LANDAU ASSOCIATES

January 15, 2021

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

Attn: Li Ma

Transmitted via email to: *lima461@ecy.wa.gov*

Re: Status Report No. 73, October through December 2020 Activity Period
Boeing Auburn Facility
WAD 041337130, RCRA Corrective Action Agreed Order No. 01HWTRNR-3345
Auburn, Washington
Project No. 0025164.180.501

Dear Mr. Ma:

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, Landau Associates, Inc. (LAI) is providing Status Report No. 73 on behalf of The Boeing Company (Boeing), which covers the 3-month activity period of October through December 2020.

References

1. October 15, 2020. Letter: Status Report No. 72, July through September 2020 Activity Period, Boeing Auburn Facility, WAD 041337130, RCRA Correction Action Agreed Order No. 01HWTRNR-3345, Auburn, Washington. From Sarah Fees, LAI, to Li Ma, Ecology.
2. October 16, 2020. Email: Boeing Fabrication Auburn Site – Status Report 72, July through August 2020 Activity Period. From Li Ma, Ecology, to Representatives of City of Algona, City of Auburn, City of Pacific, Ecology, and Boeing.
3. October 26, 2020. LAI Draft Technical Memorandum: Phase 10 Interim Groundwater Monitoring Program, Boeing Auburn Facility, Auburn, Washington.
4. October 30, 2020. Email: EIM Data Submission – Study ID FS2018. From Gaylen Sinclair, Ecology, to Kristi Schultz, LAI.
5. November 5, 2020. Email: RE: Phase 10 Groundwater Monitoring Plan. From Li Ma, Ecology, to Sarah Fees, LAI.
6. November 9, 2020. Conference Call re: Review of Ecology comments on Phase 10 Groundwater Monitoring Plan. Attendees: Sarah Fees, LAI, Debbie Taege, Boeing, and Li Ma, Ecology.
7. November 11, 2020. LAI Technical Memorandum: Phase 10 Interim Groundwater Monitoring Program, Boeing Auburn Facility, Auburn, Washington.

8. November 17, 2020. Email: RE: File Transfer: Phase 10 Groundwater Monitoring Plan – Boeing-Auburn Site Wide Corrective Action. From Li Ma, Ecology, to Sarah Fees, LAI.
9. November 19, 2020. Email: Draft SFS Additions and Due Date Extension. From Debbie Taege, Boeing, to Li Ma, Ecology.
10. November 19, 2020. Email: RE: Draft SFS Additions and Due Date Extension. From Li Ma, Ecology, to Debbie Taege, Boeing.
11. December 2, 2020. Email: Boeing Auburn – Notification of WSDOT Well Decommissioning. From Debbie Taege, Boeing, to Li Ma, Ecology.
12. December 11, 2020. LAI Report: Draft Supplemental Feasibility Study, Boeing Auburn Facility, Auburn, Washington.

Work Conducted

General Site-wide Corrective Action Activities

On October 15, 2020, LAI submitted Status Report No. 72 regarding third quarter 2020 activities to Washington State Department of Ecology (Ecology) and other stakeholders[1] for their records (Reference #1). Ecology project manager, Li Ma, has continued to attend regularly scheduled monthly conference calls with Boeing, LAI, and the City of Algona's environmental consultant, ICF International (ICF). Boeing and Ecology communication personnel also attend these calls, the primary purpose of which is to provide a status update on the project schedule, reporting, and public outreach.

Groundwater Sampling

Boeing submitted a draft Phase 10 interim groundwater monitoring plan (GWMP) to Ecology on October 26, 2020 (Reference #3). Ecology provided comments and questions on the draft (Reference #5), which were discussed via a conference call on November 7, 2020 (Reference #6). Based on these discussions, Boeing submitted a final Phase 10 interim GWMP to Ecology on November 11, 2020 (Reference #7). Ecology approved the Phase 10 GWMP on November 17, 2020 (Reference #8). Ecology-approved changes to the GWMP for Phase 10 included:

- Modifications to cyanide sampling and removal of arsenic monitoring.
- Modifications to volatile organic compound (VOC) sampling frequency including:
  - Discontinue VOC sampling at 25 wells monitored for VOCs only and discontinue VOC sampling at 4 wells monitored for petroleum hydrocarbons.
  - Reduction of sampling frequency from semiannual to annual at 161 monitoring wells.

Phase 10 semiannual groundwater sampling took place from December 1 through 8, 2020. The semiannual groundwater sampling data are provided in Attachment 1. The current monitoring well network is shown on Figure 1-1. A sampling matrix for the December 2020 semiannual sampling event

[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 #2).

is presented in Table 1-1. A complete summary of groundwater analytical results is presented in Tables 1-2 and 1-3.

Algona Enhanced Natural Attenuation Pilot Test

An enhanced natural attenuation pilot test was conducted in August and September 2015. Approximately 80,000 gallons of electron donor solution was injected into the shallow water-bearing zone. Boeing is performing post-injection sampling to monitor the effectiveness of the pilot test injection. Post-injection sampling was conducted quarterly through December 2017. Ongoing pilot test monitoring is completed semiannually during the June and December groundwater sampling events.

The December 2020 groundwater sampling event was the fifteenth sampling event (5 years) following injection activities. A summary of results from the pilot test monitoring wells is provided in Attachment 2. The pilot test injection and monitoring well locations are presented on Figure 2-1. Pilot test data are summarized in Table 2-1.

Following injection, indications of enhanced bioremediation were observed at eight wells consisting of three regularly monitored injection wells (IW34, IW36, and IW37) and five downgradient monitoring wells (AGW240-5, AGW269, AGW270, AGW271, and AGW275). The primary indications of enhanced bioremediation consist of post-injection increases in total organic carbon (TOC) above baseline (baseline TOC concentrations were less than 10 milligrams per liter [mg/L]); evidence of more reduced aquifer redox conditions; and changes in concentrations of trichloroethene (TCE), breakdown products, and/or end products. In addition, secondary effects of enhanced bioremediation were observed at three downgradient monitoring wells post-injection (AGW240-1, AGW273, and AGW274). These secondary effects consist of increased methane concentrations and shifts in the concentrations of TCE, breakdown products, and/or end products without increases in TOC concentrations. Changes in vinyl chloride concentrations and detections of end products ethene and/or ethane have been observed at all 11 wells discussed above, with primary or secondary effects of enhanced bioremediation.

Monitoring data from fourth quarter 2020 indicates that conditions are stabilizing at the 11 wells that showed primary or secondary effects of enhanced bioremediation from injection activities. Concentrations of total chlorinated VOCs (sum of TCE, DCE, and VC) appear to be stabilizing after a significant decrease from baseline concentrations at the 11 wells discussed above. There is no evidence of concentration rebound; however, some wells show evidence of seasonal variability. Additional discussions of the pilot test results and how they apply to the feasibility study are presented in the supplemental feasibility study (SFS).

Feasibility Study Reporting

The draft feasibility study (FS) report was submitted to Ecology in the fourth quarter 2019. Ecology provided initial comments on the draft FS report and Boeing and Ecology have been conducting

meetings and discussions to determine next steps. Updates that have been made based on Ecology's comments include revisions to the numerical groundwater flow and contaminant transport models, updates to individual well restoration time frame estimates, and evaluation of additional FS alternatives for the site-wide groundwater VOC plumes. In the third quarter 2020, Ecology requested submittal of a supplemental feasibility (SFS) report that evaluated four specific alternatives for site-wide groundwater cleanup. The SFS report would also include the results of the SFS investigation completed in the second and third quarters 2020. Boeing and Ecology agreed on a proposed timeline for completing the SFS report and began meeting biweekly to discuss the SFS reporting status in the third quarter 2020. On November 19, Boeing requested an extension on the due date of the SFS report in order to incorporate additional details and modeling backup for the SFS alternatives, as requested by Ecology (Reference #9). Ecology approved this extension on November 19, 2020 (Reference #10). The SFS was submitted to Ecology on December 11, 2020 (Reference #12). Boeing expects to receive Ecology comments on the draft FS and SFS reports in the first quarter 2021.

Data Management

Boeing and Ecology have agreed on annual submittals of data to Ecology's Environmental Information Management (EIM) database. In the third quarter 2020, Boeing submitted required EIM data for the past year of data collected (July 2019 through June 2020). Boeing received approval of the data submission from Ecology's EIM coordinator on October 30, 2020 (Reference #4).

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 periodically. Ecology is continuing preparation activities for the public review period for the draft FS and SFS reports.

Building 17-06 Ongoing Monitoring

Boeing and Ecology have agreed on semiannual monitoring for petroleum hydrocarbons in wells AGW128, AGW277, and AGW281 (located in Building 17-06) in June and September. However, because the wells are currently sampled semiannually in June and December, monitoring for petroleum hydrocarbons also occurs in December. Monitoring was completed on December 7, 2020. Free-phase product has been periodically detected in well AGW128; there was not any free-phase product detected in the well during the December 2020 monitoring event. 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 the product. The sorbent sock is replaced in June, September, and December during monitoring.

Occurrence of Problems

On November 5, 2020, the City of Auburn notified LAI of vandalism at the monitoring wells northwest of the intersection of SR167 and Main St to the west of Mill Creek. LAI personnel visited the area later the same day and noted that the lock had been broken off Boeing monitoring well AGW253. The lock was replaced. Monitoring well APP-069, which is owned by Washington State Department of Transportation (WSDOT), had additional vandalism that required repair. When LAI notified WSDOT about the well vandalism, they decided to decommission the well. APP-069 was decommissioned on November 17, 2020 by WSDOT personnel. This well has not been monitored as part of site-wide groundwater monitoring since 2015. The other WSDOT monitoring wells that we have previously monitored (APP-057 and APP-058) are still in place, at this time. However, WSDOT may decommission these wells in the future. This information, along with the decommissioning log for APP-069, was summarized in an email sent to Ecology on December 2, 2020 (Reference #11).

Projected Work for Next Reporting Period January through March 2021

Activities projected for the next reporting period pertain to FS activities and ongoing stormwater feature monitoring. Tasks during first quarter 2021 are expected to include:

- Respond to Ecology comments on the draft SFS report. Boeing and Ecology will continue to have biweekly meetings as needed to review progress.
- Wet season stormwater feature sampling at the Chicago Avenue ditch.

Other Significant Findings, Changes, and Contacts

None to report.

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
Associate Geologist

KMG/SEF/kjg
[\\TACOMA3\PROJECT\025\164\R\QUARTERLY PROGRESS RPTS\2020\4Q2020\LAI_BOA_4Q2020 STATUS RPT NO. 73 LETTER RPT.DOCX

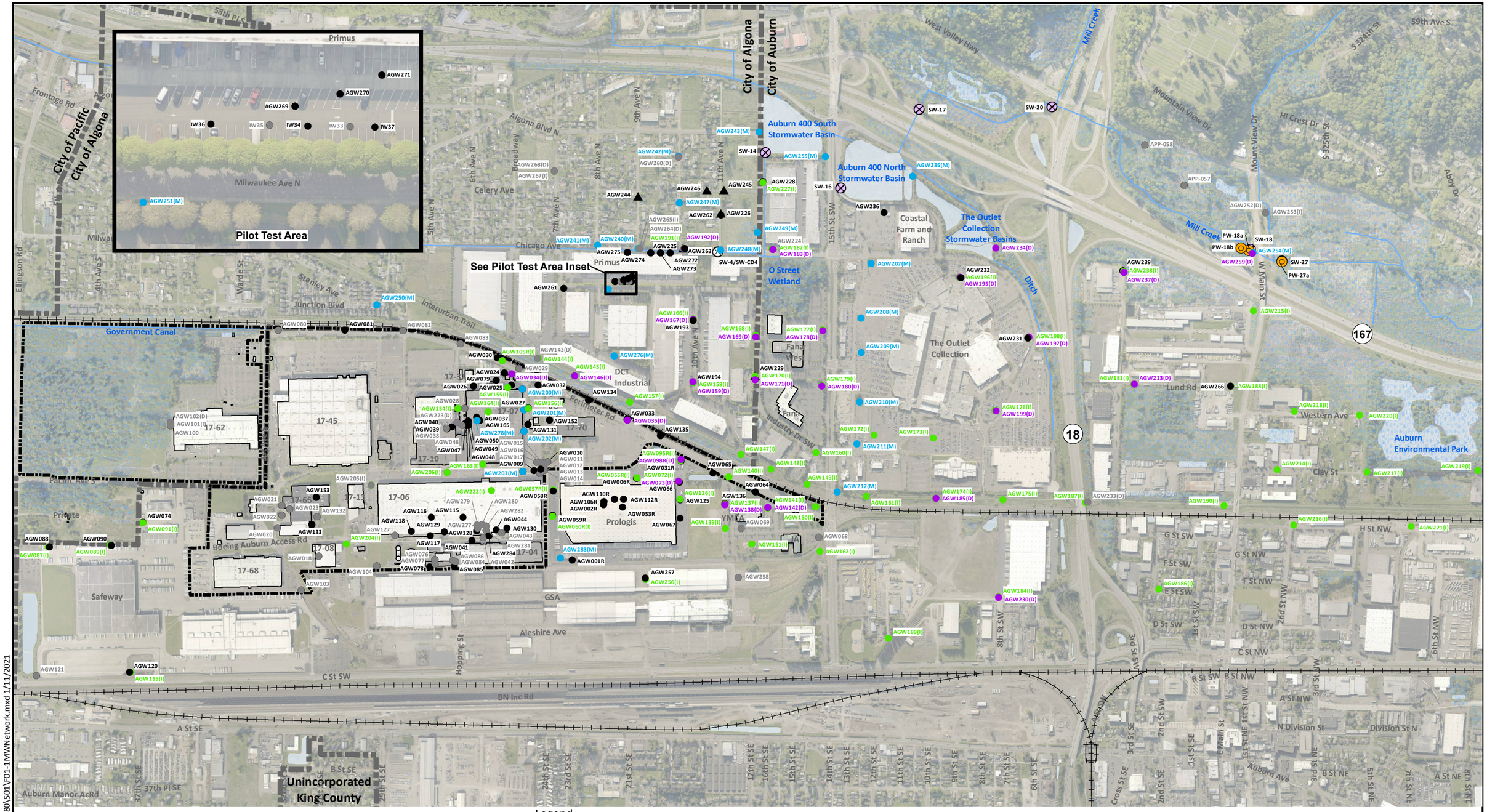
cc: Debbie Taege (email only)
Thomas MacMannis, Boeing (email only)
Kamara Sams, Boeing (email only)
James Swortz, Boeing (email only)
Kathryn Moxley, Boeing (email only)
Patrick McCabe, Boeing Realty (email only)
Janet Frentzel, Prologis (email only)
Kim Lemon, Prologis (email only)
Brett Richer, Prologis (email only)

Steve Campbell, Prologis (email only)
Jason Berry, YMCA Auburn (email only)
Christa Colouzis, Ecology (email only)
Janelle Anderson, Ecology (email only)

Attachments: Attachment 1: Groundwater Sampling Results
Attachment 2: Pilot Test Results
Attachment 3: Laboratory Data Packages

ATTACHMENT 1

Groundwater Sampling Results



Notes

1. Groundwater wells are identified by the AGW prefix. The designations behind the identifications indicate the zone. If there is no designation, the well is screened in the shallow zone. (I) = intermediate zone, (D) = deep zone, (M) = multi-level well; screens in multiple groundwater zones.
2. Well designations beginning with APP are installed and owned by WSDOT.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Offsite Water Table Well
- Shallow Monitoring Well (Water Table to 35 ft bgs)
- (I) Intermediate Monitoring Well (35 to 75 ft bgs)
- (D) Deep Monitoring Well (75 to 100 ft bgs)
- (M) Multi-Level Well
- Wells Not Currently Sampled
- Annual Stormwater/Surface Water Sample Location
- Semiannual Stormwater/Surface Water Sampling Location
- Annual Pore Water Sample Location
- Wetland Areas
- Water Bodies
- Waterways

0 1,000 2,000

Scale in Feet

N

Data Source: King County GIS.

