LANDAU ASSOCIATES

October 15, 2019

Washington State Department of Ecology
Northwest Regional Office
3190 160th Ave SE
Bellevue, Washington 98008-5452

Attn: Robin Harrover

Transmitted via email to: *rhar461@ecy.wa.gov*

Re: Status Report No. 68, July through September 2019 Activity Period
Boeing Auburn Facility
WAD 041337130, RCRA Corrective Action Agreed Order No. 01HWTRNR-3345
Auburn, Washington
Project No. 0025164.170.501

Dear Ms. Harrover:

The Resource Conservation and Recovery Act (RCRA) Corrective Action Agreed Order (Auburn Agreed Order) became effective on August 14, 2002. As required under Section VI.13 of the Auburn Agreed Order, The Boeing Company (Boeing) is providing Status Report No. 68, which covers the 3-month activity period of July through September, 2019.

References

1. July 1, 2019. Email: Auburn MNA Report Extension Request. From Debbie Taege, Boeing, to Robin Harrover and Christa Coluzis, Ecology.
2. July 15, 2019. Letter: Status Report No. 67, April through June 2019 Activity Period, Boeing Auburn Facility, WAD 041337130, RCRA Corrective Action Agreed Order No. 01HWTRNR-3345, Auburn, Washington. From Jennifer Wynkoop and Sarah Fees, Landau Associates, Inc. (LAI), to Robin Harrover, Ecology.
3. July 16, 2019. Ecology Listserv. July 22 – 5:30 PM – Come hear an update on Boeing Auburn contamination cleanup.
4. July 16, 2019. Email: Boeing Auburn – Plan for Additional Groundwater Sampling at Building 17-06. From Debbie Taege, Boeing, to Robin Harrover, Ecology.
5. July 16, 2019. Email: Re: Boeing Auburn – Plan for Additional Groundwater Sampling at Building 17-06. From Robin Harrover, Ecology, to Debbie Taege, Boeing.
6. July 16, 2019. LAI Report: Site-Wide Natural Attenuation Assessment Report, Boeing Auburn Facility, Auburn, Washington.
7. July 18, 2019. Email: Re: Boeing Auburn – Plan for Additional Groundwater Sampling at Building 17-06. From Sarah Fees, LAI, to Robin Harrover, Ecology, and Debbie Taege, Boeing.

(Attachment: laboratory QC limits, reporting limits, hold time, and bottle types for EPH analysis).

8. July 18, 2019. Email: Re: Boeing Auburn – Plan for Additional Groundwater Sampling at Building 17-06. From Robin Harrover, Ecology, to Sarah Fees, LAI.
9. July 18, 2019. Letter: Ecology comment regarding the data submittal: Surface Water Sampling and Pore Water Installation Data submittal; prepared for the Boeing Company by Landau Associates; November 13, 2018; FS #2018; CS #5049; EPA WAD041337130. From Robin Harrover, Ecology, to Debbie Taege, Boeing.
10. July 23, 2019. Ecology Listserv. Watch Boeing Auburn contamination cleanup video update.
11. July 24, 2019. Email: Boeing Fabrication Auburn Site – Status Report 67, April – June 2019 Activity Period. From Robin Harrover, Ecology, to representatives of City of Algona, City of Auburn, and City of Pacific.
12. July 24, 2019. Letter: Boeing Auburn Site Cleanup Standards and Feasibility Study. From Michael Dunning, Perkins Coie, to Christa Colouzis, Ecology.
13. July 25, 2019. Email: City of Auburn Council handouts. From Thea Levkovitz, Ecology, to Jennifer Wynkoop, LAI, and Debbie Taege, Boeing.
14. July 25, 2019. Email: Boeing Auburn FS Cleanup Standards and Due Date. From Christa Colouzis, Ecology, to representatives of Boeing and Ecology.
15. July 25, 2019. File Transfer – Boeing Auburn Site-Wide NA Assessment Report – Revised.
16. August 1, 2019. Email: Re: Ecology Response Letter to the Pore Water Data Summary Report, Boeing Auburn. From Debbie Taege, Boeing, to Robin Harrover and Christa Colouzis, Ecology.
17. August 20, 2019. Ecology Listserv. Talk with Ecology about the cleanup – Filipino Heritage Day, August 24, 11 – 4 PM.
18. September 4, 2019. LAI Report: Sampling and Analysis Plan, Boeing Auburn Facility, Auburn, Washington.
19. September 11, 2019. LAI Report: Quality Assurance Project Plan, Boeing Auburn Facility, Auburn, Washington.

Work Conducted

General Site-wide Corrective Action Activities

On July 15, 2019, LAI submitted Status Report No. 67 regarding first quarter 2019 activities to Ecology and other stakeholders[1] for their records (Reference #2). Ecology project manager, Robin Harrover, has continued to attend regularly scheduled monthly conference calls with Boeing, LAI, and the City of Algona's environmental consultant, ICF International (ICF). The primary purpose of these calls is to discuss technical aspects of the project scope and schedule, data results, and public outreach. Boeing and Ecology communication personnel also attend these calls.

[1] A list of stakeholders that receive copies of the quarterly status reports are listed at the end of this document. Ecology also forwards quarterly status reports via email to representatives of the cities of Algona, Auburn, and Pacific (Reference #11).

Surface Water and Stormwater Feature Sampling

Dry season surface water sampling in Mill Creek and sampling of stormwater conveyance, treatment, and control structures (Chicago Avenue Ditch and Auburn 400 stormwater basins) took place from September 4 through 6, 2019. The dry season sampling data are provided in Attachment 1. The current monitoring well network, surface water, and stormwater feature sample locations are shown on Figure 1-1. A complete summary of analytical results is presented in Table 1-1.

Pore Water Sampling

Dry season pore water sampling beneath Mill Creek occurred on September 4 and 5, 2019. Pore water samples are considered groundwater, but are called out separately for discussion purposes. The dry season pore water sampling data are provided in Attachment 1. Pore water sample locations are shown on Figure 1-1. Analytical results are presented in Table 1-2.

Natural Attenuation Reporting

The primary constituent of concern in groundwater at the Boeing Auburn site, trichloroethene (TCE), is being attenuated naturally through biologic and chemical processes occurring in the groundwater. Natural attenuation of TCE by reductive dechlorination at the site is evidenced by the presence of degradation breakdown products (cis-1,2-dichloroethene [cDCE], vinyl chloride [VC], ethene, and ethane) and geochemical conditions in the groundwater. In May 2018, Boeing submitted a report documenting the mechanisms and other evidence of natural attenuation occurring at the site (Site-Wide Natural Attenuation Assessment Report). Ecology provided comments on the report in the first quarter, 2019[2]. The final report was submitted to Ecology on July 16, 2019 (Reference #6, #15).

Algona Enhanced Natural Attenuation Pilot Test

A draft technical memorandum summarizing results from the second year of pilot test monitoring was submitted to Ecology in the third quarter, 2018. Boeing expects to receive Ecology comments on this technical memorandum in the fourth quarter, 2019.

