MAUL FOSTER ALONGI
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September 22, 2022
Project No. M0615.17.002

Scott Hooton
Project Manager, Environmental Programs
Port of Tacoma
One Sitcum Plaza, Tacoma, WA 98421

Re: Groundwater Monitoring Report
Former Cascade Timber No. 3 Log Sort Yard Site
Consent Decree No. 94-2-03590-3
Facility Site ID: 1206
Monitoring Date: August 21, 2022

Dear Scott Hooton:

On August 21, 2022, Maul Foster & Alongi, Inc. (MFA), conducted a groundwater monitoring event on behalf of the Port of Tacoma (the Port) at the former Cascade Timber Company (Cascade Timber) No. 3 Log Sort Yard Site, located along Maxwell Way between Port of Tacoma Road and Thorne Road in Tacoma, Washington (the Site) (Figure 1). Groundwater monitoring activities were conducted consistent with the requirements set forth in Consent Decree No. 94-2-03590-3 (CD), dated April 1994, between the Port and the Washington State Department of Ecology (Ecology) and the monitoring plan for the Site (HLA 1994). The field activities and the analytical results of the monitoring event are discussed below.

SITE BACKGROUND

The Site is located on the former Cascade Timber No. 3 Log Sort Yard Site and encompasses approximately 10.7 acres (Ecology 2017). The Site was leased to the Cascade Timber Company and operated as a log sort yard from 1978 to 1984. In 1982, approximately 500 tons of slag generated by the Asarco Smelter was placed onsite as ballast material. The Port currently operates the Site as a truck queuing area for Husky Terminal and Washington United Terminal.

Ecology collected stormwater runoff samples from the Site between November 1983 and June 1984 (Norton 1985). Metals were detected in stormwater leaving the Site at concentrations above the U.S. Environmental Protection Agency (EPA) water-quality standards. In October 1991, Ecology and the Port entered an agreed order (no. DE 91-S199) to complete a remedial investigation/feasibility study (RI/FS). An RI/FS report was submitted to Ecology in June 1993 and an engineering design report was submitted to Ecology in 1994 (HLA 1993, HLA 1994). Construction of a low-permeability asphalt cap and stormwater drainage system was completed in 1994 (Ecology 2017). A restrictive covenant (no. 9408020435) was recorded for

the Site in 1994, limiting activities that may interfere with or reduce the effectiveness of the cleanup action and requiring that the Site be used for industrial uses only (Port 1994).

In January 2017, Ecology conducted a periodic review of post-cleanup site conditions and site data and concluded that human health and the environment continue to be protected by the remedy. Ecology determined that the requirements of the restrictive covenants and the CD were met (Ecology 2017).

Groundwater monitoring has been conducted at monitoring wells MW-1 and MW-2 since 1994 to monitor groundwater quality on the Site (Figure 2). Groundwater monitoring is conducted every 18 months consistent with a 2011 memorandum of understanding between Ecology and the Port (Ecology 2011).

During the February 2021 groundwater monitoring event, dissolved arsenic was detected in MW-1 at a concentration of 283 micrograms per liter (ug/L), above the Site cleanup level (CUL) of 36 ug/L and elevated relative to historical trends on the Site. At the time, the Port suspected that elevated arsenic concentrations were the result of surface water infiltration that occurred during construction of a new remote truck gate and utilities in May and June 2020 (Port 2021). The scope of work associated with these construction activities was reviewed and approved by Ecology prior to construction on December 30, 2019 (Ecology 2019). According to the 18-month schedule, the next groundwater monitoring event is scheduled for February 2024. MFA completed a cap inspection in February 2022 (MFA 2022). Additional cap repairs resulting from MFA's cap inspection recommendations are scheduled to occur in autumn 2022. According to the 30-month schedule, the next cap inspection event is scheduled for August 2024.

GROUNDWATER MONITORING FIELD PROCEDURES

On August 21, 2022, three groundwater samples, including one field duplicate, were collected from MW-1 and MW-2 using low-flow sampling procedures. The groundwater level in each well was measured prior to sampling (Table 1). During purging, flow rates, water levels, and water quality parameters (pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity) were recorded on field sampling data sheets (Attachment A). Water-quality field parameters were stabilized before sample collection. Samples were collected directly into laboratory-provided bottles and were immediately placed in a cooler on ice. Groundwater samples were field filtered with a 0.45-micron filter and preserved with nitric acid during sample collection. Under standard chain-of-custody procedures, groundwater samples were submitted to ALS Environmental in Kelso, Washington, for laboratory analysis.

GROUNDWATER MONITORING RESULTS AND DISCUSSION

The laboratory analytical report is provided as Attachment B, and analytical data are presented in Table 2. Analytical data and the laboratory's internal quality assurance and quality control

data were reviewed to assess whether they met project-specific data quality objectives. A data validation memorandum summarizing data evaluation procedures, data usability, and deviations from specific field and/or laboratory methods is included as Attachment C. The data are considered acceptable for their intended use, with appropriate data qualifiers assigned. Results from the groundwater monitoring indicate the following:

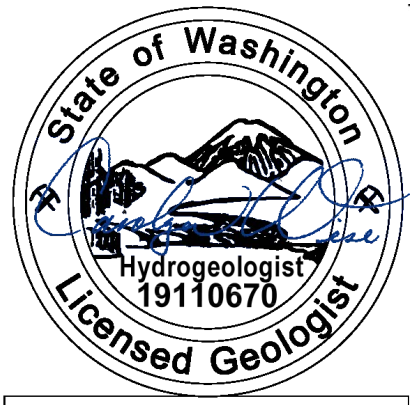
- Dissolved arsenic was detected at a concentration of 18.9 ug/L from MW-1 and 6.40 ug/L from MW-2. Both values are below the Site CUL of 36 ug/L for dissolved arsenic.
- Dissolved copper was detected at an estimated concentration of 0.06 ug/L from MW-1 and 2.06 ug/L from MW-2. Both values are below the Site CUL of 2.9 ug/L for dissolved copper.
- Dissolved lead was not detected in MW-1 (at a method reporting limit of 0.02 ug/L) and was detected at an estimated concentration of 0.096 ug/L in MW-2. Both values are below the Site CUL of 8.5 ug/L for dissolved lead.