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Current Monitoring Network

Figure 1

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Table 1-1
4Q2020 Groundwater Sampling Matrix
Boeing Auburn Facility
Auburn, Washington

Sample Location	Field Sample ID:	Sample Date:	Sample Type:	Laboratory SDG:	Laboratory Sample ID:	Select VOCs by SW-846 8260C-SIM (a)	BTEX by SW-846 8260C	TPH-G by NWTPH-Gx	TPH-D by NWTPH-Dx	MEE by RSK-175	TOC by SM 5310C	Sulfate by EPA 300.0	Diss. Metals by SW-846 6020A	Free Cyanide by ASTM D7237 (b)
AGW006R	AGW006R-20201208	12/8/2020	PDN	20L0154	20L0154-02	X								
AGW010	AGW010-20201207	12/7/2020	N	20L0104	20L0104-02		X	X	X					
AGW010	AGW900-20201207	12/7/2020	FD	20L0104	20L0104-03		X	X	X					
AGW024	AGW024-20201202	12/2/2020	PDN	20L0068	20L0068-09	X								
AGW026	AGW026-20201202	12/2/2020	PDN	20L0068	20L0068-13	X								
AGW027	AGW027-20201202	12/2/2020	PDN	20L0068	20L0068-11	X								
AGW031R	AGW031R-20201204	12/4/2020	PDN	20L0102	20L0102-03	X								
AGW032	AGW032-20201204	12/4/2020	PDN	20L0102	20L0102-02	X								
AGW033	AGW033-20201204	12/4/2020	PDN	20L0102	20L0102-07	X								
AGW033	AGW901-20201204	12/4/2020	PDFD	20L0102	20L0102-08	X								
AGW049	AGW049-20201201	12/1/2020	N	20L0048	20L0048-02								X	
AGW049	AGW049-NAOH-20201201	12/1/2020	N	A0L0047	A0L0047-01									X
AGW049	AGW902-20201201	12/1/2020	FD	20L0048	20L0048-03								X	
AGW049	AGW902-NAOH-20201201	12/1/2020	FD	A0L0047	A0L0047-03									X
AGW050	AGW050-20201201	12/1/2020	N	20L0048	20L0048-04								X	
AGW050	AGW050-NAOH-20201201	12/1/2020	N	A0L0047	A0L0047-05									X
AGW085	AGW085-20201202	12/2/2020	PDN	20L0068	20L0068-12	X								
AGW112R	AGW112R-20201208	12/8/2020	PDN	20L0154	20L0154-10	X								
AGW128	AGW128-20201207	12/7/2020	N	20L0121	20L0121-01				X					
AGW129	AGW129-20201204	12/4/2020	PDN	20L0102	20L0102-09	X								
AGW130	AGW130-20201207	12/7/2020	N	20L0121	20L0121-05				X					
AGW131	AGW131-20201202	12/2/2020	PDN	20L0068	20L0068-10	X								
AGW135	AGW135-20201204	12/4/2020	PDN	20L0102	20L0102-06	X								
AGW136	AGW136-20201204	12/4/2020	PDN	20L0102	20L0102-05	X								
AGW140	AGW140-20201204	12/4/2020	PDN	20L0102	20L0102-04	X								
AGW157	AGW157-20201203	12/3/2020	PDN	20L0089	20L0089-03	X								
AGW157	AGW903-20201203	12/3/2020	PDFD	20L0089	20L0089-04	X								
AGW159	AGW159-20201203	12/3/2020	PDN	20L0091	20L0091-07	X								
AGW160	AGW160-20201202	12/2/2020	PDN	20L0068	20L0068-06	X								
AGW164	AGW164-20201202	12/2/2020	PDN	20L0068	20L0068-14	X								
AGW170	AGW170-20201203	12/3/2020	PDN	20L0091	20L0091-08	X								
AGW171	AGW171-20201203	12/3/2020	PDN	20L0091	20L0091-09	X								
AGW175	AGW175-20201203	12/3/2020	N	20L0091	20L0091-04	X								
AGW179	AGW179-20201202	12/2/2020	PDN	20L0068	20L0068-08	X								
AGW180	AGW180-20201202	12/2/2020	PDN	20L0068	20L0068-07	X								
AGW181	AGW181-20201202	12/2/2020	PDN	20L0068	20L0068-04	X								
AGW187	AGW187-20201203	12/3/2020	PDN	20L0089	20L0089-02	X								
AGW201-2	AGW201-2-30-20201204	12/4/2020	N	20L0102	20L0102-10	X								
AGW202-2	AGW202-2-30-20201202	12/2/2020	N	20L0066	20L0066-06	X								

Table 1-1
4Q2020 Groundwater Sampling Matrix
Boeing Auburn Facility
Auburn, Washington

Sample Location	Field Sample ID:	Sample Date:	Sample Type:	Laboratory SDG:	Laboratory Sample ID:	Select VOCs by SW-846 8260C-SIM (a)	BTEX by SW-846 8260C	TPH-G by NWTPH-Gx	TPH-D by NWTPH-Dx	MEE by RSK-175	TOC by SM 5310C	Sulfate by EPA 300.0	Diss. Metals by SW-846 6020A	Free Cyanide by ASTM D7237 (b)
AGW207-2	AGW207-2-30-20201204	12/4/2020	N	20L0101	20L0101-04	X								
AGW208-4	AGW208-4-49-20201204	12/4/2020	N	20L0101	20L0101-05	X								
AGW210-5	AGW210-5-60-20201204	12/4/2020	N	20L0102	20L0102-11	X								
AGW210-6	AGW210-6-80-20201204	12/4/2020	N	20L0101	20L0101-06	X								
AGW212-5	AGW212-5-30-20201203	12/3/2020	N	20L0091	20L0091-03	X								
AGW225	AGW225-20201203	12/3/2020	N	20L0089	20L0089-06	X				X	X	X		
AGW225	AGW904-20201203	12/3/2020	FD	20L0089	20L0089-07	X				X	X	X		
AGW226	AGW226-20201202	12/2/2020	N	20L0066	20L0066-05	X				X	X	X		
AGW231	AGW231-20201202	12/2/2020	PDN	20L0068	20L0068-05	X								
AGW235-4	AGW235-4-39-20201203	12/3/2020	N	20L0091	20L0091-05	X								
AGW239	AGW239-20201202	12/2/2020	N	20L0068	20L0068-01	X								
AGW239	AGW905-20201202	12/2/2020	FD	20L0068	20L0068-02	X								
AGW240-1	AGW240-1-7-20201203	12/3/2020	N	20L0089	20L0089-05	X				X	X	X		
AGW240-5	AGW240-5-28-20201203	12/3/2020	N	20L0091	20L0091-06	X				X	X	X		
AGW244	AGW244-20201203	12/3/2020	N	20L0089	20L0089-08	X				X	X	X		
AGW247-1	AGW247-1-6-20201204	12/4/2020	N	20L0101	20L0101-03	X				X	X	X		
AGW247-5	AGW247-5-27-20201204	12/4/2020	N	20L0101	20L0101-02	X				X	X	X		
AGW251-1	AGW251-1-8-20201202	12/2/2020	N	20L0091	20L0091-02	X				X	X	X		
AGW251-2	AGW251-2-25-20201202	12/2/2020	N	20L0066	20L0066-03	X				X	X	X		
AGW251-3	AGW251-3-40-20201202	12/2/2020	N	20L0066	20L0066-04	X				X	X	X		
AGW269	AGW269-20201201	12/1/2020	N	20L0049	20L0049-04	X				X	X	X		
AGW270	AGW270-20201201	12/1/2020	N	20L0048	20L0048-09	X				X	X	X		
AGW271	AGW271-20201201	12/1/2020	N	20L0049	20L0049-02	X				X	X	X		
AGW272	AGW272-20201201	12/1/2020	N	20L0048	20L0048-07	X				X	X	X		
AGW273	AGW273-20201201	12/1/2020	N	20L0048	20L0048-08	X				X	X	X		
AGW274	AGW274-20201201	12/1/2020	N	20L0048	20L0048-05	X				X	X	X		
AGW275	AGW275-20201201	12/1/2020	N	20L0048	20L0048-06	X				X	X	X		
AGW276-2	AGW276-2-25-20201202	12/2/2020	N	20L0066	20L0066-02	X								
AGW277	AGW277-20201207	12/7/2020	N	20L0121	20L0121-02				X					
AGW281	AGW281-20201207	12/7/2020	N	20L0121	20L0121-04				X					
AGW282	AGW282-20201207	12/7/2020	N	20L0121	20L0121-03				X					
AGW283-1	AGW283-1-21-20201208	12/8/2020	N	20L0154	20L0154-03	X								
AGW283-2	AGW283-2-30-20201208	12/8/2020	N	20L0154	20L0154-04	X								
AGW283-3	AGW283-3-40-20201208	12/8/2020	N	20L0154	20L0154-05	X								
AGW283-4	AGW283-4-53-20201208	12/8/2020	N	20L0154	20L0154-06	X								
AGW283-5	AGW283-5-66-20201208	12/8/2020	N	20L0154	20L0154-07	X								
AGW283-6	AGW283-6-88-20201208	12/8/2020	N	20L0154	20L0154-08	X								
AGW283-7	AGW283-7-100-20201208	12/8/2020	N	20L0154	20L0154-09	X								

Table 1-1
4Q2020 Groundwater Sampling Matrix
Boeing Auburn Facility
Auburn, Washington

Sample Location	Field Sample ID:	Sample Date:	Sample Type:	Laboratory SDG:	Laboratory Sample ID:	Select VOCs by SW-846 8260C-SIM (a)	BTEX by SW-846 8260C	TPH-G by NWTPH-Gx	TPH-D by NWTPH-Dx	MEE by RSK-175	TOC by SM 5310C	Sulfate by EPA 300.0	Diss. Metals by SW-846 6020A	Free Cyanide by ASTM D7237 (b)
IW34	IW34-20201201	12/1/2020	N	20L0049	20L0049-06	X				X	X	X		
IW36	IW36-20201201	12/1/2020	N	20L0049	20L0049-03	X				X	X	X		
IW37	IW37-20201201	12/1/2020	N	20L0049	20L0049-05	X				X	X	X		

Notes:

(a) Select VOCs consist of 1,1-dichloroethene, cis-1,2-dichloroethene, tetrachloroethene, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride.

(b) Samples were analyzed for cyanide by Apex Laboratories; all other analytical methods were performed by Analytical Resources, Incorporated.

Abbreviations/Acronyms:

BTEX = benzene, toluene, ethylbenzene, and xylenes
EPA = US Environmental Protection Agency
FD = field duplicate
ID = identification
MEE = methane, ethane, ethene
N = primary sample
NWTPH = Northwest Total Petroleum Hydrocarbon
PDFD = passive diffusion field duplicate
PDN = passive diffusion primary sample
SDG = sample delivery group
SIM = selected ion monitoring
TOC = total organic carbon
TPH-Dx = total petroleum hydrocarbons diesel range
TPH-Gx = total petroleum hydrocarbons gasoline range
VOC = volatile organic compound

Table 1-2
4Q2020 Semiannual Groundwater Sampling Analytical Results
Volatile Organic Compounds, General Chemistry, and Dissolved Gases
Boeing Auburn Facility
Auburn, Washington