Feasibility Study Investigation and Reporting

Boeing is continuing work on the feasibility study (FS) and associated reporting. Boeing submitted the final FS work plan in the fourth quarter, 2018. On April 25, 2019, Ecology sent a letter approving the FS Work Plan, and requested submittal of the FS report. Discussions between Boeing and Ecology regarding appropriate cleanup levels for the Site are ongoing (Reference #12). Boeing requested, and Ecology approved, an extension for submittal of the FS report until October 30, 2019 (Reference #14).

A data submittal including 2018 dry season surface water sampling data and additional pore water piezometer installation plans was submitted to Ecology in the fourth quarter, 2018. On July 18, 2019, Ecology provided a letter response to the surface water and pore water data submittal requesting

[2] Boeing requested and received an extension for the due date of the revised report (Reference #1).

updates to the sampling and analysis plan (SAP) and quality assurance project plan (QAPP), as well as installation of an additional new piezometer (Reference #9). Boeing responded to this letter on August 1, 2019 agreeing to update the SAP and QAPP, and explaining that installation of a new piezometer is unnecessary at this time (Reference #16).

On July 16, 2019, Boeing requested permission to collect additional groundwater samples from two monitoring wells in Building 17-06 for extractable petroleum hydrocarbons (EPH) analysis to evaluate possible use of Method B cleanup levels for petroleum hydrocarbons (Reference #4). Ecology responded to the request on July 16, 2019 approving the collection of samples for EPH analysis and requesting that updates to the SAP and QAPP be made (Reference #5). On July 18, 2018, Boeing clarified that EPH sampling and analysis was already included in the SAP, and proposed limited updates to the quality assurance procedures before EPH sampling (Reference #7). On July 18, 2019 (Reference #8), Ecology accepted the updates and approved the EPH sampling and analysis with the understanding that Boeing would submit updated SAP and QAPP documents prior to submittal of the FS. The SAP and QAPP were finalized and sent to Ecology on September 4, 2019 (Reference #18), and September 11, 2019 (Reference #19), respectively. Results from the EPH analysis will be presented in the FS report.

Data Management

Boeing and Ecology have agreed on annual submittals of data to Ecology's Environmental Information Management (EIM) database. On August 27, 2019, Boeing submitted required EIM data for the past year of data (July 2018 through June 2019). The data is currently under review by the Ecology EIM coordinator and will be loaded to the EIM database when review is complete. Boeing expects to receive approval of the data submission from Ecology's EIM coordinator in the fourth quarter, 2019.

Communications

Ecology and Boeing are working together to ensure that all stakeholders are aware of the progress of investigation and cleanup activities at the Boeing Auburn Site. The City of Algona continues to be notified of all fieldwork occurring in Algona. The City of Algona's consultant, ICF, continues to participate in project conference calls with Boeing and Ecology and continues to review Algona-related deliverables (e.g., work plans and reports). Boeing and Ecology also continue to update the City of Auburn on activities, as needed. Ecology posted notifications to the Ecology listserv about Ecology's presentation to the City of Auburn council members about the status of groundwater cleanup (References #3 and #10), and provided Boeing with a copy of the handouts provided to the council members at the presentation (Reference #13). Ecology also posted a notification to the listserv stating that Ecology would be present to talk about the cleanup at Filipino Heritage Day (Reference #17).

Building 17-06 Ongoing Monitoring

Boeing is monitoring for petroleum hydrocarbons in wells AGW128, AGW277, and AGW281 located in Building 17-06. During the third quarter, free-phase product was detected in well AGW128 in July, August, and September (0.01, 0.02, and 0.07 feet, respectively). Free-phase product has not been detected in any of the other wells in Building 17-06. Boeing maintains a sorbent sock in AGW128 to remove accumulated product, which is replaced approximately monthly.

Occurrence of Problems

None to report.

Projected Work for Next Reporting Period October through December 2019

Activities projected for the next reporting period pertain to the FS reporting, Algona pilot test, other reporting, and ongoing monitoring of groundwater. Tasks during fourth quarter 2019 are expected to include:

- Finalizing the Algona Pilot Test Technical Memorandum (2nd year of monitoring update) once Ecology comments are received
- Submittal of the draft FS report to Ecology
- Continuing to monitor free-phase product in groundwater at Building 17-06
- Conducting semiannual groundwater sampling
- Preparing and submitting updated site-wide plume figures and an updated vapor intrusion assessment for Algona
- Preparing and distributing annual stakeholder data letters
- Continue the permit renewal process for wells in Auburn and Algona right-of-way.

Other Significant Findings, Changes, and Contacts

Ecology site manager, Robin Harrover, announced her retirement, which will begin in October 2019. Ecology has hired a new site manager, Li Ma, who will replace Robin on the Boeing Auburn project.

If you have any questions regarding this status report, or need any other information, please do not hesitate to contact Boeing or LAI.

LANDAU ASSOCIATES, INC.

