	mg/L		ND					U
Nitrite-N	ND	0.100	0.100	mg/L		ND					U
Matrix Spike (BKB0447-MS1)	**Source: 22B0253-02**				Prepared: 18-Feb-2022	Analyzed: 18-Feb-2022 15:02					
Nitrate-N	1.86	0.100	0.100	mg/L	2.00	ND	93.0	75-125			
Nitrite-N	1.71	0.100	0.100	mg/L	2.00	ND	85.6	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKB0505 - No Prep Wet Chem

Instrument: IC930 Analyst: CKI

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKB0505-BLK1)					Prepared: 22-Feb-2022	Analyzed: 22-Feb-2022 14:59					
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BKB0505-BS1)					Prepared: 22-Feb-2022	Analyzed: 22-Feb-2022 15:20					
Nitrate-N	4.87	0.100	0.100	mg/L	5.00		97.5	90-110			
Nitrite-N	5.26	0.100	0.100	mg/L	5.00		105	90-110			
Sulfate	4.84	0.100	0.100	mg/L	5.00		96.8	90-110			

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	**Reported:**
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Analysis by: Spectra Laboratories

Wet Chemistry - Quality Control

Batch B030722 - No Prep Wet Chem

Instrument: SLAB Analyst:

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
BLK (B030722-BLK1)					Prepared:	Analyzed: 07-Mar-2022 00:00					
Total Organic Carbon	ND	0.5	0.5	mg/L				0-0			
BS (B030722-BS1)					Prepared:	Analyzed: 07-Mar-2022 00:00					
Total Organic Carbon	10.12	0.5	0.5	mg/L			101.2	75-125			

The Boeing Company	Project: Boeing Renton Regional GW Building 4-78/79	
PO Box 3707 M/S 1W-12	Project Number: Boeing Renton Regional GW Building 4-78/79	Reported:
Seattle WA, 98124	Project Manager: Nick Garson	29-Mar-2022 15:31

Certified Analyses included in this Report

Analyte	Certifications
EPA 300.0 in Water	
Nitrate-N	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrite-N	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
EPA 8260D in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE

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4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE

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Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022

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Notes and Definitions

*	Flagged value is not within established control limits.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.