					Select VOCs by SW-846 8260C SIM (µg/L)						General Chemistry by EPA 300.0, SM5310C (mg/L)		Dissolved Gases by RSK-175 (µg/L)		
Sample Location	Zone	Laboratory SDG	Sample Date	Sample Type	1,1-Dichloroethene	cis-1,2-Dichloroethene	Tetrachloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride	Sulfate	Total Organic Carbon	Ethane	Ethene	Methane
AGW006R	Shallow	20L0154	12/8/2020	PDN	0.200 U	**0.787 J**	0.200 U	0.200 U	**0.374**	**0.0210**	--	--	--	--	--
AGW024	Shallow	20L0068	12/2/2020	PDN	0.200 U	**1.80**	0.200 U	0.200 U	0.200 U	**1.31**	--	--	--	--	--
AGW026	Shallow	20L0068	12/2/2020	PDN	0.200 U	**0.854**	0.200 U	0.200 U	**0.672**	**0.0280**	--	--	--	--	--
AGW027	Shallow-WT	20L0068	12/2/2020	PDN	0.200 U	**1.02**	0.200 U	0.200 U	0.200 U	**0.749**	--	--	--	--	--
AGW031R	Shallow	20L0102	12/4/2020	PDN	0.200 U	**3.39**	0.200 U	0.200 U	**0.675**	**0.0408**	--	--	--	--	--
AGW032	Shallow-WT	20L0102	12/4/2020	PDN	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0912**	--	--	--	--	--
AGW033	Shallow-WT	20L0102	12/4/2020	PDN	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0223**	--	--	--	--	--
AGW033	Shallow-WT	20L0102	12/4/2020	PDFD	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0251**	--	--	--	--	--
AGW085	Shallow-WT	20L0068	12/2/2020	PDN	0.200 U	0.200 U	**0.303**	0.200 U	**0.371**	0.0200 U	--	--	--	--	--
AGW112R	Shallow	20L0154	12/8/2020	PDN	0.200 U	**0.515**	0.200 U	0.200 U	**1.30**	**0.0662**	--	--	--	--	--
AGW129	Shallow-WT	20L0102	12/4/2020	PDN	0.200 U	0.200 UJ	**0.447 J**	0.200 U	**0.26**	0.0200 U	--	--	--	--	--
AGW131	Shallow	20L0068	12/2/2020	PDN	0.200 U	**0.999**	0.200 U	0.200 U	0.200 U	**3.45**	--	--	--	--	--
AGW135	Shallow	20L0102	12/4/2020	PDN	0.200 U	**0.337 J**	0.200 U	0.200 U	**1.16**	**0.0227**	--	--	--	--	--
AGW136	Shallow	20L0102	12/4/2020	PDN	0.200 U	**1.76**	0.200 U	0.200 U	**1.95**	**0.0243**	--	--	--	--	--
AGW140	Intermediate	20L0102	12/4/2020	PDN	0.200 U	**1.89**	0.200 U	0.200 U	**3.01**	**0.355**	--	--	--	--	--
AGW157	Intermediate	20L0089	12/3/2020	PDN	0.200 U	**3.06**	0.200 U	0.200 U	**0.236**	**0.379**	--	--	--	--	--
AGW157	Intermediate	20L0089	12/3/2020	PDFD	0.200 U	**3.09**	0.200 U	0.200 U	**0.243**	**0.383**	--	--	--	--	--
AGW159	Deep	20L0091	12/3/2020	PDN	0.200 U	**1.05**	0.200 U	0.200 U	**3.71**	**0.104**	--	--	--	--	--
AGW160	Intermediate	20L0068	12/2/2020	PDN	0.200 U	**0.227**	0.200 U	0.200 U	**2.72**	0.0200 U	--	--	--	--	--
AGW164	Intermediate	20L0068	12/2/2020	PDN	0.200 U	**0.497**	0.200 U	0.200 U	**1.47**	**0.0701**	--	--	--	--	--
AGW170	Intermediate	20L0091	12/3/2020	PDN	0.200 U	**0.513**	0.200 U	0.200 U	**2.12**	**0.0271**	--	--	--	--	--
AGW171	Deep	20L0091	12/3/2020	PDN	0.200 U	0.200 U	0.200 U	0.200 U	**1.77**	0.0200 U	--	--	--	--	--
AGW175	Intermediate	20L0091	12/3/2020	N	0.200 U	**0.562**	0.200 U	0.200 U	**1.52**	**0.0237**	--	--	--	--	--
AGW179	Intermediate	20L0068	12/2/2020	PDN	0.200 U	**7.04**	0.200 U	0.200 U	**0.246**	**0.434**	--	--	--	--	--
AGW180	Deep	20L0068	12/2/2020	PDN	0.200 U	**0.748**	0.200 U	0.200 U	**2.83**	0.0200 U	--	--	--	--	--
AGW181	Intermediate	20L0068	12/2/2020	PDN	0.200 U	**2.15**	0.200 U	0.200 U	**3.08**	**0.0423**	--	--	--	--	--
AGW187	Intermediate	20L0089	12/3/2020	PDN	0.200 U	**0.259**	0.200 U	0.200 U	**1.56**	0.0200 U	--	--	--	--	--
AGW201-2	Shallow	20L0102	12/4/2020	N	0.200 U	**1.72 J**	0.200 U	0.200 U	**0.309**	**1.85**	--	--	--	--	--
AGW202-2	Shallow	20L0066	12/2/2020	N	0.200 U	**2.96**	0.200 U	0.200 U	**0.906**	**1.51**	--	--	--	--	--
AGW207-2	Shallow	20L0101	12/4/2020	N	0.200 U	**5.33**	0.200 U	0.200 U	**3.67**	**0.160**	--	--	--	--	--
AGW208-4	Intermediate	20L0101	12/4/2020	N	0.200 U	**5.82**	0.200 U	0.200 U	**0.539**	**0.129**	--	--	--	--	--
AGW210-5	Intermediate	20L0102	12/4/2020	N	0.200 U	**1.70 J**	0.200 U	0.200 U	**0.661**	**0.0504**	--	--	--	--	--
AGW210-6	Deep	20L0101	12/4/2020	N	0.200 U	**0.448**	0.200 U	0.200 U	**3.27**	**0.0212**	--	--	--	--	--
AGW212-5	Intermediate	20L0091	12/3/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	**1.46**	0.0200 U	--	--	--	--	--

Table 1-2
4Q2020 Semiannual Groundwater Sampling Analytical Results
Volatile Organic Compounds, General Chemistry, and Dissolved Gases
Boeing Auburn Facility
Auburn, Washington

Sample Location	Zone	Laboratory SDG	Sample Date	Sample Type	Select VOCs by SW-846 8260C SIM (µg/L)						General Chemistry by EPA 300.0, SM5310C (mg/L)		Dissolved Gases by RSK-175 (µg/L)		
					1,1-Dichloroethene	cis-1,2-Dichloroethene	Tetrachloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride	Sulfate	Total Organic Carbon	Ethane	Ethene	Methane
AGW225	Off-Shallow	20L0089	12/3/2020	N	0.200 U	**4.63**	0.200 U	**0.383**	**2.07**	**0.516**	**1.68**	**3.73**	0.39 U	0.24 U	**307**
AGW225	Off-Shallow	20L0089	12/3/2020	FD	0.200 U	**4.66**	0.200 U	**0.390**	**2.05**	**0.520**	**1.82**	**3.75**	0.39 U	0.24 U	**314**
AGW226	Off-Shallow	20L0066	12/2/2020	N	0.200 U	**4.31**	0.200 U	**0.266**	**1.45**	**0.929 J**	**4.10**	**2.57**	0.39 U	0.24 UJ	**797**
AGW231	Shallow	20L0068	12/2/2020	PDN	0.200 U	**1.17**	0.200 U	0.200 U	0.200 U	**2.11**	--	--	--	--	--
AGW235-4	Intermediate	20L0091	12/3/2020	N	**0.227**	**13.8**	0.200 U	0.200 U	**1.17**	**0.215**	--	--	--	--	--
AGW239	Shallow	20L0068	12/2/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.152**	--	--	--	--	--
AGW239	Shallow	20L0068	12/2/2020	FD	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.147**	--	--	--	--	--
AGW240-1	Off-Shallow-WT	20L0089	12/3/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0797**	**0.190**	**7.94**	**2.25**	0.24 U	**7820**
AGW240-5	Off-Shallow	20L0091	12/3/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0354**	**0.118**	**6.30**	**3.69**	0.24 U	**4400**
AGW244	Shallow-WT	20L0089	12/3/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U	**9.11**	**4.81**	0.39 U	0.24 U	**14.3**
AGW247-1	Off-Shallow-WT	20L0101	12/4/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0731**	**0.857**	**25.35**	0.39 U	0.24 U	**2900**
AGW247-5	Off-Shallow	20L0101	12/4/2020	N	0.200 U	**0.551**	0.200 U	**0.349**	0.200 U	**0.983**	**0.133**	**5.39**	**2.75**	**0.92 J**	**2660**
AGW251-1	Off-Shallow-WT	20L0091	12/2/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.437**	**32.4**	**13.70**	0.39 U	0.24 U	**546**
AGW251-2	Off-Shallow	20L0066	12/2/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.711**	**0.221**	**5.41**	0.39 U	0.24 U	**1890**
AGW251-3	Off-Intermediate	20L0066	12/2/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**6.17**	**0.142**	**5.12**	0.39 U	0.24 U	**1730**
AGW269	Off-Shallow	20L0049	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0991**	0.100 U	**7.43**	0.39 U	0.24 U	**3170**
AGW270	Off-Shallow	20L0048	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.830**	0.100 U	**8.82**	**1.77**	0.24 U	**3420**
AGW271	Off-Shallow	20L0049	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.170**	**0.115**	**9.06**	0.39 U	0.24 U	**5390**
AGW272	Off-Shallow	20L0048	12/1/2020	N	0.200 U	**1.69**	0.200 U	**0.540**	**0.211**	**4.34**	0.100 U	**3.82**	0.39 U	0.24 U	**824**
AGW273	Off-Shallow	20L0048	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**1.60**	0.100 U	**5.67**	0.39 U	0.24 U	**2120**
AGW274	Off-Shallow	20L0048	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.112**	**0.120**	**7.58**	0.39 U	0.24 U	**5870**
AGW275	Off-Shallow	20L0048	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.0259**	0.100 U	**5.60**	0.39 U	0.24 U	**1820**
AGW276-2	Off-Shallow	20L0066	12/2/2020	N	0.200 U	**1.65**	0.200 U	**0.215**	**0.256**	**1.53**	--	--	--	--	--
AGW283-1	Shallow-WT	20L0154	12/8/2020	N	0.200 U	0.200 U	**0.214**	0.200 U	**1.56**	0.0200 U	--	--	--	--	--
AGW283-2	Shallow	20L0154	12/8/2020	N	0.200 U	0.200 UJ	0.200 U	0.200 U	**0.281**	0.0200 U	--	--	--	--	--
AGW283-3	Intermediate	20L0154	12/8/2020	N	0.200 U	0.200 U	**0.213**	0.200 U	0.200 U	0.0200 U	--	--	--	--	--
AGW283-4	Intermediate	20L0154	12/8/2020	N	0.200 U	0.200 UJ	0.200 U	0.200 U	0.200 U	0.0200 U	--	--	--	--	--
AGW283-5	Intermediate	20L0154	12/8/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U	--	--	--	--	--
AGW283-6	Deep	20L0154	12/8/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U	--	--	--	--	--
AGW283-7	Deep	20L0154	12/8/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.0200 U	--	--	--	--	--

Table 1-2
4Q2020 Semiannual Groundwater Sampling Analytical Results
Volatile Organic Compounds, General Chemistry, and Dissolved Gases
Boeing Auburn Facility
Auburn, Washington

Sample Location	Zone	Laboratory SDG	Sample Date	Sample Type	Select VOCs by SW-846 8260C SIM (µg/L)						General Chemistry by EPA 300.0, SM5310C (mg/L)		Dissolved Gases by RSK-175 (µg/L)		
					1,1-Dichloroethene	cis-1,2-Dichloroethene	Tetrachloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride	Sulfate	Total Organic Carbon	Ethane	Ethene	Methane
IW34	On-Shallow	20L0049	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**1.23**	0.100 U	**9.74**	0.39 U	0.24 U	**12900**
IW36	On-Shallow	20L0049	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**1.56**	**0.105**	**7.79**	0.39 U	0.24 U	**1500**
IW37	Shallow	20L0049	12/1/2020	N	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.318**	0.100 U	**8.44**	0.39 U	0.24 U	**4400**

Notes:

Bold text indicates detected analyte.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

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

UJ = The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Abbreviations/Acronyms:

EPA = US Environmental Protection Agency

FD = field duplicate

µg/L = micrograms per liter

mg/L = milligrams per liter

-- = not analyzed

N = primary sample

PDFD = passive diffusion field duplicate

PDN = passive diffusion primary sample

SDG = sample delivery group

SIM = selected ion monitoring

VOCs = volatile organic compounds

WT = water table

Table 1-3
4Q2020 Semiannual Groundwater Sampling Analytical Results
BTEX, Petroleum Hydrocarbons, Dissolved Metals, and Cyanide
Boeing Auburn Facility
Auburn, Washington

Sample Location	Zone	Laboratory SDG	Sample Date	Sample Type	BTEX by SW-846 8260C (µg/L)						Petroleum Hydrocarbons by NWTPH-Gx/Dx (mg/L)			Dissolved Metals by SW-846 6020A (mg/L)			Cyanide by ASTM D7237-10 (mg/L)
					Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes	Gasoline Range Organics (C7-C12)	Diesel Range Organics (C12-C24)	Oil Range Organics (C24-C40)	Cadmium	Copper	Nickel	Free Cyanide
AGW010	Shallow-WT	20L0104	12/7/2020	N	**0.63 J**	**1.88 J**	**436**	**438**	**45.7**	**484**	**18.8**	**0.441**	0.200 U	--	--	--	--
AGW010	Shallow-WT	20L0104	12/7/2020	FD	**0.65**	**2.05**	**441**	**433**	**45.8**	**479**	**19.3**	**0.419**	0.200 U	--	--	--	--
AGW049	Shallow	20L0048/A0L0047	12/1/2020	N	--	--	--	--	--	--	--	--	--	**0.0153**	**0.176**	**0.0331**	0.00500 U
AGW049	Shallow	20L0048/A0L0047	12/1/2020	FD	--	--	--	--	--	--	--	**--**	--	**0.0147**	**0.172**	**0.0315**	0.00500 U
AGW050	Shallow	20L0048/A0L0047	12/1/2020	N	--	--	--	--	--	--	--	--	--	**0.00738**	**--**	**0.00571**	0.00500 U
AGW128	Shallow-WT	20L0121	12/7/2020	N	--	--	--	--	--	--	--	**0.208**	**0.853**	**--**	**--**	**--**	--
AGW130	Shallow-WT	20L0121	12/7/2020	N	--	--	--	--	--	--	--	0.100 U	0.200 U	**--**	**--**	**--**	--
AGW277	Shallow-WT	20L0121	12/7/2020	N	--	--	--	--	--	--	--	0.100 U	0.200 U	**--**	--	**--**	**--**
AGW281	Shallow-WT	20L0121	12/7/2020	N	--	--	--	--	--	--	--	0.100 U	0.200 U	**--**	--	**--**	**--**
AGW282	Shallow-WT	20L0121	12/7/2020	N	--	--	--	--	--	--	--	0.100 U	0.200 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.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample

Abbreviations/Acronyms:

BTEX = benzene, toluene, ethylbenzene, and xylenes

FD = field duplicate

µg/L = micrograms per liter

mg/L = milligrams per liter

-- = not analyzed

N = primary sample

NWTPH = Northwest Total Petroleum Hydrocarbon

SDG = sample delivery group

WT = water table

ATTACHMENT 2

Pilot Test Results

Legend

- One-Time Surface Water Sampling Location
- Offsite Water Table Well
- Shallow Monitoring Well
- Shallow Observation Well (not part of ongoing monitoring)
- Shallow Injection Well
- Shallow Injection Well (not part of ongoing monitoring)
- Waterways

Notes

1. SW-CD13 was sampled in September 2017 for total organic carbon analysis.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 120 240