Sarah Fees, LG
Senior Geologist

Jennifer Wynkoop
Principal Scientist

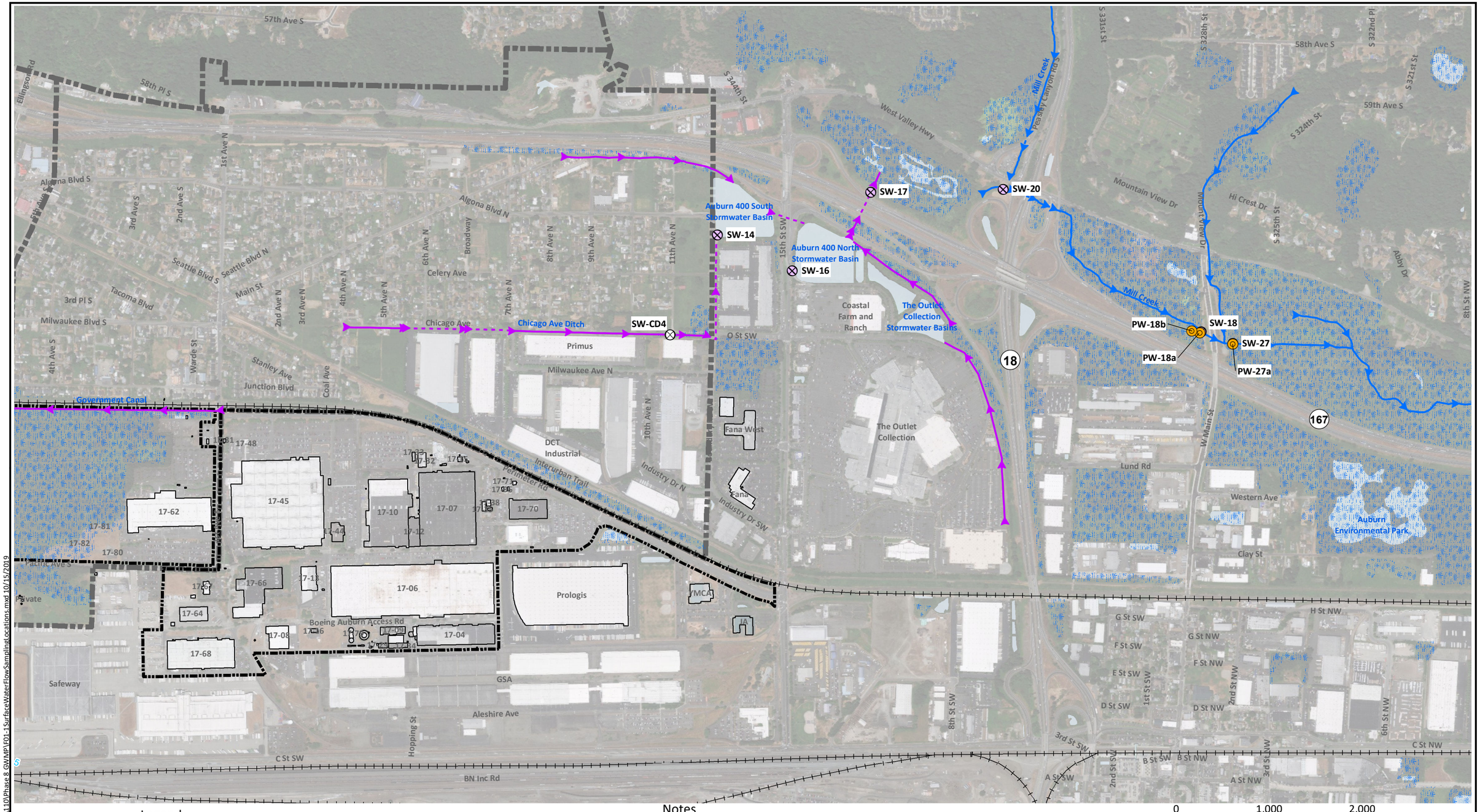
KMG/SEF/JWW/kjg
[\\TACOMA3\PROJECT\025\164\R\QUARTERLY PROGRESS RPTS\2019\3Q2019\3Q2019 STATUS RPT NO. 68 LETTER RPT.DOCX

cc: Debbie Taege (email only)
Thomas MacMannis, Boeing (email only)
Kamara Sams, Boeing (email only)
James Swortz, Boeing (email only)
Kathryn Moxley, Boeing (email only)
Patrick McCabe, Boeing Realty (email only)
Janet Frentzel, Prologis (email only)
Kim Lemon, Prologis (email only)
Brett Richer, Prologis (email only)
Steve Campbell, Prologis (email only)
Jason Berry, YMCA Auburn (email only)
Christa Colouzis, Ecology (email only)
Li Ma (email only)

Attachments: Attachment 1: 3Q19 Sampling Analytical Results
Attachment 2: Laboratory Data Packages

Attachment 1

3Q19 Sampling Analytical Results



Legend

- Annual Stormwater/Surface Water Sample Location
- Semiannual Stormwater/Surface Water Sampling Location
- Annual Pore Water Sample Location
- Boeing Property
- City Limits
- Wetland Areas
- Open Surface Water Waterway
- Open Stormwater Waterway
- Piped Surface Water Waterway
- Piped Stormwater Waterway

Notes

1. Stormwater/surface water sampling locations are designated by SW. Pore water sampling locations are designated by PW.
2. The locations of surface water features are approximate.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

N

0 1,000 2,000

Scale in Feet

Base Map Source: Geometrix 2003; Parcel Data Source: King County 2015; Aerial Photo Source: Esri World Imagery.

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Boeing Auburn Remedial Investigation Auburn, Washington	**Stormwater and Surface Water Features and Pore Water Sampling Locations**	Figure 1-1

G:\Project\s\025\164\150\110\Phase B GWMP\F01-1SurfaceWaterFlowSamplingLocations.mxd 10/15/2019

Table 1-1
3Q2019 Surface Water and Stormwater Feature Analytical Results
Boeing Auburn Facility
Auburn, Washington

Sample Location:	Laboratory SDG:	Sample Date:	Sample Type:	Select VOCs by SW-846 8260C (µg/L)					
				1,1-Dichloroethene	cis-1,2-Dichloroethene	Tetrachloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride
SW-14	19I0083	9/5/2019	N	0.200 U	**0.290**	0.200 U	0.200 U	**0.331**	0.0200 U
SW-16	19I0083	9/5/2019	N	0.200 U	**0.290**	0.200 U	0.200 U	0.200 U	**0.0483**
SW-17	19I0083	9/5/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0231**
SW-18	19I0064	9/4/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U
SW-18	19I0064	9/4/2019	FD	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U
SW-20	19I0083	9/5/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U
SW-27	19I0086	9/6/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U
SW-CD4	19I0083	9/5/2019	N	0.200 U	**0.574**	0.200 U	0.200 U	**0.546**	**0.0465**

Notes:

Bold text indicates detected analyte.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

Abbreviations/Acronyms:

FD = field duplicate
µg/L = micrograms per liter
N = primary sample
SDG = sample delivery group
VOC = volatile organic compound

Table 1-2
3Q2019 Pore Water Analytical Results
Boeing Auburn Facility
Auburn, Washington

Sample Location:	Laboratory SDG:	Sample Date:	Sample Type:	Select VOCs by SW-846 8260C (µg/L)					
				1,1-Dichloroethene	cis-1,2-Dichloroethene	Tetrachloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride
PW-18a-2.5	19I0064	9/4/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U
PW-18a-5	19I0064	9/4/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0758**
PW-18b-2.5	19I0064	9/4/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U
PW-18b-5	19I0064	9/4/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U
PW-27a-2.5	19I0064	9/4/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U
PW-27a-5	19I0064	9/4/2019	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U

Notes:

Bold text indicates detected analyte.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

Abbreviations/Acronyms:

µg/L = micrograms per liter
N = primary sample
SDG = sample delivery group
VOC = volatile organic compound

Attachment 2

Laboratory Data Packages

Analytical Resources, Incorporated
Analytical Chemists and Consultants

13 September 2019

Jennifer Parsons
The Boeing Company
PO Box 3703 MS 2R-96
Seattle, WA 98124

RE: Boeing Auburn 2Q 2019 Regional GWM

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)
19I0064	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, Inc.

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 it entirety.

