

TECHNICAL MEMORANDUM

TO: Carl Bach, The Boeing Company, and Allison Crowley, Seattle City Light

FROM: Colette Gaona and Kristy J. Hendrickson, P.E.

DATE: August 18, 2015

RE: **ADDENDUM NO. 2**
NORTH BOEING FIELD/GEORGETOWN STEAM PLANT SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN
SEATTLE, WASHINGTON

This technical memorandum presents Addendum No. 2 to the North Boeing Field/Georgetown Steam Plant Site (NBF/GTSP) Remedial Investigation/Feasibility Study (RI/FS) Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP, Leidos 2014). This addendum provides a summary of the deviations/revisions to the approved SAP/QAPP, which have been approved by the Washington State Department of Ecology (Ecology) since Addendum No. 1 was issued on February 19, 2015.

Revisions to the approved SAP/QAPP are summarized below:

- Sample locations that were moved more than 10 feet (ft) during utility locate activities were approved by Ecology via email. These are soil boring PEL-SB02 and groundwater monitoring wells NGW608, NGW612, and NGW618 (Edens 2015a, b, c, d).
- In some cases, adjacent drainage areas identified for sample collection were combined to provide enough surface debris material for sample collection. This change from the approved SAP/QAPP was approved by Ecology via email on March 30, 2015 (Dube 2015a).
- As approved by Ecology (Gaona 2015), Cascade Drilling followed their standard operating procedure for decontamination of equipment between sample locations, which included pressure washing and/or steam cleaning of drilling equipment.
- The analytical laboratory, Analytical Resources, Inc. (ARI), adjusted the method for metals analysis in aqueous samples, as needed, based on high concentrations that may interfere with the method specified in the SAP/QAPP. ARI worked to maintain the same limit of quantitation (LOQ) specified in the SAP/QAPP when the method was adjusted (Landau Associates 2015).
- As approved by Ecology (Dube 2015b), inspection and sampling of alternate storm drain structures or surface debris sample locations in place of sample locations with limited or no sample volume will be conducted during a Phase 1B sampling event, if needed. The Phase 1B sampling event will be conducted after results from the initial storm drain structures have been validated. The proposed Phase 1B sampling locations will be submitted to Ecology for approval prior to the sampling event.
- During validation of dioxin/furan data, it was noted that, due to a communication error, three field duplicates for dioxin/furan samples, one each for soil, storm drain solids, and surface debris, were not collected. Field duplicates for dioxin/furan samples will be collected during the remaining Phase 1B and Phase 2 sampling events in accordance with the SAP/QAPP (Leidos 2014).

- Due to a lab reporting error, results for four compounds [aniline, azobenzene, n-nitrosodimethylamine, and dichlorodifluoromethane (CFC 12)] were not included in the laboratory data packages for soil and groundwater. As subsequently approved by Ecology (Edens 2015e), these four compounds were removed from the list of required analytes for soil and groundwater. As shown in Tables 6-3 and 6-4 of the NBF/GTSP RIFS Work Plan (Leidos 2013), there have been no detections of these compounds during historic sampling activities at NBF/GTSP.
- The SAP/QAPP requires measurement of water levels prior to each round of groundwater sampling; however, due to timing of the groundwater sampling events, site-wide water levels were collected after the first and second quarter sampling events. First quarter groundwater monitoring well samples were collected shortly after well installation in February and March 2015; first quarter site-wide water levels were measured in March 2015 after all wells, except those in the 3-818 building construction area, were installed and sampled. Second quarter groundwater monitoring well samples were collected in May 2015, to accommodate the RI/FS schedule; second quarter site-wide water levels were measured in June 2015 to provide a reasonable timeframe between first and second quarter water level measurements.