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2016

N

LANDAU ASSOCIATES

Boeing Auburn Auburn, Washington	**Pilot Test Well Locations**	Figure 2-1

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Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
AGW225	WT	12/1/2014	-0.8	<0.2	2.3	5.7	0.6	<0.2	0.5	<1.0	<1.0	1.20	-76.8	2.6	4.8	290	Fe/S	3.7	90	0.00	0.19	0.72	0.09	0.00
		8/14/2015	-0.1	<0.2	1.9	5.1	0.5	<0.2	0.49	<1.0	<1.0	1.39	**	6.4	4.1	360	Fe/S	4.2	80	0.00	0.18	0.72	0.10	0.00
		12/8/2015	0.3	<0.2	2.1	4.8	0.5	<0.2	0.5	<1.0	<1.0	2.0	-54.7	4.0	4.2	170	Fe/S	3.8	79	0.00	0.20	0.70	0.10	0.00
		3/2/2016	0.5	<0.2	1.9	4.6	0.4	<0.2	0.54	<1.0	<1.0	0.73	-14	2.5	3.3	420	Fe/S	4.3	75	0.00	0.19	0.69	0.12	0.00
		6/23/2016	0.8	<0.2	2.3	4.4	0.5	<0.2	0.5	<1.0	<1.0	3.40	271	2.0	4.9	330	Fe/S	3.6	76	0.00	0.23	0.66	0.11	0.00
		9/8/2016	1.0	<0.2	2.0	4.4	0.5	<0.2	0.46	<1.0	<1.0	0.48	-6.0	2.5	5.7	340	Fe/S	4.3	73	0.00	0.21	0.69	0.10	0.00
		12/2/2016	1.2	<0.2	2.4	4.8	0.5	<0.2	0.44	<1.0	<1.0	0.96	4.5	5.0	4.7	280	Fe/S	3.4	80	0.00	0.23	0.68	0.09	0.00
		3/10/2017	1.5	<0.2	2.2	4.3	0.4	<0.2	0.6	<1.0	<1.0	0.26	71.5	2.0	3.4	320	Fe/S	4.9	75	0.00	0.22	0.65	0.13	0.00
		6/7/2017	1.8	<0.2	2.5	4.5	0.5	<0.2	0.40	<1.0	<1.0	0.53	62.6	2.0	4.9	280	Fe/S	3.8	77	0.00	0.25	0.67	0.08	0.00
		9/7/2017	2.0	<0.20	2.1	4.3	0.49	<0.20	0.33	<0.40	<0.57	0.46	-31.3	3.5	5.0	430	Fe/S	4.2	71	0.00	0.23	0.70	0.07	0.00
		11/28/2017	2.2	<0.20	1.9	3.7	0.36	<0.20	0.39	<0.40	<0.57	2.85	-85.1	4.0	5.4	390	Fe/S	4.1	63	0.00	0.23	0.67	0.10	0.00
		6/5/2018	2.8	<0.20	1.8	3.2	0.32	<0.20	0.34	<0.40	<0.57	0.74	108.8	3	5.1	330	Fe/S	4.4	55	0.00	0.25	0.65	0.10	0.00
		12/7/2018	3.3	<0.200	2.17	3.44	0.337	<0.200	0.316	<0.24	<0.39	0.5	-38.6	5.00	5.16	390	Fe/S	3.46	61	0.00	0.27	0.64	0.08	0.00
		5/31/2019	3.7	<0.200	2.00	4.01	0.401	<0.200	0.435	<0.24	<0.39	0.58	166.8	1.50	3.22	476	Fe/S	4.52	68	0.00	0.22	0.67	0.10	0.00
		12/5/2019	4.3	<0.200	1.88	3.03	0.251	<0.200	0.320	<1.14	<1.23	0.28	-22.6	4.0	3.08	355	Fe/S	4.28	53	0.00	0.27	0.64	0.10	0.00
		5/29/2020	4.7	<0.200	1.38	3.00	0.242	<0.200	0.353	<0.24	<0.39	0.17	46.6	3.9	1.93	341	Fe/S	4.32	50	0.00	0.21	0.67	0.11	0.00
		12/3/2020	5.3	<0.200	2.07	4.63	0.383	<0.200	0.516	<0.24	<0.39	0.44	-214.1	6.0	1.68	307	Fe/S	3.73	76	0.00	0.21	0.68	0.11	0.00
AGW226	WT	8/14/2015	-0.1	<0.2	4.1	3.1	0.3	<0.2	0.56	<1.0	<1.0	0.55	-12.2	2.0	8	970	S/M	2.6	75	0.00	0.41	0.47	0.12	0.00
		12/2/2015	0.2	<0.2	0.5	1.8	<0.2	<0.2	0.4	<1.0	<1.0	7.29	-26.1	2.0	7.8	1000	S/M	5.5	29	0.00	0.13	0.65	0.22	0.00
		3/3/2016	0.5	<0.2	3.6	3.1	0.3	<0.2	0.54	<1.0	<1.0	0.54	-28.45	2.5	6.5	1300	S/M	2.4	71	0.00	0.39	0.49	0.12	0.00
		6/21/2016	0.8	<0.2	1	4.8	0.3	<0.2	0.7	<1.0	<1.0	0.44	177	2.0	7.4	1200	S/M	2.7	71	0.00	0.11	0.74	0.16	0.00
		9/8/2016	1.0	<0.2	1.1	3.8	0.3	<0.2	0.90	<1.0	<1.0	0.70	82.5	0.0	17.6	1100	S/M	4.2	65	0.00	0.13	0.65	0.22	0.00
		12/7/2016	1.3	<0.2	2.6	4.0	0.3	<0.2	0.73	<1.0	<1.0	1.67	45.1	3.0	7.6	920	S/M	2.4	76	0.00	0.26	0.58	0.15	0.00
		3/7/2017	1.5	<0.2	3.6	3.5	0.3	<0.2	0.60	<0.1	<0.1	0.48	-31.2	4.0	6.7	1000	S/M	2.5	76	0.00	0.36	0.51	0.13	0.00
		6/6/2017	1.8	<0.2	3.9	3.4	0.3	<0.2	0.5	<1.0	<1.0	0.46	75.9	3.0	7.5	970	S/M	2.3	76	0.00	0.39	0.50	0.11	0.00
		9/5/2017	2.0	<0.20	3.6	3.6	0.31	<0.20	0.36	<0.40	<0.57	0.68	-37.7	3.0	7.4	1400	S/M	2.6	73	0.00	0.37	0.55	0.08	0.00
		11/29/2017	2.2	<0.20	1.8	1.4	<0.20	<0.20	0.35	<0.40	<0.57	2.33	-65.7	4.5	19	870	S/M	4.4	34	0.00	0.41	0.43	0.17	0.00
		6/11/2018	2.8	<0.20	1.5	3.5	0.23	<0.20	0.49	<0.40	<0.57	0.61	105.2	3.0	7.6	960	S/M	2.5	58	0.00	0.20	0.67	0.14	0.00
		12/3/2018	3.2	<0.200	<0.200	0.284	<0.200	<0.200	0.295	<0.24	<0.39	0.96	175.0	1.00	70.2	613	S/M	13.89	8	0.00	0.00	0.38	0.62	0.00
		6/5/2019	3.8	<0.200	1.18	4.14	0.248	<0.200	0.561	<0.24	<0.39	0.36	-8.4	2.60	5.78	1480	S/M	2.35	63	0.00	0.14	0.72	0.14	0.00
		12/2/2019	4.2	<0.200	1.25	2.00	<0.200	<0.200	0.795	<1.14	<1.23	0.20	-94.9	0.80	22.2	1600	S/M	7.06	43	0.00	0.22	0.48	0.30	0.00
		6/4/2020	4.8	<0.200	1.56	3.31	0.209	<0.200	0.565	<0.24	<0.39	0.21	-48.5	3.50	4.33	1150	S/M	2.3	57	0.00	0.21	0.63	0.16	0.00
		12/2/2020	5.3	<0.200	1.45	4.31	0.266	<0.200	0.929	<0.24	<0.39	0.30	5.6	2.2	4.10	797	S/M	2.57	73	0.00	0.15	0.65	0.20	0.00

Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
AGW240-1	WT	12/1/2014	-0.8	<0.020	<0.2	<0.2	0.3	<0.2	0.3	<1.0	3.5	1.32	-169.5	2.7	<1.0	3200	M	8.6	7.9	0.00	0.00	0.02	0.04	0.94
		8/14/2015	-0.1	<0.020	<0.2	<0.2	0.2	<0.2	0.049	<1.0	2.5	0.54	-67.3	1.8	<1.0	2900	M	8.1	2.8	0.00	0.00	0.02	0.01	0.97
		12/7/2015	0.3	<0.020	<0.2	<0.2	<0.2	<0.2	0.3	<1.0	3.1	1.89	-83.3	2.5	<1.0	2800	M	7.5	4.8	0.00	0.00	0.00	0.04	0.96
		3/3/2016	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	1	<1.0	3.2	0.73	-13.23	5.0	<1.0	2900	M	7.9	16	0.00	0.00	0.00	0.13	0.87
		6/15/2016	0.8	<0.2	<0.2	<0.2	<0.2	<0.2	0.11	<1.0	3.4	1.9	-42.5	1.5	<1.0	5700	M	7.5	1.8	0.00	0.00	0.00	0.02	0.98
		9/8/2016	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	0.091	<1.0	4.2	0.60	-45.4	4.5	<1.0	8900	M	7.7	1.5	0.00	0.00	0.00	0.01	0.99
		11/30/2016	1.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.13	<1.0	2.5	0.64	-22.4	7.0	<1.0	14000	M	7.3	2.1	0.00	0.00	0.00	0.02	0.98
		3/10/2017	1.5	<0.2	<0.2	<0.2	<0.2	<0.2	0.13	<1.0	6.2	0.50	83.4	1.5	<1.0	19000	M	8.9	2.1	0.00	0.00	0.00	0.01	0.99
		6/6/2017	1.8	<0.2	<0.2	<0.2	<0.2	<0.2	0.049	<1.0	1.1	**	15.9	2.0	<1.0	1200	M	7.1	0.8	0.00	0.00	0.00	0.02	0.98
		9/5/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	0.068	<0.40	5.6	0.58	-77.6	3.4	<1.2	11000	M	7.9	1.1	0.00	0.00	0.00	0.01	0.99
		11/27/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	<0.57	6.57	-63.4	1.5 (c)	<1.2	1000	M	7.8	0.0	0.00	0.00	0.00	0.00	0.00
		6/5/2018	2.8	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	3.6	0.77	108.1	4	<1.2	11000	M	8.1	0.0	0.00	0.00	0.00	0.00	1.00
		12/7/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0531	<0.24	<0.39	0.59	-61.6	6.50	0.211	11700	M	7.36	0.8	0.00	0.00	0.00	1.00	0.00
		6/5/2019	3.8	<0.200	<0.200	<0.200	<0.200	<0.200	0.0624	<0.24	2.68	1.32	-19.3	4.20	0.127	9690	M	8.07	1.0	0.00	0.00	0.00	1.00	0.00
		12/5/2019	4.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0365	<1.14	2.13	0.32	-33.9	4.60	0.442	8350	M	8.67	0.6	0.00	0.00	0.00	0.01	0.99
		6/1/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	<0.0200	<0.24	2.18	0.33	126.1	3.00	0.117	5700	M	7.99	0.0	0.00	0.00	0.00	0.00	1.00
		12/3/2020	5.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0797	<0.24	2.25	0.46	-209.6	5.50	0.190	7820	M	7.94	1.3	0.00	0.00	0.00	0.02	0.98
AGW240-5	SZ	12/1/2014	-0.8	<0.020	<0.2	4.9	0.7	<0.2	6.6	<1.0	1	0.51	-116.1	2.8	<1.0	2200	M	6.6	163	0.00	0.00	0.29	0.54	0.17
		8/14/2015	-0.1	<0.020	<0.2	3.3	0.4	<0.2	5.6	1.2	<1.0	0.77	-41.7	2.8	<1.0	2000	M	5.4	128	0.00	0.00	0.22	0.53	0.25
		12/7/2015	0.3	<0.020	<0.2	1.8	0.3	<0.2	4.3	1.3	1.3	0.81	-86.8	6.0	<1.0	2200	M	6.5	90	0.00	0.00	0.12	0.38	0.50
		3/3/2016	0.5	<0.2	<0.2	1.7	0.3	<0.2	3.1	<1.0	<1.0	0.55	-19.15	6.0	<1.0	1700	M	6.9	70	0.00	0.00	0.29	0.71	0.00
		6/15/2016	0.8	<0.2	<0.2	0.3	0.3	<0.2	2.5	2	2.3	0.33	-40.8	3.0	<1.0	8100	M	20.2	46	0.00	0.00	0.03	0.21	0.76
		9/8/2016	1.0	<0.2	<0.2	<0.2	0.2	<0.2	0.20	<1.0	3.7	0.36	-48.8	4.0	<1.0	31000	M	5.7	5.3	0.00	0.00	0.02	0.02	0.96
		11/30/2016	1.2	<0.2	<0.2	<0.2	0.2	<0.2	0.10	<1.0	3.7	0.51	-34.4	8.0	<1.0	28000	M	6.2	3.7	0.00	0.00	0.02	0.01	0.97
		3/10/2017	1.5	<0.2	<0.2	<0.2	<0.2	<0.2	0.066	<1.0	9.2	0.24	58.7	4.0	<1.0	22000	M	5.8	1.1	0.00	0.00	0.00	0.00	1.00
		6/6/2017	1.8	<0.2	<0.2	<0.2	<0.2	<0.2	0.074	<1.0	7.6	0.73	63.8	3.0	<1.0	9500	M	4.8	1.2	0.00	0.00	0.00	0.00	1.00
		9/5/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	0.062	<0.80	4.5	0.71	-54.7	2.4	<1.2	20000	M	5.9	1.0	0.00	0.00	0.00	0.01	0.99
		11/27/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	4.6	1.60	-67.3	2.5 (c)	<1.2	19000	M	7.0	0.0	0.00	0.00	0.00	0.00	1.00
		6/5/2018	2.8	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	5.1	0.42	104.1	4.5	<1.2	9200	M	5.3	0.0	0.00	0.00	0.00	0.00	1.00
		12/7/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0237	<0.24	<0.39	0.38	-60.8	6.5	<0.100	12300	M	6.89	0.4	0.00	0.00	0.00	1.00	0.00
		6/5/2019	3.8	<0.200	<0.200	<0.200	<0.200	<0.200	0.0475	<0.24	2.86	0.39	-80.4	6.0	0.134	11900	M	5.75	0.8	0.00	0.00	0.00	1.00	0.00
		12/5/2019	4.3	<0.200	<0.200	<0.200	<0.200	<0.200	<0.0200	<1.14	2.47	0.41	-48.1	4.0	0.161	5060	M	7.47	0.0	0.00	0.00	0.00	0.00	1.00
		6/1/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.0368	<0.24	2.18	0.64	39.8	5.5	0.143	4640	M	5.68	0.6	0.00	0.00	0.00	0.01	0.99
		12/3/2020	5.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0354	<0.24	3.69	0.32	-43.8	4.6	0.118	4400	M	6.30	0.6	0.00	0.00	0.00	0.00	1.00
AGW244	WT	12/1/2016	1.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.020	<1.0	<1.0	0.96	20.1	0.0	13.2	54	N	3.8	0	0.00	0.00	0.00	0.00	0.00
		3/10/2017	1.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.020	<1.0	<1.0	6.3	88	0.5	15.2	<3.0	Fe	5.4	0	0.00	0.00	0.00	0.00	0.00
		6/5/2017	1.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.020	<1.0	<1.0	0.62	41.2	2.0	3.8	4600	S/M	53.1	0	0.00	0.00	0.00	0.00	0.00
		9/5/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	<0.57	0.59	-28.8	3.8	5.4	360	Fe/S	9.3	0	0.00	0.00	0.00	0.00	0.00
		11/27/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	<0.57	5.15	36.2	1.0	14	0.30	Fe	4.7	0	0.00	0.00	0.00	0.00	0.00
		6/7/2018	2.8	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	<0.57	0.58	113.4	1.5	6.6	1000	S/M	26	0	0.00	0.00	0.00	0.00	0.00
		12/3/2018	3.2	<0.200	<0.200	<0.200	<0.200	<0.200	<0.0200	<0.24	<0.39	2.85	146.7	1.00	10.8	<0.65	N/Fe	4.54	0	0.00	0.00	0.00	0.00	0.00
		6/5/2019	3.8	<0.200	<0.200	<0.200	<0.200	<0.200	<0.0200	<0.24	<0.39	0.5	13.0	2.00	6.55	605	S/M	15.11	0	0.00	0.00	0.00	0.00	0.00
		12/4/2019	4.3	<0.200	<0.200	<0.200	<0.200	<0.200	<0.0200	<1.14	<1.23	0.76	-169.8	1.20	15.3	506	S/M	11.20	0	0.00	0.00	0.00	0.00	0.00
		6/4/2020	4.8	<0.200	<0.200	<0.200	<0.200	<0.200	<0.0200	<0.24	<0.39	0.68	114.7	1.00	11.3	67	Fe/S	5.25	0	0.00	0.00	0.00	0.00	0.00
		12/3/2020	5.3	<0.200	<0.200	<0.200	<0.200	<0.200	<0.0200	<0.24	<0.39	0.79	-204.4	0.5	9.11	14.3	Fe/S	4.81	0	0.00	0.00	0.00	0.00	0.00

Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
AGW247-1	WT	12/2/2014	-0.8	<0.020	<0.2	0.8	<0.2	<0.2	0.17	<1.0	1	0.64	-76.1	2.5	6.3	3600	S/M	57.4	11	0.00	0.00	0.19	0.06	0.75
		8/14/2015	-0.1	<0.020	<0.2	3.4	0.4	<0.2	2.5	<1.0	<1.0	0.49	-61.4	3.4	<1.0	5200	M	9.6	79	0.00	0.00	0.49	0.51	0.00
		12/2/2015	0.2	<0.020	<0.2	1.5	0.3	<0.2	2.1	<1.0	<1.0	4.32	-101.2	5.5	1.1	6900	M	13.2	52	0.00	0.00	0.36	0.64	0.00
		3/2/2016	0.5	<0.2	<0.2	0.9	0.4	<0.2	4	<1.0	<1.0	0.44	-32.23	6.0	<1.0	7100	M	9.4	77	0.00	0.00	0.17	0.83	0.00
		6/15/2016	0.8	<0.2	<0.2	<0.2	0.5	<0.2	4.9	<1.0	<1.0	0.43	-49.5	2.5	<1.0	6100	M	9.7	84	0.00	0.00	0.06	0.94	0.00
		9/8/2016	1.0	<0.2	<0.2	<0.2	0.4	<0.2	4.7	<1.0	<1.0	0.62	-48.6	2.5	1.3	4200	M	11.1	79	0.00	0.00	0.05	0.95	0.00
		12/1/2016	1.2	<0.2	<0.2	<0.2	0.3	<0.2	4.0	<1.0	<1.0	0.74	-8.5	5.0	<1.0	4200	M	13.2	67	0.00	0.00	0.05	0.95	0.00
		3/7/2017	1.5	<0.2	<0.2	<0.2	0.4	<0.2	5.1	<1.0	<1.0	0.61	-47.3	4.5	<1.0	6500	M	10.2	86	0.00	0.00	0.05	0.95	0.00
		6/5/2017	1.8	<0.2	<0.2	<0.2	0.5	<0.2	4.8	<1.0	<1.0	0.79	0.9	2.0	<1.0	6700	M	9.2	82	0.00	0.00	0.06	0.94	0.00
		9/6/2017	2.0	<0.20	<0.20	<0.20	0.52	<0.20	6.5	<0.40	<0.57	0.52	-113.8	2.8	<1.2	6200	M	9.8	109	0.00	0.00	0.05	0.95	0.00
		11/28/2017	2.2	<0.20	<0.20	<0.20	0.23	<0.20	2.6	<0.40	<0.57	2.66	-74.2	3.5	2.7	4500	S/M	14	44	0.00	0.00	0.05	0.95	0.00
		3/13/2018	2.5	<0.20	<0.20	<0.20	0.41	<0.20	5.8	--	--	1.53	156.7	--	--	--	--	--	97	0.00	0.00	0.04	0.96	0.00
		6/11/2018	2.8	<0.20	<0.20	<0.20	0.39	<0.20	3.1	1.0	1.1	0.66	108.7	4.5	<1.2	4500	M	8.6	54	0.00	0.00	0.03	0.39	0.57
		9/4/2018	3.0	<0.20	<0.20	<0.20	0.44	<0.20	3.4	--	--	1.04	103.6	--	--	--	--	--	59	0.00	0.00	0.08	0.92	0.00
		12/3/2018	3.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.369	<0.24	<0.39	1.25	-11.8	4.0	8.69	2360	S/M	16.85	5.9	0.00	0.00	0.00	1.00	0.00
		5/28/2019	3.7	<0.200	<0.200	<0.200	0.318	<0.200	1.77	<0.24	<0.39	0.55	-40.4	4.5	0.212	7310	M	8.28	32	0.00	0.00	0.10	0.90	0.00
		12/2/2019	4.2	<0.200	<0.200	<0.200	0.207	<0.200	0.38	<1.14	<1.23	0.69	-102.1	5.0	0.81	2110	M	15.91	8.2	0.00	0.00	0.26	0.74	0.00
		5/28/2020	4.7	<0.200	<0.200	<0.200	0.232	<0.200	0.352	<0.24	<0.39	0.79	10.0	5.5	0.17	5160	M	8.39	8.0	0.00	0.00	0.30	0.70	0.00
		12/4/2020	5.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0731	<0.24	<0.39	0.59	-222.1	5.5	0.857	2900	M	25.35	1.2	0.00	0.00	0.00	1.00	0.00
AGW247-5	SZ	12/2/2014	-0.8	<0.020	<0.2	6.6	0.7	<0.2	1.7	<1.0	1.7	0.22	-136	5.0	<1.0	4000	M	21.3	103	0.00	0.00	0.47	0.17	0.36
		8/14/2015	-0.1	<0.020	<0.2	4.7	0.8	<0.2	3.0	<1.0	<1.0	0.54	-90.3	2.4	1.1	3400	M	6.2	105	0.00	0.00	0.54	0.46	0.00
		12/2/2015	0.2	<0.020	<0.2	2.9	0.7	<0.2	4.0	<1.0	<1.0	4.76	-97.4	4.5	<1.0	2100	M	6.7	101	0.00	0.00	0.37	0.63	0.00
		3/3/2016	0.5	<0.2	<0.2	2.2	0.7	<0.2	4.5	<1.0	<1.0	0.51	-63.1	6.5	<1.0	2000	M	5.7	102	0.00	0.00	0.29	0.71	0.00
		6/15/2016	0.8	<0.2	<0.2	1.8	0.8	<0.2	4.4	<1.0	<1.0	0.34	-72.1	2.0	<1.0	2300	M	5.4	97	0.00	0.00	0.28	0.72	0.00
		9/8/2016	1.0	<0.2	<0.2	1.3	0.6	<0.2	3.9	<1.0	<1.0	0.34	-77.9	3.5	1.6	1300	M	6.7	82	0.00	0.00	0.24	0.76	0.00
		12/1/2016	1.2	<0.2	<0.2	1.6	0.7	<0.2	4.0	<1.0	<1.0	0.65	-69.2	4.0	<1.0	1400	M	5.7	88	0.00	0.00	0.27	0.73	0.00
		3/7/2017	1.5	<0.2	<0.2	0.7	0.5	<0.2	3.9	<1.0	1.5	0.59	-89.3	3.0	<1.0	1400	M	5.5	75	0.00	0.00	0.10	0.50	0.40
		6/5/2017	1.8	<0.2	<0.2	1.2	0.5	<0.2	2.6	<1.0	2.1	0.45	-13.1	2.0	<1.0	1600	M	5.4	59	0.00	0.00	0.14	0.32	0.54
		9/6/2017	2.0	<0.20	<0.20	1.1	0.43	<0.20	2.7	<0.40	1.7	0.51	-118.1	1.6	<1.2	2200	M	5.9	59	0.00	0.00	0.14	0.37	0.49
		11/29/2017	2.2	<0.20	<0.20	1.2	0.44	<0.20	2.0	<0.40	1.7	2.15	-103.9	4.2 (b)	<1.2	1600	M	6.5	49	0.00	0.00	0.16	0.30	0.54
		6/11/2018	2.8	<0.20	<0.20	0.48	0.3	<0.20	1.1	0.87	2.9	0.99	113.9	3.5	<1.2	2400	M	5.9	26	0.00	0.00	0.05	0.11	0.83
		12/3/2018	3.2	<0.200	<0.200	0.999	0.422	<0.200	1.72	<0.24	<0.39	0.60	-44.9	6.0	<0.100	3120	M	5.42	42	0.00	0.00	0.35	0.65	0.00
		5/28/2019	3.7	<0.200	<0.200	0.824	0.273	<0.200	1.06	<0.24	<0.39	0.42	-61.1	2.0	0.157	3520	M	5.23	28	0.00	0.00	0.40	0.60	0.00
		12/2/2019	4.2	<0.200	<0.200	0.446	0.294	<0.200	0.957	<1.14	<1.23	0.30	-102.9	4.0	0.351	1920	M	6.22	23	0.00	0.00	0.33	0.67	0.00
		5/29/2020	4.7	<0.200	<0.200	0.303	<0.200	<0.200	0.565	<0.24	<0.39	0.55	13.0	5.5 (d)	0.125	3380	M	5.88	12	0.00	0.00	0.26	0.74	0.00
		12/4/2020	5.3	<0.200	<0.200	0.551	0.349	<0.200	0.983	0.92	2.75	0.43	-211.7	6.5	0.133	2660	M	5.39	25	0.00	0.00	0.06	0.11	0.83

Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
AGW251-1	WT	12/2/2014	-0.8	<0.020	<0.2	<0.2	<0.2	<0.2	1.8	2.2	5.8	0.83	-73.1	3.4	37.2	16000	S/M	27.3	29	0.00	0.00	0.00	0.10	0.90
		8/14/2015	-0.1	<0.020	<0.2	<0.2	<0.2	<0.2	0.62	<1.0	<1.0	4.51	**	6.8	1.3	140	Fe/S	16.9	10	0.00	0.00	0.00	1.00	0.00
		12/3/2015	0.2	<0.020	<0.2	<0.2	<0.2	<0.2	0.23	<1.0	<1.0	**	-60.5	1.0	280	440	Fe	8.9	3.7	0.00	0.00	0.00	1.00	0.00
		3/3/2016	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	0.15	<1.0	<1.0	0.85	41.55	1.0	117	560	Fe/S	33.8	2.4	0.00	0.00	0.00	1.00	0.00
		6/20/2016	0.8	<0.2	<0.2	<0.2	<0.2	<0.2	1.1	<1.0	<1.0	0.83	124.4	2.0	20.7	1800	S/M	11	18	0.00	0.00	0.00	1.00	0.00
		9/6/2016	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	1.6	1.3	<1.0	2.19	-78.2	4.5	4.3	1100	S/M	13.1	26	0.00	0.00	0.00	0.36	0.64
		12/2/2016	1.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.037	<1.0	<1.0	1.71	27.9	1.0	281	59	Fe	11.5	0.6	0.00	0.00	0.00	1.00	0.00
		3/7/2017	1.5	<0.2	<0.2	<0.2	<0.2	<0.2	0.050	<1.0	<1.0	0.78	-27.7	2.0	203	130	Fe	23.3	0.8	0.00	0.00	0.00	1.00	0.00
		6/7/2017	1.8	<0.2	<0.2	<0.2	<0.2	<0.2	1.0	<1.0	<1.0	5.88	61.6	2.0	69.7	410	Fe	11.5	16	0.00	0.00	0.00	1.00	0.00
		9/6/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	<0.57	5.13	-48.2	1.6	28	120	Fe	11	0.0	0.00	0.00	0.00	0.00	0.00
		12/1/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	<0.57	4.20	-59.2	5.5	210	54	Fe	13	0.0	0.00	0.00	0.00	0.00	0.00
		6/8/2018	2.8	<0.20	<0.20	<0.20	<0.20	<0.20	0.34	<0.40	0.97	1.44	115.8	5	110	220	Fe	15	5.4	0.00	0.00	0.00	0.14	0.86
		12/13/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.105	<0.24	<0.39	5.19	109.0	0.5	128	201	Fe	8.31	1.7	0.00	0.00	0.00	1.00	0.00
		5/29/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.0575	<0.24	<0.39	9.72	20.0	3.5	152	21.8	Fe	8.19	0.9	0.00	0.00	0.00	1.00	0.00
		12/9/2019	4.3	<0.200	<0.200	<0.200	<0.200	<0.200	<0.0200	<1.14	<1.23	--	--	2.20	170	5.96	Fe	35.56	0.0	0.00	0.00	0.00	0.00	0.00
		6/3/2020	4.8	<0.200	<0.200	<0.200	<0.200	<0.200	0.223	<0.24	<0.39	7.41	98.9	4.5 (e)	50.9	250	Fe	12.35	3.6	0.00	0.00	0.00	1.00	0.00
		12/2/2020	5.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.437	<0.24	<0.39	--	--	3.4	32.4	546	S/M	13.70	7.0	0.00	0.00	0.00	1.00	0.00
AGW251-2	SZ	12/2/2014	-0.8	<0.020	<0.2	2	0.2	<0.2	4.7	3.2	5.9	0.49	-141.9	4.0	1.1	8500	M	11.2	98	0.00	0.00	0.06	0.18	0.76
		8/14/2015	-0.1	<0.020	<0.2	<0.2	<0.2	<0.2	5.7	2.2	1.6	0.94	**	5.2	2.1	4800	M	7.1	91	0.00	0.00	0.00	0.41	0.59
		12/3/2015	0.2	<0.020	<0.2	<0.2	<0.2	<0.2	3.9	1.8	1.1	**	-109.1	6.0	1.2	3900	M	6.8	62	0.00	0.00	0.00	0.38	0.62
		3/3/2016	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	4.9	1.9	1.1	0.56	-99.13	1.5	1.9	2900	M	7.2	78	0.00	0.00	0.00	0.43	0.57
		6/20/2016	0.8	<0.2	<0.2	<0.2	<0.2	<0.2	2.7	2.7	1.1	0.56	48.8	2.0	<1.0	3700	M	8.1	43	0.00	0.00	0.00	0.25	0.75
		9/8/2016	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	1.8	2.6	1.3	0.73	-81.8	2.0	<1.0	3300	M	8.1	29	0.00	0.00	0.00	0.17	0.83
		12/2/2016	1.2	<0.2	<0.2	<0.2	<0.2	<0.2	2.3	2.1	<1.0	1.09	-56.9	5.0	<1.0	2800	M	6.8	37	0.00	0.00	0.00	0.33	0.67
		3/7/2017	1.5	<0.2	<0.2	<0.2	<0.2	<0.2	3.2	1.9	1.4	0.69	-80	5.5	<1.0	2500	M	7.3	51	0.00	0.00	0.00	0.31	0.69
		6/7/2017	1.8	<0.2	<0.2	<0.2	<0.2	<0.2	2.3	2.3	2.6	0.54	17.0	2.0	<1.0	3200	M	8.6	37	0.00	0.00	0.00	0.18	0.82
		9/6/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	1.6	2.4	1.7	0.55	-116.5	2.2	<1.2	3500	M	9.0	26	0.00	0.00	0.00	0.15	0.85
		12/1/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	1.4	2.0	1.8	2.66	-95.4	4.5	<1.2	2900	M	8.1	22	0.00	0.00	0.00	0.15	0.85
		6/8/2018	2.8	<0.20	<0.20	<0.20	<0.20	<0.20	1.1	2.5	2.3	0.99	102.4	4.5	<1.2	2200	M	9.1	18	0.00	0.00	0.00	0.10	0.90
		12/13/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.714	0.78	1.53	0.57	-29.7	3.4	0.127	2120	M	6.46	11	0.00	0.00	0.00	0.13	0.87
		5/29/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.724	<0.24	<0.39	0.63	-72.6	3.5	0.521	3030	M	7.00	12	0.00	0.00	0.00	1.00	0.00
		12/9/2019	4.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.649	0.98	2.09	0.23	-197.6	4.6	0.144	3020	M	6.25	10	0.00	0.00	0.00	0.09	0.91
		6/3/2020	4.8	<0.200	<0.200	<0.200	<0.200	<0.200	0.388	4.04	1.66	0.36	71.6	5.5	0.149	2100	M	6.45	6	0.00	0.00	0.00	0.03	0.97
		12/2/2020	5.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.711	<0.24	<0.39	0.44	-64.8	4.0	0.221	1890	M	5.41	11	0.00	0.00	0.00	1.00	0.00

Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
AGW251-3	IZ	12/2/2014	-0.8	<0.020	<0.2	5.9	0.5	<0.2	4.3	<1.0	1.2	1.09	-112.2	3.1	<1.0	2500	M	7.6	135	0.00	0.00	0.38	0.39	0.23
		8/14/2015	-0.1	<0.020	<0.2	3.0	0.2	<0.2	5.0	<1.0	<1.0	1.51	**	5.8	<1.0	2200	M	6.3	113	0.00	0.00	0.29	0.71	0.00
		12/3/2015	0.2	<0.020	<0.2	3.0	<0.2	<0.2	5.0	<1.0	<1.0	**	-93.7	6.0	<1.0	2100	M	6.1	111	0.00	0.00	0.28	0.72	0.00
		3/3/2016	0.5	<0.2	<0.2	1.2	<0.2	<0.2	7.8	<1.0	<1.0	0.59	-50.43	2.0	<1.0	2600	M	7.3	137	0.00	0.00	0.09	0.91	0.00
		6/20/2016	0.8	<0.2	<0.2	1.2	<0.2	<0.2	6.1	<1.0	<1.0	0.45	78.3	2.0	<1.0	2600	M	8.1	110	0.00	0.00	0.11	0.89	0.00
		9/8/2016	1.0	<0.2	<0.2	0.9	<0.2	<0.2	5.1	<1.0	<1.0	0.68	-38.6	3.5	<1.0	2100	M	6.7	91	0.00	0.00	0.10	0.90	0.00
		12/2/2016	1.2	<0.2	<0.2	1.2	<0.2	<0.2	6.8	<1.0	<1.0	1.05	-21.2	5.0	<1.0	2000	M	6.1	121	0.00	0.00	0.10	0.90	0.00
		3/7/2017	1.5	<0.2	<0.2	0.7	<0.2	<0.2	8.4	<1.0	<1.0	0.75	-50.8	5.0	<1.0	2100	M	7.2	142	0.00	0.00	0.05	0.95	0.00
		6/7/2017	1.8	<0.2	<0.2	0.6	<0.2	<0.2	6.6	<1.0	1.9	0.45	32.7	1.5	<1.0	2900	M	8.8	112	0.00	0.00	0.04	0.60	0.36
		9/6/2017	2.0	<0.20	<0.20	1.0	<0.20	<0.20	6.6	0.80	<0.57	0.47	-85.8	2.0	<1.2	2900	M	7.6	116	0.00	0.00	0.07	0.73	0.20
		12/5/2017	2.3	<0.20	<0.20	1.1	<0.20	<0.20	6.5	0.70	<0.57	2.93	-81.7	4.0	<1.2	3100	M	7.2	115	0.00	0.00	0.08	0.74	0.18
		3/13/2018	2.5	<0.20	<0.20	0.26	<0.20	<0.20	7.8	--	--	1.18	153.8	--	--	--	--	--	127	0.00	0.00	0.02	0.98	0.00
		6/8/2018	2.8	<0.20	<0.20	0.26	<0.20	<0.20	4.3	1.8	1.1	0.99	106.7	4.5	<1.2	2500	M	8.7	71	0.00	0.00	0.02	0.40	0.58
		9/4/2018	3.0	<0.20	<0.20	0.21	<0.20	<0.20	4.5	--	--	1.30	103.0	--	--	--	--	--	74	0.00	0.00	0.03	0.97	0.00
		12/13/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	4.99	0.84	0.70	0.36	-41.8	1.8	0.332	2260	M	6.33	80	0.00	0.00	0.00	0.60	0.40
		5/29/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	4.39	<0.24	<0.39	0.50	-32.9	4.5	0.190	3000	M	6.80	70	0.00	0.00	0.00	1.00	0.00
		12/9/2019	4.3	<0.200	<0.200	0.201	<0.200	<0.200	4.87	0.64	0.65	0.25	-235.2	3.6	<0.100	2250	M	5.97	80	0.00	0.00	0.02	0.63	0.36
		6/3/2020	4.8	<0.200	<0.200	<0.200	<0.200	<0.200	2.46	4.82	1.67	0.38	31.6	5.5	0.119	1990	M	6.41	39	0.00	0.00	0.00	0.15	0.85
		12/2/2020	5.3	<0.200	<0.200	<0.200	<0.200	<0.200	6.17	<0.24	<0.39	0.43	-41.2	4.4	0.142	1730	M	5.12	99	0.00	0.00	0.00	1.00	0.00
AGW269	SZ	8/14/2015	-0.1	<0.020	<0.2	6.7	0.7	<0.2	3.2	<1.0	<1.0	0.52	-95.9	1.0	1.9	1300	M	9.1	128	0.00	0.00	0.60	0.40	0.00
		12/7/2015	0.3	<0.020	0.2	7.4	1.2	<0.2	5.1	<1.0	1.7	0.36	-49.0	4.0	<1.0	26000	M	122	172	0.00	0.01	0.39	0.36	0.25
		3/2/2016	0.5	<0.2	<0.2	6.5	1	<0.2	5.2	<1.0	2	0.27	-43.8	2.0	<1.0	15000	M	8.5	161	0.00	0.00	0.34	0.37	0.29
		6/16/2016	0.8	<0.2	<0.2	1.9	0.6	<0.2	8.7	<1.0	<2.3	0.36	-28.1	2.0	<1.0	24000	M	8.2	165	0.00	0.00	0.16	0.84	0.00
		9/7/2016	1.0	<0.2	<0.2	0.6	0.3	<0.2	6.4	1.3	<1.0	0.49	-21.7	4.0	<1.0	29000	M	9.9	112	0.00	0.00	0.06	0.65	0.29
		11/29/2016	1.2	<0.2	<0.2	0.3	0.3	<0.2	4.9	1.1	5.9	0.67	-7.5	7.0	<1.0	35000	M	9.6	85	0.00	0.00	0.02	0.24	0.74
		3/6/2017	1.5	<0.2	<0.2	0.3	0.2	<0.2	5.4	<1.0	4.6	0.59	-39.9	2.0	<1.0	23000	M	8.9	92	0.00	0.00	0.02	0.35	0.63
		6/1/2017	1.7	<0.2	<0.2	< 0.2	0.2	<0.2	2.3	1.5	11	0.50	2.7	3.5	<1.0	18000	M	8.8	39	0.00	0.00	0.00	0.08	0.92
		9/5/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	1.0	<0.80	2.3	1.16	-44.9	3.0	<1.2	28000	M	8.5	16	0.00	0.00	0.00	0.17	0.83
		11/29/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	0.97	<1.2	2.4	0.26	-31.8	2.6	<1.2	34000	M	8.5	16	0.00	0.00	0.00	0.16	0.84
		5/31/2018	2.7	<0.20	<0.20	<0.20	<0.20	<0.20	0.89	<0.40	3.7	1.14	103.5	4.0	<1.2	12000	M	8.5	14	0.00	0.00	0.00	0.10	0.90
		12/4/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.159	<0.24	<0.39	0.67	-11.3	5.0	<0.100	22000	M	7.53	3	0.00	0.00	0.00	1.00	0.00
		5/30/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.718	<0.24	1.77	0.53	-20.1	6.0	0.115	5710	M	7.65	11	0.00	0.00	0.00	0.16	0.84
		12/3/2019	4.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.0696	<1.14	2.04	0.19	-177.8	4.6	0.681	12600	M	8.26	1	0.00	0.00	0.00	0.02	0.98
		5/26/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.744	<0.24	<0.39	0.83	95.8	1.8	0.137	2230	M	7.86	12	0.00	0.00	0.00	1.00	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.0991	<0.24	<0.39	0.39	-202.6	5.5	<0.100	3170	M	7.43	2	0.00	0.00	0.00	1.00	0.00

Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
AGW270	SZ	8/13/2015	-0.1	<0.020	<0.2	7.3	1	<0.2	2.2	<1.0	<1.0	1.58	**	5.8	<1.0	750	M	7.2	121	0.00	0.00	0.71	0.29	0.00
		12/7/2015	0.3	<0.020	1.7	10	1.7	<0.2	1.3	1.5	2.0	0.30	-11.0	2.5	<1.0	23000	M	682	154	0.00	0.05	0.44	0.08	0.44
		3/2/2016	0.5	<0.2	0.7	8.8	1	<0.2	1.7	<1.0	2.8	0.30	-38.6	6.5	<1.0	22000	M	75.2	134	0.00	0.02	0.45	0.12	0.41
		6/16/2016	0.8	<0.2	0.3	6	0.8	<0.2	2	<1.0	<2.0	0.60	-52.4	2.0	<1.0	25000	M	46.7	104	0.00	0.02	0.67	0.31	0.00
		9/7/2016	1.0	<0.2	<0.2	3.3	0.5	<0.2	2.9	1.0	<1.0	0.49	-47.9	3.0	1.1	22000	M	39.1	86	0.00	0.00	0.32	0.38	0.29
		11/28/2016	1.2	<0.2	<0.2	2.2	0.4	<0.2	3.2	1.4	<1.0	0.47	-26.2	5.0	<1.0	30000	M	38.7	78	0.00	0.00	0.21	0.40	0.39
		3/6/2017	1.5	<0.2	<0.2	1.3	0.3	<0.2	6.4	1.1	<1.0	0.46	-49.1	2.5	<1.0	29000	M	29.6	119	0.00	0.00	0.10	0.65	0.25
		6/2/2017	1.7	<0.2	<0.2	0.6	0.3	<0.2	6.1	2.1	<1.0	0.68	1.6	4.0	<1.0	23000	M	20.3	107	0.00	0.00	0.05	0.54	0.41
		9/7/2017	2.0	<0.20	<0.20	0.34	0.22	<0.20	6.3	<1.2	<1.7	0.66	-55.8	3.5	<1.2	30000	M	18	107	0.00	0.00	0.05	0.95	0.00
		11/28/2017	2.2	<0.20	<0.20	0.23	<0.20	<0.20	3.0	<1.2	<1.7	0.28	-10.6	3.6	<1.2	23000	M	17	50	0.00	0.00	0.05	0.95	0.00
		5/31/2018	2.7	<0.20	<0.20	<0.20	<0.20	<0.20	4.1	<1.2	3.7	6.84	113.8	3.5	<1.2	19000	M	12	66	0.00	0.00	0.00	0.35	0.65
		12/4/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	1.26	<0.24	<0.39	0.85	-5.3	2.0	<0.100	18200	M	10.96	20	0.00	0.00	0.00	1.00	0.00
		5/30/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	3.36	<0.37	1.32	0.33	-29.6	2.5	0.147	16900	M	10.35	54	0.00	0.00	0.00	0.55	0.45
		12/3/2019	4.2	<0.200	<0.200	<0.200	<0.200	<0.200	1.11	<1.14	1.37	0.19	-145.6	3.8	0.109	11000	M	10.30	18	0.00	0.00	0.00	0.28	0.72
		5/27/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	1.57	<0.24	<0.39	0.44	32.5	6.0	0.134	4400	M	9.18	25	0.00	0.00	0.00	1.00	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.830	<0.24	1.77	0.34	-211.4	5.0	<0.100	3420	M	8.82	13	0.00	0.00	0.00	0.18	0.82
AGW271	SZ	8/13/2015	-0.1	<0.020	<0.2	6.5	0.7	<0.2	4.6	<1.0	<1.0	1.32	**	6.2	<1.0	2300	M	6.8	148	0.00	0.00	0.50	0.50	0.00
		12/7/2015	0.3	<0.020	1.2	15	1.8	<0.2	5.9	1.2	1.9	0.33	22.2	7.0	<1.0	19000	M	971	277	0.00	0.02	0.45	0.25	0.28
		3/2/2016	0.5	<0.2	1.8	15	2.4	<0.2	2.8	1.5	3	0.37	25.8	6.0	<10.0	28000	M	1080	238	0.00	0.04	0.46	0.11	0.39
		6/16/2016	0.8	<0.2	0.3	6.9	0.7	<0.2	2	<1.0	<2.6	0.58	-35.8	3.0	<1.0	29000	M	48.6	113	0.00	0.02	0.70	0.28	0.00
		9/7/2016	1.0	<0.2	<0.2	4.4	0.5	<0.2	1.1	<1.0	<1.0	0.43	-39.5	2.5	<1.0	28000	M	16.9	68	0.00	0.00	0.74	0.26	0.00
		11/29/2016	1.2	<0.2	<0.2	2.5	0.5	<0.2	3.9	<1.0	<1.0	0.72	-25.5	8.0	<1.0	36000	M	14.0	93	0.00	0.00	0.33	0.67	0.00
		3/7/2017	1.5	<0.2	<0.2	0.6	<0.2	<0.2	3.3	<1.0	6.3	0.76	-54.6	3.0	<1.0	34000	M	15.0	59	0.00	0.00	0.02	0.20	0.78
		6/2/2017	1.7	<0.2	<0.2	0.3	<0.2	<0.2	1.7	<1.0	<1.0	0.56	1.6	2.5	<1.0	30000	M	14.1	30	0.00	0.00	0.10	0.90	0.00
		9/5/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	0.63	<1.2	<1.7	1.96	-60.1	3.0	<1.2	33000	M	13	10	0.00	0.00	0.00	1.00	0.00
		11/28/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	0.29	<1.2	<1.7	0.22	-43.6	3.8	<1.2	27000	M	14	4.6	0.00	0.00	0.00	1.00	0.00
		6/1/2018	2.7	<0.20	<0.20	<0.20	<0.20	<0.20	0.57	<0.40	3.4	0.89	125.6	3.5	<1.2	14000	M	13	9.1	0.00	0.00	0.00	0.07	0.93
		12/4/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.214	<0.24	<0.39	0.76	-8.0	4.0	<0.100	17600	M	10.39	3.4	0.00	0.00	0.00	1.00	0.00
		5/30/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.467	<0.24	2.23	0.47	-70.0	4.5	0.158	12100	M	13.71	7.5	0.00	0.00	0.00	0.09	0.91
		12/3/2019	4.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.142	<1.14	2.00	0.21	-169.4	1.8	<0.100	8380	M	11.39	2.3	0.00	0.00	0.00	0.03	0.97
		5/26/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.677	<0.24	<0.39	0.26	50.8	1.9	0.124	6470	M	10.09	11	0.00	0.00	0.00	1.00	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.170	<0.24	<0.39	0.27	-27.2	4.4	0.115	5390	M	9.06	2.7	0.00	0.00	0.00	1.00	0.00

Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
AGW272	SZ	8/13/2015	-0.1	<0.020	0.2	7.3	0.6	<0.2	0.66	<1.0	<1.0	0.49	-55.2	1.8	1.5	400	Fe/S	5.4	94	0.00	0.02	0.87	0.11	0.00
		12/7/2015	0.3	<0.020	0.2	6.4	0.7	<0.2	1.8	<1.0	<1.0	1.36	-85.3	4.0	<1.0	940	M	3.5	104	0.00	0.01	0.71	0.28	0.00
		3/2/2016	0.5	<0.2	0.3	5.4	0.5	<0.2	1.2	<1.0	<1.0	0.91	-71.43	1.0	1.1	460	Fe/S	4.1	82	0.00	0.03	0.74	0.23	0.00
		6/17/2016	0.8	<0.2	0.3	4.9	0.6	<0.2	2	<1.0	<1.0	0.76	-29.8	2.5	1.4	450	Fe/S	4.1	91	0.00	0.03	0.62	0.35	0.00
		9/7/2016	1.0	<0.2	0.3	3.9	0.6	<0.2	2.3	<1.0	<1.0	0.42	-37.5	3.0	1.6	360	Fe/S	4.9	86	0.00	0.03	0.54	0.43	0.00
		11/28/2016	1.2	<0.2	0.4	6.0	0.7	<0.2	1.3	<1.0	<1.0	1.22	-19.0	5.0	<1.0	700	M	4.0	93	0.00	0.03	0.74	0.22	0.00
		3/6/2017	1.5	<0.2	0.4	5.5	0.6	<0.2	1.3	<1.0	<1.0	0.33	23.9	2.5	<1.0	500	M	4.3	87	0.00	0.04	0.73	0.24	0.00
		6/1/2017	1.7	<0.2	0.4	4.9	0.7	<0.2	1.4	<1.0	<1.0	0.89	0.2	2.0	1.7	440	Fe/S	4.3	83	0.00	0.04	0.69	0.27	0.00
		9/5/2017	2.0	<0.20	<0.20	3.5	0.65	<0.20	1.6	0.60	<0.57	3.19	-72.3	3.5	1.3	680	S/M	4.6	68	0.00	0.00	0.48	0.29	0.24
		11/28/2017	2.2	<0.20	0.29	4.6	0.52	<0.20	1.4	<0.40	<0.57	0.26	-43.6	1.8	<1.2	930	M	4.3	77	0.00	0.03	0.68	0.29	0.00
		6/1/2018	2.7	<0.20	0.32	3.7	0.51	<0.20	1.3	0.88	<0.57	0.99	123.6	5.0	2.7	410	Fe/S	4.8	67	0.00	0.02	0.44	0.21	0.32
		12/4/2018	3.3	<0.200	0.261	4.66	0.5	<0.200	1.76	<0.24	<0.39	0.47	-25.7	6.0	<0.100	1080	M	3.51	83	0.00	0.02	0.64	0.34	0.00
		5/30/2019	3.7	<0.200	0.323	3.22	0.507	<0.200	1.5	<0.30	<0.39	2.09	-20.9	4.0	0.410	841	M	4.10	65	0.00	0.04	0.59	0.37	0.00
		12/3/2019	4.2	<0.200	<0.200	1.67	0.439	<0.200	3.68	0.44	<1.23	0.18	-185.5	3.4	<0.100	1170	M	4.22	81	0.00	0.00	0.23	0.61	0.16
		5/27/2020	4.7	<0.200	0.311	2.63	0.394	<0.200	1.41	<0.24	<0.39	2.04	101.5	6.0	0.273	428	Fe/S	4.57	56	0.00	0.04	0.56	0.40	0.00
		12/1/2020	5.2	<0.200	0.211	1.69	0.540	<0.200	4.34	<0.24	<0.39	0.34	-26.7	5.0	<0.100	824	M	3.82	94	0.00	0.02	0.24	0.74	0.00
AGW273	SZ	8/13/2015	-0.1	<0.020	<0.2	6.3	0.7	<0.2	4.2	<1.0	<1.0	1.61	**	4.6	<1.0	880	M	6.1	139	0.00	0.00	0.52	0.48	0.00
		12/7/2015	0.3	<0.020	<0.2	3.4	0.6	<0.2	6.0	<1.0	<1.0	1.52	-99.3	6.0	<1.0	1500	M	6.0	137	0.00	0.00	0.30	0.70	0.00
		3/2/2016	0.5	<0.2	<0.2	3.5	0.5	<0.2	3.9	<1.0	<1.0	0.51	-54.3	1.2	<1.0	1300	M	6.1	104	0.00	0.00	0.40	0.60	0.00
		6/17/2016	0.8	<0.2	<0.2	2.9	5	<0.2	3.9	<1.0	<1.0	0.71	24.1	2.0	<1.0	1300	M	5.5	144	0.00	0.00	0.57	0.43	0.00
		9/7/2016	1.0	<0.2	<0.2	2.6	0.5	<0.2	4.2	<1.0	<1.0	0.77	-30.9	4.0	<1.0	900	M	6.7	99	0.00	0.00	0.32	0.68	0.00
		11/29/2016	1.2	<0.2	<0.2	2.4	0.5	<0.2	4.8	1.3	1.2	1.33	-26.6	6.0	<1.0	3600	M	6.4	107	0.00	0.00	0.16	0.40	0.45
		3/6/2017	1.5	<0.2	<0.2	2.6	0.4	<0.2	5	<1.0	<1.0	0.21	-10.9	4.5	<1.0	1200	M	6.4	111	0.00	0.00	0.28	0.72	0.00
		6/1/2017	1.7	<0.2	<0.2	2.5	0.5	<0.2	3.9	<1.0	<1.0	0.61	2.2	3.0	<1.0	1200	M	6.0	93	0.00	0.00	0.33	0.67	0.00
		9/5/2017	2.0	<0.20	<0.20	1.6	0.33	<0.20	4.0	0.95	<0.57	0.72	-64.9	2.2	<1.2	1300	M	6.0	84	0.00	0.00	0.17	0.54	0.29
		11/28/2017	2.2	<0.20	<0.20	0.84	0.29	<0.20	4.1	1.3	1.5	0.23	-39.2	2.8	<1.2	3300	M	6.3	77	0.00	0.00	0.07	0.38	0.55
		3/13/2018	2.5	<0.20	<0.20	1.7	0.37	<0.20	4.1	--	--	1.37	148.0	--	--	--	--	--	87	0.00	0.00	0.25	0.75	0.00
		6/1/2018	2.7	<0.20	<0.20	1.4	0.3	<0.20	3.3	1.5	1.2	0.53	120.5	4.0	<1.2	1100	M	6.3	70	0.00	0.00	0.11	0.32	0.57
		9/4/2018	3.0	<0.20	<0.20	1.1	0.32	<0.20	3.3	--	--	1.29	101.8	--	--	--	--	--	67	0.00	0.00	0.22	0.78	0.00
		12/5/2018	3.3	<0.200	<0.200	0.501	0.219	<0.200	3.09	<0.24	<0.39	0.47	-62.1	6.0	<0.100	3130	M	5.56	57	0.00	0.00	0.13	0.87	0.00
		5/31/2019	3.7	<0.200	<0.200	0.870	0.267	<0.200	3.18	1.17	0.83	0.59	61.0	5.5	0.129	1880	M	6.09	63	0.00	0.00	0.09	0.39	0.53
		12/4/2019	4.3	<0.200	<0.200	0.209	<0.200	<0.200	2.00	0.78	1.98	0.31	-211.7	3.6	0.120	4160	M	6.53	34	0.00	0.00	0.02	0.25	0.73
		5/27/2020	4.7	<0.200	<0.200	0.385	<0.200	<0.200	2.12	<0.24	<0.39	0.38	49.8	6.0	0.130	1140	M	6.24	38	0.00	0.00	0.10	0.90	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	1.60	<0.24	<0.39	0.38	-193.9	5.5	<0.100	2120	M	5.67	26	0.00	0.00	0.00	1.00	0.00

Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
AGW274	SZ	8/13/2015	-0.1	<0.020	<0.2	<0.2	<0.2	<0.2	4	2.3	<1.0	0.54	-36.6	3.6	<1.0	1900	M	7.5	64	0.00	0.00	0.00	0.44	0.56
		12/7/2015	0.3	<0.020	<0.2	<0.2	<0.2	<0.2	1.9	1.3	2.2	2.07	-95.0	4.0	<1.0	2700	M	8.1	30	0.00	0.00	0.00	0.20	0.80
		3/2/2016	0.5	<0.2	<0.2	2	0.4	<0.2	5.5	<1.0	<1.0	0.43	-48.9	2.0	<1.0	920	M	7	113	0.00	0.00	0.22	0.78	0.00
		6/17/2016	0.8	<0.2	<0.2	0.6	0.3	<0.2	4.6	1.5	<1.0	0.47	-5.1	2.0	<1.0	920	M	5.8	83	0.00	0.00	0.07	0.54	0.39
		9/8/2016	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	1.1	1.6	3.6	1.05	-33.1	2.8	<1.0	9600	M	7	18	0.00	0.00	0.00	0.09	0.91
		11/29/2016	1.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7	1.6	4.6	0.83	-23.7	5.5	<1.0	13000	M	8.2	11	0.00	0.00	0.00	0.05	0.95
		3/6/2017	1.5	<0.2	<0.2	0.6	<0.2	<0.2	4.4	1.1	1.0	0.25	-27.3	1.5	<1.0	1500	M	7.6	77	0.00	0.00	0.04	0.47	0.49
		6/1/2017	1.7	<0.2	<0.2	1.9	0.4	<0.2	4.5	<1.0	<1.0	0.58	6.1	2.0	<1.0	700	M	6.7	96	0.00	0.00	0.25	0.75	0.00
		9/5/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	0.43	0.79	4.4	2.22	-55.9	4.3	<1.2	5300	M	6.9	7	0.00	0.00	0.00	0.04	0.96
		11/28/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	<0.40	4.6	0.46	-41.3	3.8	<1.2	12000	M	7.8	3	0.00	0.00	0.00	0.02	0.98
		6/1/2018	2.7	<0.20	<0.20	0.82	0.2	<0.20	3.2	1.5	1.5	0.55	117.5	4.0	<1.2	870	M	7.1	62	0.00	0.00	0.06	0.31	0.63
		12/5/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.116	<0.24	<0.39	0.55	-63.3	6.5	<0.100	7640	M	7.11	2	0.00	0.00	0.00	1.00	0.00
		5/31/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	1.82	0.57	1.47	0.51	85.1	5.0	0.152	1910	M	6.59	29	0.00	0.00	0.00	0.30	0.70
		12/4/2019	4.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0957	<1.14	1.94	0.25	-209.5	3.6	<0.100	7040	M	9.64	2	0.00	0.00	0.00	0.02	0.98
		5/27/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	1.98	<0.24	<0.39	0.42	85.1	6.5	0.137	1350	M	6.43	32	0.00	0.00	0.00	1.00	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.112	<0.24	<0.39	0.35	-39.3	5.0	0.120	5870	M	7.58	2	0.00	0.00	0.00	1.00	0.00
AGW275	SZ	8/13/2015	-0.1	<0.020	<0.2	2.3	0.3	<0.2	7.7	<1.0	<1.0	0.64	-47.6	3.0	1	2000	M	7.6	150	0.00	0.00	0.18	0.82	0.00
		12/7/2015	0.3	<0.020	<0.2	2.5	0.3	<0.2	7.7	<1.0	<1.0	1.02	-100.3	4.5	<1.0	2100	M	6.9	152	0.00	0.00	0.19	0.81	0.00
		3/2/2016	0.5	<0.2	<0.2	0.6	<0.2	<0.2	7.7	2.2	1.6	0.35	-48.5	2.2	<1.0	14000	M	79.7	129	0.00	0.00	0.02	0.47	0.50
		6/17/2016	0.8	<0.2	<0.2	<0.2	<0.2	<0.2	0.16	2.8	4.5	0.44	0.07	3.5	<1.0	26000	M	7.9	2.6	0.00	0.00	0.00	0.01	0.99
		9/8/2016	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	0.061	<1.0	5.8	0.46	-45.3	2.0	<1.0	16000	M	8.3	1.0	0.00	0.00	0.00	0.01	0.99
		11/29/2016	1.2	<0.2	<0.2	<0.2	0.2	<0.2	0.055	<1.0	6.5	0.60	-30.4	7.0	<1.0	16000	M	4.1	2.9	0.00	0.00	0.01	0.00	0.99
		3/6/2017	1.5	<0.2	<0.2	<0.2	<0.2	<0.2	0.057	<1.0	5.1	0.20	-44.9	2.0	<1.0	14000	M	8.5	0.9	0.00	0.00	0.00	0.01	0.99
		6/1/2017	1.7	<0.2	<0.2	<0.2	<0.2	<0.2	0.053	<1.0	9.6	0.52	0.3	1.0	<1.0	17000	M	8.1	0.8	0.00	0.00	0.00	0.00	1.00
		9/5/2017	2.0	<0.20	<0.20	<0.20	<0.20	<0.20	0.047	<0.40	4.1	0.67	-58.5	1.8	<1.2	9500	M	7.8	0.8	0.00	0.00	0.00	0.01	0.99
		11/29/2017	2.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	4.7	0.27	-47.5	3.8	<1.2	7300	M	8.0	0.0	0.00	0.00	0.00	0.00	1.00
		6/1/2018	2.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.020	<0.40	4.1	0.7	120	3.0	<1.2	8100	M	8.7	0.0	0.00	0.00	0.00	0.00	1.00
		12/5/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0295	<0.24	<0.39	0.45	-65.4	6.0	<0.100	2830	M	6.06	0.5	0.00	0.00	0.00	1.00	0.00
		5/31/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.0260	<0.24	2.65	0.39	93.5	5.5	0.317	4390	M	7.55	0.4	0.00	0.00	0.00	0.00	1.00
		12/4/2019	4.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.0266	<1.14	2.29	0.18	-205.9	4.6	<0.100	2130	M	6.69	0.4	0.00	0.00	0.00	0.01	0.99
		5/26/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.0220	<0.24	<0.39	0.43	49.1	4.2 (f)	0.122	2810	M	7.34	0.4	0.00	0.00	0.00	1.00	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.0259	<0.24	<0.39	0.48	-231.1	4.0	<0.100	1820	M	5.60	0.4	0.00	0.00	0.00	1.00	0.00
IW33	SZ	8/13/2015	-0.1	<0.020	<0.2	6.6	0.8	<0.2	3	<1.0	<1.0	1.86	-17.1	2.6	<1.0	940	M	7.4	124	0.00	0.00	0.61	0.39	0.00
		11/28/2016	1.2	--	--	--	--	--	--	--	--	**	38.3	--	--	--	--	205	--	--	--	--	--	--