Cert# 100006

PJLA Testing
Accreditation # 66169

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

19I0064

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Chain-of-Custody Record

☐ Seattle/Edmonds (425) 778-0907 ☐ Spokane (509) 327-9737
☒ Tacoma (253) 926-2493 ☐ Portland (503) 542-1080
☐ _____

Date 9/4/2019
Page 1 of 1

Turnaround Time:
(Standard)
Accelerated

Project Name Boeing Auburn Project No. 00251647.170.101
Project Location/Event Auburn, WA / 3Q SW sampling
Sampler's Name KMG/HER
Project Contact J. Wynkoop (LAI), Debbie Taege (Boeing)
Send Results To D. Jurgensen, D. Taege (see LIMS list)

Testing Parameters

5.9°C

Special Handling Requirements:

Shipment Method:
Stored on ice: (Yes) No

Sample I.D.	Date	Time	Matrix	No. of Containers	8260B SIM	MS/MSD
TripBlank-20190904	—	—	Aq	2	X	
SW-18-20190904	9/4/19	952	Aq	3	X	X
SW-900-20190904	9/4/19	954	Aq	3	X	
PW-18a-5-20190904	9/4/19	1103	Aq	3	X	
PW-18b-5-20190904	9/4/19	1248	Aq	3	X	
PW-18b-2.5-20190904	9/4/19	1253	Aq	3	X	
PW-18a-2.5-20190904	9/4/19	1308	Aq	3	X	X
PW-27a-2.5-20190904	9/4/19	1407	Aq	3	X	
PW-27a-5-20190904	9/4/19 ~~1328~~ KMG 1528		Aq	3	X	

Observations/Comments

☐ Allow water samples to settle, collect aliquot from clear portion

☐ NWTPH-Dx - Acid wash cleanup
☐ - Silica gel cleanup

☐ Dissolved metal samples were field filtered

Other

Relinquished by	Received by	Relinquished by	Received by
Signature Katie M. Yaught	Signature	Signature	Signature
Printed Name Katie Yaught	Printed Name Erin Salle	Printed Name	Printed Name
Company Landau Associates	Company ARI	Company	Company
Date 9/4/2019 Time 1600	Date 9/5/19 Time 1050	Date Time	Date Time

WHITE COPY - Laboratory YELLOW COPY - Project File PINK COPY - Client Representative

10/2018

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TripBlank-20190904	19I0064-01	Water	04-Sep-2019 09:52	05-Sep-2019 10:50
SW-18-20190904	19I0064-02	Water	04-Sep-2019 09:52	05-Sep-2019 10:50
SW-900-20190904	19I0064-03	Water	04-Sep-2019 09:54	05-Sep-2019 10:50
PW-18a-5-20190904	19I0064-04	Water	04-Sep-2019 11:03	05-Sep-2019 10:50
PW-18b-5-20190904	19I0064-05	Water	04-Sep-2019 12:48	05-Sep-2019 10:50
PW-18b-2.5-20190904	19I0064-06	Water	04-Sep-2019 12:53	05-Sep-2019 10:50
PW-18a-2.5-20190904	19I0064-07	Water	04-Sep-2019 13:08	05-Sep-2019 10:50
PW-27a-2.5-20190904	19I0064-08	Water	04-Sep-2019 14:07	05-Sep-2019 10:50
PW-27a-5-20190904	19I0064-09	Water	04-Sep-2019 15:28	05-Sep-2019 10:50

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

Work Order Case Narrative

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were run 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 LCS percent recoveries were within control limits.

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WORK ORDER

19I0064

Client: The Boeing Company
Project Manager: Kelly Bottem
Project: Boeing Auburn 2Q 2019 Regional GWM
Project Number: [none]

Report To:
The Boeing Company
Jennifer Parsons
PO Box 3703 MS 2R-96
Seattle, WA 98124
Phone: -
Fax: -

Invoice To:
The Boeing Company
Jennifer Parsons
PO Box 3703 MS 2R-96
Seattle, WA 98124
Phone :-
Fax: -

Date Due: 19-Sep-2019 18:00 (10 day TAT)
Received By: Erin I. Salle
Date Received: 05-Sep-2019 10:50
Logged In By: Kenny Dang
Date Logged In: 06-Sep-2019 09:58

Samples Received at: **5.9°C**

Intact, properly signed and dated custody seals attached to outside of cooler(s)	Yes	Custody papers included with the cooler	Yes
Custody papers properly filled out (in, signed, analyses requested, etc)	Yes	Was a temperature blank included in the cooler	No
Was sufficient ice used (if appropriate)	Yes	All bottles sealed in individual plastic bags	No
All bottles arrived in good condition (unbroken)	Yes	All bottle labels complete and legible	Yes
Number of containers listed on COC match number received	Yes	Bottle labels and tags agree with COC	Yes
Correct bottles used for the requested analyses	Yes	All VOC vials free of air bubbles	Yes
Analyses/bottles require preservation (attach preservation sheet excluding VOC).	No	Sufficient amount of sample sent in each bottle	Yes
Sample split at ARI	No		

Analysis	Due	TAT	Expires	Comments

WORK ORDER

19I0064

Client: The Boeing Company **Project Manager:** Kelly Bottem

Project: Boeing Auburn 2Q 2019 Regional GWM **Project Number:** [none]

Analysis	Due	TAT	Expires	Comments
19I0064-01 TripBlank-20190904 [Water] Sampled 04-Sep-2019 09:52 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 09:52	Custom RLs
19I0064-02 SW-18-20190904 [Water] Sampled 04-Sep-2019 09:52 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 09:52	Custom RLs
19I0064-03 SW-900-20190904 [Water] Sampled 04-Sep-2019 09:54 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 09:54	Custom RLs
19I0064-04 PW-18a-5-20190904 [Water] Sampled 04-Sep-2019 11:03 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 11:03	Custom RLs
19I0064-05 PW-18b-5-20190904 [Water] Sampled 04-Sep-2019 12:48 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 12:48	Custom RLs
19I0064-06 PW-18b-2.5-20190904 [Water] Sampled 04-Sep-2019 12:53 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 12:53	Custom RLs
19I0064-07 PW-18a-2.5-20190904 [Water] Sampled 04-Sep-2019 13:08 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 13:08	Custom RLs
19I0064-08 PW-27a-2.5-20190904 [Water] Sampled 04-Sep-2019 14:07 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 14:07	Custom RLs
19I0064-09 PW-27a-5-20190904 [Water] Sampled 04-Sep-2019 15:28 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	19-Sep-2019 15:00	10	18-Sep-2019 15:28	Custom RLs

Reviewed By _____ Date _____

WORK ORDER

19I0064

Client: The Boeing Company	**Project Manager:** Kelly Bottem
Project: Boeing Auburn 2Q 2019 Regional GWM	**Project Number:** [none]

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Auburn — Project Name: 3Q SW Sampling

COC No(s): _____ (NA) — Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 19I0064 — 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) 5.9

Time 1500

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: D00256S

Cooler Accepted by: _____ Date: 9/5/19 Time: 1050

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?		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?	KD 9/6/19	YES	NO
Date VOC Trip Blank was made at ARI	NA	8/23/19	

Were the sample(s) split by ARI? (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: KD Date: 9/6/19 Time: 0946 Labels checked by: KD

***** 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:

By: Date:

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

TripBlank-20190904

19I0064-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 09:52
Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 10:50