In addition to the changes listed above, Ecology has approved revisions to the Phase 1 groundwater monitoring analytes, as summarized below (Edens 2015f); these revisions are also documented in Table 1:

- Revise the RI screening level (RISL) for vanadium in groundwater to 80 micrograms per liter ($\mu\text{g/L}$), the current Model Toxics Control Act (MTCA) Method B cleanup level for groundwater in Ecology's Cleanup Levels and Risk Calculation (CLARC).
- Discontinue analysis for the following chemical classes for 3rd and 4th quarter monitoring at RI wells:
 - Semivolatile organic compounds (SVOCs)
 - SVOCs by 8270 Selected Ion Monitoring (SIM)
 - Total petroleum hydrocarbons-Gasoline range (TPH-Gx; with the exception of the three monitoring wells in the Main Fuel Farm that were installed in July 2015)
 - TPH-Diesel range (TPH-Dx; with the exception of the three monitoring wells in the Main Fuel Farm that were installed in July 2015)
 - Benzene, Toluene, ethylbenzene, xylenes (BTEX; with the exception of the three monitoring wells in the Main Fuel Farm that were installed in July 2015)
 - Polychlorinated biphenyls (PCBs; compliance monitoring of fenceline wells will continue to be conducted semi-annually in accordance with the Groundwater Compliance Monitoring Plan)
 - All metals except total arsenic in wells listed below
 - All volatile organic compounds (VOCs) except as described below.
- Analyze groundwater samples from NGW604, NGW605, NGW608, NGW612, NGW621, NGW622, and NGW624 for total arsenic. If results for total arsenic in a sample are anomalously high, a sample from that well may be analyzed for dissolved arsenic.
- Analyze groundwater samples from NGW601, NGW602, NGW603, NGW604, and NGW607 for PCE, TCE, cis-DCE, trans-DCE, and vinyl chloride.

Additional significant changes, as determined by Ecology, will be documented in separate addenda.

REFERENCES

Dube, Tom E. 2015a. Email message from Tom E. Dube, Leidos, to Colette Gaona, Landau Associates, and Mark Edens, Washington State Department of Ecology. Re: *NBF/GTSP RI - Surface Debris Sample Notes and Priority for Analyses*. March 30.

Dube, Tom E. 2015b. Email message from Tom E. Dube, Leidos, to Colette Gaona, Landau Associates, and Mark Edens, Washington State Department of Ecology. Re: *NBF/GTSP RI - Structures with no solids or limited solids*. March 30.

Ecology website. 2015. Cleanup Levels and Risk Calculation (CLARC) table. <https://fortress.wa.gov/ecy/clarc/FocusSheets/Groundwater%20Methods%20B%20and%20A%20and%20ARARs.pdf>. Washington State Department of Ecology. Accessed August.

Edens, Mark. 2015a. Email message from Mark Edens, Washington State Department of Ecology, to Colette Gaona, Landau Associates, and Tom Dube, Leidos. Re: *NBF/GTSP RI - PEL-SB02 Relocation*. February 19.

Edens, Mark. 2015b. Email message from Mark Edens, Washington State Department of Ecology, to Carl Bach, The Boeing Company. Re: *Proposed relocation for NGW618*. February 10.

Edens, Mark. 2015c. Email message from Mark Edens, Washington State Department of Ecology, to Colette Gaona, Landau Associates. Re: *NBF/GTSP RI - NGW612 Relocation and Installation Today*. February 18.

Edens, Mark. 2015d. Email message from Mark Edens, Washington State Department of Ecology, to Colette Gaona, Landau Associates, and Tom Dube, Leidos. Re: *NBF/GTSP RI - NGW608 Relocation*. February 27.

Edens, Mark. 2015e. Email message from Mark Edens, Washington State Department of Ecology, to Carl Bach, the Boeing Company. Re: *NBF/GTSP RI Analytes*. May 5.

Edens, Mark. 2015f. Email message from Mark Edens, Washington State Department of Ecology, to Kris Hendrickson, Landau Associates. Re: *NBF/GTSP RI Meeting Notes*. July 22.

Gaona, Colette. 2015. Email message from Colette Gaona, Landau Associates, to Tom Dube, Leidos, and Mark Edens, Washington State Department of Ecology. Re: *NBF/GTSP RI - Cascade Decon Procedure*. February 17.

Landau Associates. 2015. Letter Report re: *February and March 2015 Progress Report, North Boeing Field/ Georgetown Steam Plant Site, Agreed Order No. DE 5685*. From Kristy J. Hendrickson, Landau Associates, to Mark Edens, Washington State Department of Ecology. April 15.

Leidos (formerly SAIC). 2014. *North Boeing Field/Georgetown Steam Plant Site, Remedial Investigation/Feasibility Study, Final Sampling and Analysis Plan and Quality Assurance Project Plan*. Prepared for Toxics Cleanup Program, Northwest Regional Office, Washington State Department of Ecology, Bellevue, Washington. April.