Table 2-1
Data Summary - Algona Bioremediation Pilot Test
Boeing Auburn Facility
Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
IW34	SZ	8/17/2015	0.0	<0.020	0.2	7.6	0.8	<0.2	4.9	<1.0	<1.0	0.57	-60.2	4.0	<1.0	1900	M	6.9	167	0.00	0.01	0.52	0.47	0.00
		12/7/2015	0.3	<0.10	1.6	8.5	1.2	<0.2	1.1	2.9	1.7	1.79	-24.7	9.5	22.5	7900	S/M	6010	130	0.00	0.04	0.35	0.06	0.55
		3/2/2016	0.5	<0.2	5.3	16	2.5	<0.2	1.1	3	2.7	0.39	44.1	7.0	<10.0	15000	M	6450	249	0.00	0.09	0.43	0.04	0.44
		6/16/2016	0.8	<0.2	5.4	16	2.2	<0.2	0.9	3.8	2.2	1.07	116	3.0	1.9	23000	M	3840	243	0.00	0.09	0.42	0.03	0.46
		9/7/2016	1.0	<0.2	1.9	7.4	0.8	<0.2	0.34	1.5	<1.0	0.46	-85.3	6.0	1.1	17000	M	377	104	0.00	0.09	0.54	0.03	0.34
		11/28/2016	1.2	<2.0	<2.0	6.1	<2.0	<2.0	0.31	<1.0	<1.0	0.50	-69.7	7.0	<1.0	24000	M	259	68	0.00	0.00	0.93	0.07	0.00
		3/6/2017	1.5	<0.040 (a)	0.16 (a)	3.6	<2.0	<0.040 (a)	1.2	1.1	<1.0	0.89	-38.9	4.5	<1.0	24000	M	88	58	0.00	0.01	0.38	0.20	0.41
		6/1/2017	1.7	<0.2	<0.2	1.7	0.4	<0.2	2.2	2.4	< 1.0	0.53	28.3	1.0	<1.0	30000	M	36.6	58	0.00	0.01	0.15	0.25	0.60
		9/5/2017	2.0	<0.20	<0.20	1.0	<0.20	<0.20	2.0	<1.2	<1.7	1.26	-16.3	4.5	<1.2	27000	M	37	42	0.00	0.00	0.24	0.76	0.00
		11/28/2017	2.2	<0.20	<0.20	0.85	<0.20	<0.20	1.1	<1.2	<1.7	0.45	8.1	3.0	<1.2	27000	M	46	26	0.00	0.00	0.33	0.67	0.00
		5/31/2018	2.7	<0.20	<0.20	0.34	<0.20	<0.20	2.6	<1.2	2.9	1.35	121.9	5.0	<1.2	24000	M	32	45	0.00	0.00	0.02	0.29	0.68
		12/4/2018	3.3	<0.200	<0.200	0.272	<0.200	<0.200	0.67	<0.24	<0.39	0.52	-2.7	4.0	<0.100	23300	M	46.99	14	0.00	0.00	0.21	0.79	0.00
		5/30/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	3.90	<0.27	<0.61	0.51	-4.2	4.5	0.158	24800	M	12.63	62	0.00	0.00	0.00	1.00	0.00
		12/3/2019	4.2	<0.200	<0.200	0.269	<0.200	<0.200	0.568	<1.14	0.94	0.23	-192.4	3.8	0.114	17200	M	21.05	12	0.00	0.00	0.06	0.21	0.72
		5/26/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	3.090	<0.24	<0.39	0.90	73.3	1.9	0.139	11400	M	9.73	49	0.00	0.00	0.00	1.00	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	1.23	<0.24	<0.39	0.46	-205.1	5.0	<0.100	12900	M	9.74	20	0.00	0.00	0.00	1.00	0.00
IW35	SZ	8/17/2015	0.0	<0.020	<0.2	3.3	0.5	<0.2	3.7	<1.0	<1.0	0.77	-22.8	2.0	1	1800	M	7.2	98	0.00	0.00	0.40	0.60	0.00
		11/28/2016	1.2	--	--	--	--	--	--	--	--	0.76	0.7	--	--	--	--	16.3	--	--	--	--	--	--
IW36	SZ	8/17/2015	0.0	<0.020	0.2	3.3	0.7	<0.2	6	<1.0	<1.0	0.58	-29.5	2.8	<1.0	1700	M	7.6	139	0.00	0.01	0.30	0.69	0.00
		12/7/2015	0.3	<0.020	<1.0	1.6	<1.0	<1.0	3.8	<1.0	1.4	1.77	-100.2	6.0	<1.0	17000	M	63.7	77	0.00	0.00	0.13	0.49	0.38
		3/2/2016	0.5	<0.2	<0.2	1.5	0.4	<0.2	5.7	<1.0	2	0.32	-47.58	1.5	<1.0	14000	M	17.9	111	0.00	0.00	0.11	0.51	0.38
		6/16/2016	0.8	<0.2	<0.2	1.5	0.4	<0.2	4.5	<1.0	1.9	0.36	-7.85	1.0	<1.0	11000	M	11.4	92	0.00	0.00	0.13	0.47	0.41
		9/7/2016	1.0	<0.2	<0.2	1.7	0.4	<0.2	4.3	<1.0	1.8	0.35	-27.8	4.5	<1.0	6600	M	11.2	90	0.00	0.00	0.14	0.46	0.40
		11/28/2016	1.2	<0.2	<0.2	1.7	0.4	<0.2	4.8	<1.0	1.2	0.87	-8.2	6.0	<1.0	2900	M	10.1	98	0.00	0.00	0.16	0.56	0.29
		3/6/2017	1.5	<0.2	<0.2	1.3	0.4	<0.2	6.1	<1.0	<1.0	0.71	-38.9	1.5	<1.0	2500	M	10.8	115	0.00	0.00	0.15	0.85	0.00
		6/1/2017	1.7	<0.2	<0.2	1.3	0.4	<0.2	5.5	<1.0	2.0	0.36	5.9	1.5	<1.0	2800	M	10.3	106	0.00	0.00	0.10	0.51	0.39
		9/5/2017	2.0	<0.20	<0.20	0.36	0.23	<0.20	5.0	<0.40	1.7	0.69	-54.3	2.4	<1.2	2600	M	9.2	86	0.00	0.00	0.04	0.56	0.40
		11/29/2017	2.2	<0.20	<0.20	0.26	0.21	<0.20	4.9	0.41	1.3	0.34	-29.3	1.8	<1.2	2400	M	9.2	83	0.00	0.00	0.03	0.56	0.41
		3/13/2018	2.5	<0.20	<0.20	0.39	0.30	<0.20	6.2	--	--	1.20	155.5	--	--	--	--	--	106	0.00	0.00	0.07	0.93	0.00
		5/31/2018	2.7	<0.20	<0.20	0.22	0.23	<0.20	3.3	1.2	2.2	0.65	106.2	4.0	<1.2	1900	M	9.8	57	0.00	0.00	0.03	0.30	0.67
		9/4/2018	3.0	<0.20	<0.20	<0.20	<0.20	<0.20	2.0	--	--	5.85	109.6	--	--	--	--	--	32	0.00	0.00	0.00	1.00	0.00
		12/4/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	2.65	<0.24	<0.39	0.51	-8.7	5.5	<0.100	2410	M	8.24	42	0.00	0.00	0.00	1.00	0.00
		5/30/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	2.92	<0.36	1.16	0.43	-13.3	3.5	0.114	1830	M	8.57	47	0.00	0.00	0.00	0.55	0.45
		12/3/2019	4.2	<0.200	<0.200	<0.200	<0.200	<0.200	1.71	0.48	1.24	0.18	-187.7	3.0	0.15	2290	M	8.87	27	0.00	0.00	0.00	0.32	0.68
		5/26/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	1.54	<0.24	<0.39	0.44	115.2	1.7	0.148	1690	M	8.57	25	0.00	0.00	0.00	1.00	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	1.56	<0.24	<0.39	0.24	-23.1	4.0	0.105	1500	M	7.79	25	0.00	0.00	0.00	1.00	0.00

Table 2-1
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Auburn, Washington

Well	Aquifer Zone	Date	Elapsed Time from Injection (years)	Volatile Organic Compounds								Aquifer Redox Conditions						Donor Indicators	Total cVOC (nmol/L)	Molar Fraction				
				PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	tDCE (µg/L)	11DCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Sulfate (mg/L)	Methane (µg/L)	Aquifer Redox State	TOC (mg/L)		PCE	TCE	Total DCE	VC	Ethene+ Ethane
IW37	SZ	8/13/2015	-0.1	<0.020	<0.2	5.3	0.5	<0.2	4.9	<1.0	<1.0	0.56	-45	2.0	<1.0	1800	M	6.6	138	0.00	0.00	0.43	0.57	0.00
		12/7/2015	0.3	0.16	1.3	13	2.0	<0.2	1.5	5.8	3.1	1.40	-24.2	9.0	6.6	3800	M	4780	190	0.00	0.02	0.31	0.05	0.62
		3/2/2016	0.5	<0.2	0.8	7.7	1.0	<0.2	1.2	1.8	2.2	0.47	35.1	5.0	<10.0	23000	M	2480	115	0.00	0.02	0.36	0.08	0.54
		6/17/2016	0.8	<0.2	0.3	6	0.3	<0.2	0.4	<1.0	1.6	0.91	-81.5	2.5	<1.0	20000	M	1130	74	0.00	0.02	0.51	0.05	0.42
		9/7/2016	1.0	<0.2	<0.2	2.7	<0.2	<0.2	0.14	<1.0	<1.0	0.91	-123.4	5.0	1.3	17000	M	337	30	0.00	0.00	0.93	0.07	0.00
		11/28/2016	1.2	<0.2	<0.2	2.7	<0.2	<0.2	0.062	<1.0	<1.0	0.67	-106.8	7.0	<1.0	25000	M	356	29	0.00	0.00	0.97	0.03	0.00
		3/7/2017	1.5	<0.2	<0.2	2.5	<0.2	<0.2	0.17	<1.0	<1.0	0.74	-104.3	2.0	<1.0	27000	M	180	29	0.00	0.00	0.90	0.10	0.00
		6/1/2017	1.7	<0.2	<0.2	1.8	<0.2	<0.2	0.38	2.6	< 1.0	0.66	-49.3	4.5	<1.0	31000	M	87.6	25	0.00	0.00	0.16	0.05	0.79
		9/5/2017	2.0	<0.20	<0.20	0.80	<0.20	<0.20	1.3	<1.2	<1.7	0.88	-71.9	3.0	<1.2	31000	M	59	29	0.00	0.00	0.28	0.72	0.00
		11/28/2017	2.2	<0.20	<0.20	0.53	<0.20	<0.20	0.91	<1.2	<1.7	0.19	-40.3	3.6	<1.2	42000	M	48	20	0.00	0.00	0.27	0.73	0.00
		3/13/2018	2.5	<0.20	<0.20	0.36	<0.20	<0.20	1.3	--	--	1.27	157.1	--	--	--	--	--	25	0.00	0.00	0.15	0.85	0.00
		5/31/2018	2.7	<0.20	<0.20	0.22	<0.20	<0.20	0.98	<1.2	3.3	0.52	83.9	4.0	<1.2	21000	M	20	18	0.00	0.00	0.02	0.12	0.86
		9/4/2018	3.0	<0.20	<0.20	<0.20	<0.20	<0.20	0.42	--	--	1.04	108.6	--	--	--	--	--	7	0.00	0.00	0.00	1.00	0.00
		12/5/2018	3.3	<0.200	<0.200	<0.200	<0.200	<0.200	0.309	<0.24	<0.39	0.42	-70.1	6.5	<0.100	23900	M	18.89	5	0.00	0.00	0.00	1.00	0.00
		5/30/2019	3.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.466	<0.24	1.65	0.44	-38.2	5.5	0.132	12200	M	9.93	7	0.00	0.00	0.00	0.12	0.88
		12/3/2019	4.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.285	<1.14	2.09	0.18	-188.2	2.6	<0.100	16200	M	13.73	5	0.00	0.00	0.00	0.06	0.94
		5/26/2020	4.7	<0.200	<0.200	<0.200	<0.200	<0.200	0.801	<0.24	<0.39	0.30	42.9	1.7	0.116	3090	M	6.77	13	0.00	0.00	0.00	1.00	0.00
		12/1/2020	5.2	<0.200	<0.200	<0.200	<0.200	<0.200	0.318	<0.24	<0.39	0.26	-43.0	3.0	<0.100	4400	M	8.44	5	0.00	0.00	0.00	1.00	0.00

Notes:

Blue shading indicates the compound with highest molar fraction per event
Electron donor injection performed August 18 through September 4, 2015
Acetylene was monitored from August 2015 through December 2016. There were no detections of this constituent; therefore, sampling was discontinued and it has been removed from this table.
Methane, Ethene, and Ethane values are reported to the method detection limit and non-detect values are presented as less than the method detection limit.
The number of significant figures and reporting limits have varied throughout the analysis period due to changes in laboratory reporting.
Total DCE is the sum of cDCE, tDCE, and 11DCE
Bubbly = Large surface bubbles (apparent surfactant)
Effervescent = Small suspended bubbles (dissolved gases)
(a) Results presented are from analysis by Method 8260C SIM. Samples were reanalyzed by Method 8260C SIM in order to meet data quality objectives due to elevated reporting limits (2.0 µg/L) in the Method 8260C run.
(b) Iron was measured on December 14, 2017.
(c) Iron was measured on November 28, 2017.
(d) Iron was measured on June 3, 2020.
(e) Iron was measured on June 5, 2020.
(f) Iron was measured on May 28, 2020.

Abbreviations/Acronyms:

Fe = Iron-reducing
M = Methanogenic
S = Sulfate-reducing
IZ = Intermediate Zone
SZ = Shallow Zone
WT = Water Table Zone

Units/Analytical Results

-- = not applicable/not analyzed
** = Instrument Error
µg/L = micrograms per liter
µmol/L = micromoles per liter
mg/L = micrograms per liter
mV = millivolt
nmol/L = nanomole per liter

Chemicals

11DCE = 1,1-dichloroethene
cDCE = cis-1,2-dichlorethene
cVOC = chlorinated volatile organic compounds
DO = dissolved oxygen
ORP = oxygen-reduction potential
PCE = tetrachloroethene
tDCE = trans-1,2-dichloroethene
TCE = trichloroethene
VC = vinyl chloride

ATTACHMENT 3

Laboratory Data Packages
(only included in final hard copy on DVD)