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-01 A
Preparation Batch: BHI0292 — Sample Size: 10 mL
Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*107*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.5*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*96.9*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

SW-18-20190904

19I0064-02 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 09:52

Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 13:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-02 B

Preparation Batch: BHI0292 — Sample Size: 10 mL

Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*108*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.2*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*95.1*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

SW-900-20190904

19I0064-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 09:54

Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 13:48

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-03 B

Preparation Batch: BHI0292 — Sample Size: 10 mL

Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*107*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.4*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*95.0*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

PW-18a-5-20190904

19I0064-04 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 11:03

Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 14:14

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-04 B

Preparation Batch: BHI0292 — Sample Size: 10 mL

Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	**0.0758**	ug/L	
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*107*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.3*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*94.7*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

PW-18b-5-20190904

19I0064-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 12:48

Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 14:39

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-05 B

Preparation Batch: BHI0292 — Sample Size: 10 mL

Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*106*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.5*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*94.9*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

PW-18b-2.5-20190904

19I0064-06 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 12:53

Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 15:04

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-06 B

Preparation Batch: BHI0292 — Sample Size: 10 mL

Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*107*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.6*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*94.1*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

PW-18a-2.5-20190904

19I0064-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 13:08

Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 15:30

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-07 B

Preparation Batch: BHI0292 — Sample Size: 10 mL

Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*111*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.8*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*94.2*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

PW-27a-2.5-20190904

19I0064-08 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 14:07

Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 15:55

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-08 B

Preparation Batch: BHI0292 — Sample Size: 10 mL

Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*108*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.6*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*93.8*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

PW-27a-5-20190904

19I0064-09 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/04/2019 15:28

Instrument: NT7 Analyst: LH — Analyzed: 09/11/2019 16:21

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0064-09 B

Preparation Batch: BHI0292 — Sample Size: 10 mL

Prepared: 11-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*110*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.9*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*94.9*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

Volatile Organic Compounds - SIM - Quality Control

Batch BHI0292 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0292-BLK1)				Prepared: 11-Sep-2019 Analyzed: 11-Sep-2019 09:31						
Vinyl chloride	ND	0.0200	ug/L							U
1,1-Dichloroethene	ND	0.200	ug/L							U
cis-1,2-Dichloroethene	ND	0.200	ug/L							U
trans-1,2-Dichloroethene	ND	0.200	ug/L							U
Trichloroethene	ND	0.200	ug/L							U
Tetrachloroethene	ND	0.200	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5280		ug/L	*5000*		*106*	*80-129*			
Surrogate: Toluene-d8	4980		ug/L	*5000*		*99.6*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4880		ug/L	*5000*		*97.6*	*75-125*			
LCS (BHI0292-BS1)				Prepared: 11-Sep-2019 Analyzed: 11-Sep-2019 08:41						
Vinyl chloride	2.07	0.0200	ug/L	2.00		104	76-120			
1,1-Dichloroethene	2.05	0.200	ug/L	2.00		103	80-120			
cis-1,2-Dichloroethene	2.08	0.200	ug/L	2.00		104	80-120			
trans-1,2-Dichloroethene	2.05	0.200	ug/L	2.00		102	80-120			
Trichloroethene	2.00	0.200	ug/L	2.00		100	80-120			
Tetrachloroethene	2.08	0.200	ug/L	2.00		104	80-122			
Surrogate: 1,2-Dichloroethane-d4	5150		ug/L	*5000*		*103*	*80-129*			
Surrogate: Toluene-d8	5020		ug/L	*5000*		*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4970		ug/L	*5000*		*99.3*	*75-125*			
LCS Dup (BHI0292-BSD1)				Prepared: 11-Sep-2019 Analyzed: 11-Sep-2019 09:06						
Vinyl chloride	1.99	0.0200	ug/L	2.00		99.6	76-120	3.84	30	
1,1-Dichloroethene	1.98	0.200	ug/L	2.00		98.9	80-120	3.60	30	
cis-1,2-Dichloroethene	2.01	0.200	ug/L	2.00		101	80-120	3.13	30	
trans-1,2-Dichloroethene	1.99	0.200	ug/L	2.00		99.4	80-120	2.95	30	
Trichloroethene	1.95	0.200	ug/L	2.00		97.4	80-120	2.64	30	
Tetrachloroethene	2.04	0.200	ug/L	2.00		102	80-122	1.78	30	
Surrogate: 1,2-Dichloroethane-d4	5250		ug/L	*5000*		*105*	*80-129*			
Surrogate: Toluene-d8	5020		ug/L	*5000*		*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4990		ug/L	*5000*		*99.7*	*75-125*			

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

Certified Analyses included in this Report

Analyte	Certifications
EPA 8260C-SIM in Water	
Acrylonitrile	NELAP,CALAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2020
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	13-Sep-2019 16:33

Notes and Definitions

*	Flagged value is not within established control limits.
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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

16 September 2019

Jennifer Parsons
The Boeing Company
PO Box 3703 MS 2R-96
Seattle, WA 98124

RE: Boeing Auburn 2Q 2019 Regional GWM

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)
19I0083	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, Inc.

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 it entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

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19I0083

LANDAU ASSOCIATES

Chain-of-Custody Record

☐ Seattle/Edmonds (425) 778-0907 ☐ Spokane (509) 327-9737
☒ Tacoma (253) 926-2493 ☐ Portland (503) 542-1080
☐ _____

Date 9/5/2019
Page 1 of 1

Turnaround Time: (Standard) / Accelerated

Project Name Boeing Auburn Project No. 00257164.170.101
Project Location/Event Auburn, WA / 3Q SW Sampling
Sampler's Name KMG / HER
Project Contact J. Wynkoop (LAI), Debbie Tuege (Boeing)
Send Results To D. Jorgensen, D. Tuege (see LIMS list)

Testing Parameters

5.0°C

Special Handling Requirements:

Shipment Method:

Stored on ice: (Yes) / No

Sample I.D.	Date	Time	Matrix	No. of Containers	8260C SIM MS/MSD												Observations/Comments
TripBlank-20190905	—	—	Aq	2	X												
SW-CD4-20190905	9/5/19	928	Aq	9	X	X											Allow water samples to settle, collect aliquot from clear portion ☐
SW-14-20190905	9/5/19	1027	Aq	3	X												
SW-17-20190905	9/5/19	1112	Aq	3	X												NWTPH-Dx - Acid wash cleanup ☐ - Silica gel cleanup ☐
SW-16-20190905	9/5/19	1140	Aq	3	X												
SW-20-20190905	9/5/19	1238	Aq	3	X												Dissolved metal samples were field filtered

Other

Relinquished by	Received by	Relinquished by	Received by
Signature	Signature	Signature	Signature
Printed Name Heather Rogers	Printed Name Erin Salle	Printed Name	Printed Name
Company Landau Associates Inc	Company ARI	Company	Company
Date 9/5/19 Time 1300	Date 9/6/19 Time 1245	Date Time	Date Time

WHITE COPY - Laboratory YELLOW COPY - Project File PINK COPY - Client Representative

10/2018

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TripBlank-20190905	19I0083-01	Water	05-Sep-2019 09:28	06-Sep-2019 12:45
SW-CD4-20190905	19I0083-02	Water	05-Sep-2019 09:28	06-Sep-2019 12:45
SW-14-20190905	19I0083-03	Water	05-Sep-2019 10:27	06-Sep-2019 12:45
SW-17-20190905	19I0083-04	Water	05-Sep-2019 11:12	06-Sep-2019 12:45
SW-16-20190905	19I0083-05	Water	05-Sep-2019 11:40	06-Sep-2019 12:45
SW-20-20190905	19I0083-06	Water	05-Sep-2019 12:38	06-Sep-2019 12:45

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

Work Order Case Narrative

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were run 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 LCS percent recoveries were within control limits.