Leidos (formerly SAIC). 2013. *North Boeing Field/Georgetown Steam Plant Site Remedial Investigation/Feasibility, Final Remedial Investigation/Feasibility Study Work Plan*. Prepared for Toxics Cleanup Program, Northwest Regional Office, Washington State Department of Ecology, Bellevue, Washington. November 11.

CMG/KJH/tam

**TABLE 1
REVISIONS TO PHASE I GROUNDWATER MONITORING ANALYTES
NORTH BOEING FIELD/GEORGETOWN STEAM PLANT REMEDIAL INVESTIGATION**

Area of Concern	Groundwater Monitoring Well	1Q/2Q 2015 Groundwater Analytes	3Q/4Q 2015 Groundwater Analytes (a)	Notes/Comments
NBF - PEL Area				
Bldg 3-329, 3-333, 3-335 Area	NGW601	VOCs	VOCs (PCE, TCE, cis-DCE, trans-DCE, VC only)	
	NGW602	VOCs	VOCs (PCE, TCE, cis-DCE, trans-DCE, VC only)	
	NGW603	PCBs, TPH, VOCs	VOCs (PCE, TCE, cis-DCE, trans-DCE, VC only)	
	NGW604	PCBs, Metals, TPH, PAHs, BTEX	Total Arsenic, VOCs (PCE, TCE, cis-DCE, trans-DCE, VC only)	
	NGW605	PCBs, Metals, TPH, SVOCs, BTEX	Total Arsenic	
	NGW606	TPH, SVOCs, BTEX	None	
NBF - North Flightline				
Fmr Bldg 3-360 and 3-367 Area	NGW607	VOCs	VOCs (PCE, TCE, cis-DCE, trans-DCE, VC only)	
	NGW608	PCBs, Metals, SVOCs	Total Arsenic	
Bldg 3-380 Area	NGW609	PCBs, Metals, SVOCs	None	
	NGW610	PCBs, Metals, TPH, SVOCs, VOCs	None	
Bldg 3-390 Area	NGW611	PCBs, Metals, TPH, SVOCs, VOCs	None	
	NGW612	PCBs, Metals, TPH, SVOCs, VOCs	Total Arsenic	
NBF - Central Flightline				
Bldg 3-801 Area	NGW613	Metals, VOCs	None	
	NGW614	Metals, VOCs	None	
Main Fuel Farm Area	NGW615	TPH, PAHs, BTEX	TPH, PAHs, BTEX	Installed/sampled in July 2015. Review/revise required analytes after 3Q 2015 monitoring
	NGW616	TPH, PAHs, BTEX	TPH, PAHs, BTEX	Installed/sampled in July 2015. Review/revise required analytes after 3Q 2015 monitoring
	NGW617	TPH, PAHs, BTEX	TPH, PAHs, BTEX	Installed/sampled in July 2015. Review/revise required analytes after 3Q 2015 monitoring
Concourse B Area	NGW618	PCBs, Metals, SVOCs, VOCs	None	
	NGW619	PCBs, Metals, SVOCs, VOCs	None	
NBF - South Flightline				
Bldg 3-380, 3-831, and 3-832 Area	NGW620	PCBs, TPH	None	
Site-Wide Groundwater Investigation				
	NGW621	PCBs, Metals, TPH, SVOCs	Total Arsenic	
	NGW622	PCBs, Metals, TPH, SVOCs	Total Arsenic	
	NGW623	PCBs, Metals, TPH, SVOCs	None	
	NGW624	PCBs, Metals, TPH, SVOCs	Total Arsenic	
	NGW625	PCBs, Metals, TPH, SVOCs	None	

SVOC = semivolatile organic compound
PAH = polycyclic aromatic hydrocarbon
TPH = total petroleum hydrocarbon
PCB = polychlorinated biphenyl
VOC = volatile organic compound
BTEX = benzene, toluene, ethylbenzene, xylene

TCE = trichloroethene
cis-DCE = cis-1,2-dichloroethene
trans-DCE = trans-1,2-DCE
VC = vinyl chloride
Ecology = Washington State Department of Ecology

(a) Approved by Ecology on July 22, 2015 (Edans, Mark. 2015a. Email message from Mark Edans, Washington State Department of Ecology, to Carl Bach, the Boeing Company. Re: NBF/GTSP RI Analytes. May 5.)