The Matrix Spike/Matrix Spike duplicate recoveries and RPD were within limits.

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WORK ORDER

19I0083

Client: The Boeing Company
Project: Boeing Auburn 2Q 2019 Regional GWM

Project Manager: Kelly Bottem
Project Number: [none]

Report To:
The Boeing Company
Jennifer Parsons
PO Box 3703 MS 2R-96
Seattle, WA 98124
Phone: -
Fax: -

Invoice To:
The Boeing Company
Jennifer Parsons
PO Box 3703 MS 2R-96
Seattle, WA 98124
Phone :-
Fax: -

Date Due:	20-Sep-2019 18:00 (10 day TAT)		
Received By:	Erin I. Salle	Date Received:	06-Sep-2019 12:45
Logged In By:	Kenny Dang	Date Logged In:	06-Sep-2019 16:29

Samples Received at: **5°C**

Intact, properly signed and dated custody seals attached to outside of cooler(s)	Yes	Custody papers included with the cooler	Yes
Custody papers properly filled out (in, signed, analyses requested, etc)	Yes	Was a temperature blank included in the cooler	No
Was sufficient ice used (if appropriate)	Yes	All bottles sealed in individual plastic bags	No
All bottles arrived in good condition (unbroken)	Yes	All bottle labels complete and legible	Yes
Number of containers listed on COC match number received	Yes	Bottle labels and tags agree with COC	Yes
Correct bottles used for the requested analyses	Yes	All VOC vials free of air bubbles	Yes
Analyses/bottles require preservation (attach preservation sheet excluding VOC)	No	Sufficient amount of sample sent in each bottle	Yes
Sample split at ARI	No		

Analysis	Due	TAT	Expires	Comments

WORK ORDER

19I0083

Client: The Boeing Company **Project Manager:** Kelly Bottem

Project: Boeing Auburn 2Q 2019 Regional GWM **Project Number:** |none|

Analysis	Due	TAT	Expires	Comments
19I0083-01 TripBlank-20190905 [Water] Sampled 05-Sep-2019 09:28 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	20-Sep-2019 15:00	10	19-Sep-2019 09:28	Custom RLs
19I0083-02 SW-CD4-20190905 [Water] Sampled 05-Sep-2019 09:28 (GMT-08:00) Pacific Time (US & Canada)				**MS/MSD**
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL* *D = VOA Vial, Clear, 40 mL, HCL* *E = VOA Vial, Clear, 40 mL, HCL* *F = VOA Vial, Clear, 40 mL, HCL* *G = VOA Vial, Clear, 40 mL, HCL* *H = VOA Vial, Clear, 40 mL, HCL* *I = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	20-Sep-2019 15:00	10	19-Sep-2019 09:28	Custom RLs
19I0083-03 SW-14-20190905 [Water] Sampled 05-Sep-2019 10:27 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	20-Sep-2019 15:00	10	19-Sep-2019 10:27	Custom RLs
19I0083-04 SW-17-20190905 [Water] Sampled 05-Sep-2019 11:12 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	20-Sep-2019 15:00	10	19-Sep-2019 11:12	Custom RLs
19I0083-05 SW-16-20190905 [Water] Sampled 05-Sep-2019 11:40 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	20-Sep-2019 15:00	10	19-Sep-2019 11:40	Custom RLs
19I0083-06 SW-20-20190905 [Water] Sampled 05-Sep-2019 12:38 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL *B = VOA Vial, Clear, 40 mL, HCL* *C = VOA Vial, Clear, 40 mL, HCL*				
8260C-SIM VOC	20-Sep-2019 15:00	10	19-Sep-2019 12:38	Custom RLs

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Auburn Project Name: 3Q SW Sampling

COC No(s): _____ NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 19I0083 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 1415 5.0 ___ ___ ___ ___ ___

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D00 2565

Cooler Accepted by: _____ Date: 9/6/19 Time: 1745

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? 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 8/23/19

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: KD Date: 9/6/19 Time: 1630 Labels checked by: KD

***** 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:

By: Date:

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

TripBlank-20190905

19I0083-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/05/2019 09:28
Instrument: NT7 Analyst: LH — Analyzed: 09/12/2019 09:11

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0083-01 A
Preparation Batch: BHI0336 — Sample Size: 10 mL
Prepared: 12-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*107*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.3*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*93.6*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

SW-CD4-20190905

19I0083-02 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/05/2019 09:28

Instrument: NT7 Analyst: LH — Analyzed: 09/12/2019 10:27

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0083-02 B

Preparation Batch: BHI0336 — Sample Size: 10 mL

Prepared: 12-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	**0.0465**	ug/L	
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	**0.574**	ug/L	
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	**0.546**	ug/L	
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*109*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.8*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*93.1*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

SW-14-20190905

19I0083-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/05/2019 10:27

Instrument: NT7 Analyst: LH — Analyzed: 09/12/2019 10:52

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0083-03 A

Preparation Batch: BHI0336 — Sample Size: 10 mL

Prepared: 12-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	**0.290**	ug/L	
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	**0.331**	ug/L	
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.5*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*93.0*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

SW-17-20190905

19I0083-04 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/05/2019 11:12

Instrument: NT7 Analyst: LH — Analyzed: 09/12/2019 11:18

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0083-04 A

Preparation Batch: BHI0336 — Sample Size: 10 mL

Prepared: 12-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	**0.0231**	ug/L	
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.8*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*93.5*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

SW-16-20190905

19I0083-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/05/2019 11:40

Instrument: NT7 Analyst: LH — Analyzed: 09/12/2019 11:43

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0083-05 A

Preparation Batch: BHI0336 — Sample Size: 10 mL

Prepared: 12-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	**0.0483**	ug/L	
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	**0.290**	ug/L	
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*113*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.1*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*92.9*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

SW-20-20190905

19I0083-06 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/05/2019 12:38

Instrument: NT7 Analyst: LH — Analyzed: 09/12/2019 12:09

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0083-06 A

Preparation Batch: BHI0336 — Sample Size: 10 mL

Prepared: 12-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*114*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.7*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*91.4*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

Volatile Organic Compounds - SIM - Quality Control

Batch BHI0336 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0336-BLK1)				Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 08:45						
Vinyl chloride	ND	0.0200	ug/L							U
1,1-Dichloroethene	ND	0.200	ug/L							U
cis-1,2-Dichloroethene	ND	0.200	ug/L							U
trans-1,2-Dichloroethene	ND	0.200	ug/L							U
Trichloroethene	ND	0.200	ug/L							U
Tetrachloroethene	ND	0.200	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5420		ug/L	*5000*		*108*	*80-129*			
Surrogate: Toluene-d8	4980		ug/L	*5000*		*99.5*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4700		ug/L	*5000*		*94.0*	*75-125*			
LCS (BHI0336-BS1)				Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 07:54						
Vinyl chloride	2.06	0.0200	ug/L	2.00		103	76-120			
1,1-Dichloroethene	2.06	0.200	ug/L	2.00		103	80-120			
cis-1,2-Dichloroethene	2.10	0.200	ug/L	2.00		105	80-120			
trans-1,2-Dichloroethene	2.06	0.200	ug/L	2.00		103	80-120			
Trichloroethene	1.97	0.200	ug/L	2.00		98.5	80-120			
Tetrachloroethene	2.07	0.200	ug/L	2.00		103	80-122			
Surrogate: 1,2-Dichloroethane-d4	5340		ug/L	*5000*		*107*	*80-129*			
Surrogate: Toluene-d8	5040		ug/L	*5000*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4870		ug/L	*5000*		*97.5*	*75-125*			
LCS Dup (BHI0336-BSD1)				Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 08:20						
Vinyl chloride	2.07	0.0200	ug/L	2.00		104	76-120	0.86	30	
1,1-Dichloroethene	2.06	0.200	ug/L	2.00		103	80-120	0.18	30	
cis-1,2-Dichloroethene	2.10	0.200	ug/L	2.00		105	80-120	0.02	30	
trans-1,2-Dichloroethene	2.08	0.200	ug/L	2.00		104	80-120	0.86	30	
Trichloroethene	1.97	0.200	ug/L	2.00		98.4	80-120	0.05	30	
Tetrachloroethene	2.08	0.200	ug/L	2.00		104	80-122	0.70	30	
Surrogate: 1,2-Dichloroethane-d4	5490		ug/L	*5000*		*110*	*80-129*			
Surrogate: Toluene-d8	5060		ug/L	*5000*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4900		ug/L	*5000*		*98.1*	*75-125*			
Matrix Spike (BHI0336-MS1)	**Source: 19I0083-02**			Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 16:48						
Vinyl chloride	2.03	0.0200	ug/L	2.00	0.0465	99.2	76-120			

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

Volatile Organic Compounds - SIM - Quality Control

Batch BHI0336 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BHI0336-MS1)	**Source: 19I0083-02**		Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 16:48							
1,1-Dichloroethene	2.03	0.200	ug/L	2.00	ND	101	80-120			
cis-1,2-Dichloroethene	2.58	0.200	ug/L	2.00	0.574	100	80-120			
trans-1,2-Dichloroethene	2.05	0.200	ug/L	2.00	ND	101	80-120			
Trichloroethene	2.38	0.200	ug/L	2.00	0.546	91.5	80-120			
Tetrachloroethene	1.98	0.200	ug/L	2.00	ND	99.2	80-122			
Surrogate: 1,2-Dichloroethane-d4	5630		ug/L	*5000*	*5460*	*113*	*80-129*			
Surrogate: Toluene-d8	4990		ug/L	*5000*	*4940*	*99.8*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4850		ug/L	*5000*	*4650*	*97.0*	*75-125*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BHI0336-MSD1)	**Source: 19I0083-02**		Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 17:13							
Vinyl chloride	2.07	0.0200	ug/L	2.00	0.0465	101	76-120	2.02	30	
1,1-Dichloroethene	2.06	0.200	ug/L	2.00	ND	102	80-120	1.40	30	
cis-1,2-Dichloroethene	2.60	0.200	ug/L	2.00	0.574	101	80-120	0.62	30	
trans-1,2-Dichloroethene	2.06	0.200	ug/L	2.00	ND	101	80-120	0.43	30	
Trichloroethene	2.40	0.200	ug/L	2.00	0.546	92.7	80-120	0.96	30	
Tetrachloroethene	2.02	0.200	ug/L	2.00	ND	101	80-122	1.72	30	
Surrogate: 1,2-Dichloroethane-d4	5400		ug/L	*5000*	*5460*	*108*	*80-129*			
Surrogate: Toluene-d8	4970		ug/L	*5000*	*4940*	*99.5*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4850		ug/L	*5000*	*4650*	*97.0*	*75-125*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

Certified Analyses included in this Report

Analyte	Certifications
EPA 8260C-SIM in Water	
Acrylonitrile	NELAP,CALAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2020
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:33

Notes and Definitions

*	Flagged value is not within established control limits.
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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

16 September 2019

Jennifer Parsons
The Boeing Company
PO Box 3703 MS 2R-96
Seattle, WA 98124

RE: Boeing Auburn 2Q 2019 Regional GWM

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)
19I0086	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, Inc.

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19I0086

LANDAU ASSOCIATES

Chain-of-Custody Record

☐ Seattle/Edmonds (425) 778-0907 ☐ Spokane (509) 327-9737
☑ Tacoma (253) 926-2493 ☐ Portland (503) 542-1080
☐ _____

Date 9/6/19
Page 1 of 1

Turnaround Time:
(Standard)
Accelerated

Project Name Boeing Auburn Project No. 0025164.170.101
Project Location/Event Auburn, WA/3Q SW sampling
Sampler's Name KMG/HER
Project Contact J. Wynkoop (LAI) D. Taege (Boeing)
Send Results To D. Jorgensen, D. Taege (see LIMS list)

Testing Parameters

5.3

Special Handling Requirements:

Shipment Method:

Stored on ice: (Yes) No

Sample I.D.	Date	Time	Matrix	No. of Containers	8260C SIM	Observations/Comments
TripBlank-20190904	—	—	Aq	2	X	
SW-27-20190906	9/6/19	930	Aq	3	X	

Allow water samples to settle, collect aliquot from clear portion ☐

NWTPH-Dx - Acid wash cleanup ☐
- Silica gel cleanup ☐

Dissolved metal samples were field filtered

Other

Relinquished by	Received by	Relinquished by	Received by
Signature Katie Geraghty	Signature	Signature	Signature
Printed Name Katie Geraghty	Printed Name Erin Scalle	Printed Name	Printed Name
Company Landau Associates	Company ARI	Company	Company
Date 9/6/2019 Time 10:00	Date 9/6/19 Time 1245	Date Time	Date Time

WHITE COPY - Laboratory YELLOW COPY - Project File PINK COPY - Client Representative

10/2018

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:36

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TripBlank-20190904	19I0086-01	Water	06-Sep-2019 09:36	06-Sep-2019 12:45
SW-27-20190906	19I0086-02	Water	06-Sep-2019 09:36	06-Sep-2019 12:45

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:36

Work Order Case Narrative

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were run 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 LCS percent recoveries were within control limits.

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WORK ORDER

19I0086

Client: The Boeing Company
Project: Boeing Auburn 2Q 2019 Regional GWM

Project Manager: Kelly Bottem
Project Number: [none]

Report To:
The Boeing Company
Jennifer Parsons
PO Box 3703 MS 2R-96
Seattle, WA 98124
Phone: -
Fax: -

Invoice To:
The Boeing Company
Jennifer Parsons
PO Box 3703 MS 2R-96
Seattle, WA 98124
Phone :-
Fax: -

Date Due: 20-Sep-2019 18:00 (10 day TAT)

Received By: Erin I. Salle
Logged In By: Kenny Dang

Date Received: 06-Sep-2019 12:45
Date Logged In: 06-Sep-2019 17:58

Samples Received at: **5.3°C**

Intact, properly signed and dated custody seals attached to outside of cooler(s)	Yes	Custody papers included with the cooler	Yes
Custody papers properly filled out (in, signed, analyses requested, etc)	Yes	Was a temperature blank included in the cooler	No
Was sufficient ice used (if appropriate)	Yes	All bottles sealed in individual plastic bags	No
All bottles arrived in good condition (unbroken)	Yes	All bottle labels complete and legible	Yes
Number of containers listed on COC match number received	Yes	Bottle labels and tags agree with COC	Yes
Correct bottles used for the requested analyses	Yes	All VOC vials free of air bubbles	Yes
Analyses/bottles require preservation (attach preservation sheet excluding VOC)	No	Sufficient amount of sample sent in each bottle	Yes
Sample split at ARI	No		

Analysis	Due	TAT	Expires	Comments
19I0086-01 TripBlank-20190904 [Water] Sampled 06-Sep-2019 09:36 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL B = VOA Vial, Clear, 40 mL, HCL				
8260C-SIM VOC	20-Sep-2019 15:00	10	20-Sep-2019 09:36	Custom RLs
19I0086-02 SW-27-20190906 [Water] Sampled 06-Sep-2019 09:36 (GMT-08:00) Pacific Time (US & Canada)				
A = VOA Vial, Clear, 40 mL, HCL B = VOA Vial, Clear, 40 mL, HCL C = VOA Vial, Clear, 40 mL, HCL				
8260C-SIM VOC	20-Sep-2019 15:00	10	20-Sep-2019 09:36	Custom RLs

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Auburn — Project Name: 3Q SW Sampling

COC No(s): _____ NA — Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 19I0086 — 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 1415 — 5.3

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: D00 2565

Cooler Accepted by: _____ Date: 9/6/19 Time: 1745

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? 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 _____

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: KD Date: 9/6/19 Time: 1758 Labels checked by: KD

***** 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:

By: Date:

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:36

TripBlank-20190904

19I0086-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/06/2019 09:36
Instrument: NT7 Analyst: LH — Analyzed: 09/12/2019 09:36

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0086-01 A
Preparation Batch: BHI0336 — Sample Size: 10 mL
Prepared: 12-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*99.5*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*93.5*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:36

SW-27-20190906

19I0086-02 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM — Sampled: 09/06/2019 09:36

Instrument: NT7 Analyst: LH — Analyzed: 09/12/2019 12:34

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) — Extract ID: 19I0086-02 A

Preparation Batch: BHI0336 — Sample Size: 10 mL

Prepared: 12-Sep-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	0.0200	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.200	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.200	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.200	ND	ug/L	U
Trichloroethene	79-01-6	1	0.200	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.200	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4			*80-129 %*	*112*	*%*	
Surrogate: Toluene-d8			*80-120 %*	*98.6*	*%*	
Surrogate: 4-Bromofluorobenzene			*75-125 %*	*92.6*	*%*	

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:36

Volatile Organic Compounds - SIM - Quality Control

Batch BHI0336 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0336-BLK1)				Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 08:45						
Vinyl chloride	ND	0.0200	ug/L							U
1,1-Dichloroethene	ND	0.200	ug/L							U
cis-1,2-Dichloroethene	ND	0.200	ug/L							U
trans-1,2-Dichloroethene	ND	0.200	ug/L							U
Trichloroethene	ND	0.200	ug/L							U
Tetrachloroethene	ND	0.200	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5420		ug/L	*5000*		*108*	*80-129*			
Surrogate: Toluene-d8	4980		ug/L	*5000*		*99.5*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4700		ug/L	*5000*		*94.0*	*75-125*			
LCS (BHI0336-BS1)				Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 07:54						
Vinyl chloride	2.06	0.0200	ug/L	2.00		103	76-120			
1,1-Dichloroethene	2.06	0.200	ug/L	2.00		103	80-120			
cis-1,2-Dichloroethene	2.10	0.200	ug/L	2.00		105	80-120			
trans-1,2-Dichloroethene	2.06	0.200	ug/L	2.00		103	80-120			
Trichloroethene	1.97	0.200	ug/L	2.00		98.5	80-120			
Tetrachloroethene	2.07	0.200	ug/L	2.00		103	80-122			
Surrogate: 1,2-Dichloroethane-d4	5340		ug/L	*5000*		*107*	*80-129*			
Surrogate: Toluene-d8	5040		ug/L	*5000*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4870		ug/L	*5000*		*97.5*	*75-125*			
LCS Dup (BHI0336-BSD1)				Prepared: 12-Sep-2019 Analyzed: 12-Sep-2019 08:20						
Vinyl chloride	2.07	0.0200	ug/L	2.00		104	76-120	0.86	30	
1,1-Dichloroethene	2.06	0.200	ug/L	2.00		103	80-120	0.18	30	
cis-1,2-Dichloroethene	2.10	0.200	ug/L	2.00		105	80-120	0.02	30	
trans-1,2-Dichloroethene	2.08	0.200	ug/L	2.00		104	80-120	0.86	30	
Trichloroethene	1.97	0.200	ug/L	2.00		98.4	80-120	0.05	30	
Tetrachloroethene	2.08	0.200	ug/L	2.00		104	80-122	0.70	30	
Surrogate: 1,2-Dichloroethane-d4	5490		ug/L	*5000*		*110*	*80-129*			
Surrogate: Toluene-d8	5060		ug/L	*5000*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4900		ug/L	*5000*		*98.1*	*75-125*			

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The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:36

Certified Analyses included in this Report

Analyte	Certifications
EPA 8260C-SIM in Water	
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Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2020
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019

The Boeing Company	Project: Boeing Auburn 2Q 2019 Regional GWM	
PO Box 3703 MS 2R-96	Project Number: [none]	**Reported:**
Seattle WA, 98124	Project Manager: Jennifer Parsons	16-Sep-2019 15:36

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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
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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.