Plots depicting dissolved arsenic, copper, and lead concentrations over time (since monitoring began in 1994) for MW-1 and MW-2 are presented in Figures 3 through 5, respectively. Groundwater monitoring results from this event will be submitted to Ecology within 45 days after completion of data validation.

Please contact Audrey Hackett at (206) 556-2015 if you have any questions related to the groundwater monitoring activities or results presented above.

Sincerely,

Maul Foster & Alongi, Inc.



CAROLYN ROCHELLE WISE 09-22-2022

Audrey Hackett
Senior Environmental Scientist

Carolyn R. Wise, LHG
Project Hydrogeologist

Attachments: Limitations
References
Tables
Figures
Attachment A—Water Field Sampling Data Sheets
Attachment B—Analytical Laboratory Reports
Attachment C—Data Validation Memorandum

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

REFERENCES

Ecology. 2011. Washington State Department of Ecology. *Memorandum of Understanding, Former Log Yard Groundwater Monitoring and Cap Inspection*. Memorandum to Port of Tacoma. September 12.

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Ecology. 2019. P. Balaraju, Washington State Department of Ecology. *Cascade Timber No. 3 – construction in January 2020*. Email to S. Weeks, Port of Tacoma. December 31.

HLA. 1993. *Remedial Investigation/Feasibility Study, Cascade Timber No. 3 Log Sort Yard, Tacoma Washington*. Harding Lawson Associates. March.

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MFA. 2022. *Environmental Cap and Drainage System Inspection Report, Former Cascade Timber No. 3 Log Sort Yard Site*. Prepared for Port of Tacoma. Maul Foster & Alongi, Inc. June 17.

Norton, D., and A. Johnson. 1985. *Completion report on WQIS Project 1 for the Commencement Bay nearshore/tideflats remedial investigation: assessment of log sort yards as metal sources to Commencement Bay waterways, November 1983 to June 1984*. Washington State Department of Ecology. February 27.

Port. 1994. *Declaration of restrictive covenant (no. 9408020435)*. Port of Tacoma. August 2.

Port. 2021. S. Weeks, Port of Tacoma. *Cascade Timber 2020 Cap Repairs*. Interoffice Memorandum to Project File. April 22.

TABLES

Table 1
Water Level Data
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington

Location	Date	Top of Casing Elevation (feet)	Depth of Water below Top of Casing (feet)	Water Level Elevation (feet)
MW-1	12/28/1994	--	--	--
	12/09/1994	--	--	--
	12/01/1995	20.00	3.68	16.32
	12/13/1996	20.00	3.98	16.02
	12/09/1997	20.00	5.26	14.74
	12/07/1998	20.00	4.71	15.29
	12/22/1999	20.00	4.47	15.53
	10/11/2000	20.00	6.58	13.42
	11/03/2000	20.00	--	--
	11/16/2001	20.00	4.35	15.65
	11/19/2001	20.00	--	--
	11/26/2002	20.00	6.58	13.42
	11/14/2003	20.98	12.22	8.76
	10/29/2004	20.98	12.31	8.67
	10/26/2005	20.98	12.71	8.27
	01/29/2007	20.98	11.83	9.15
	02/08/2008	20.98	12.45	8.53
	02/27/2009	20.98	12.18	8.80
	02/04/2010	20.98	11.13	9.85
	02/22/2011	20.98	11.54	9.44
	02/13/2012	20.98	12.24	8.74
	09/23/2013	20.98	12.23	8.75
	02/12/2015	20.98	10.90	10.08
	08/26/2016	20.98	12.35	8.63
	02/12/2018	20.98	10.74	10.24
	08/23/2019	20.98	13.59	7.39
	02/19/2021	20.98	11.34	9.64
	02/27/2022	20.98	12.46	8.52
	08/21/2022	20.98	12.13	8.85

Table 1
Water Level Data
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington

Location	Date	Top of Casing Elevation (feet)	Depth of Water below Top of Casing (feet)	Water Level Elevation (feet)
MW-2	12/28/1994	--	--	--
	12/09/1994	--	--	--
	12/01/1995	18.12	4.60	13.52
	12/13/1996	18.12	7.35	10.77
	12/09/1997	18.12	13.66	4.46
	12/07/1998	18.12	5.82	12.30
	12/22/1999	18.12	7.21	10.91
	10/11/2000	18.12	12.60	5.52
	11/03/2000	18.12	--	--
	11/16/2001	18.12	13.55	4.57
	11/19/2001	18.12	6.32	11.80
	11/26/2002	18.12	8.91	9.21
	11/14/2003	19.91	10.02	9.89
	10/29/2004	19.91	9.10	10.81
	10/26/2005	19.91	9.74	10.17
	01/29/2007	19.91	5.43	14.48
	02/08/2008	19.91	10.10	9.81
	02/27/2009	19.91	8.77	11.14
	02/04/2010	19.91	12.19	7.72
	02/22/2011	19.91	5.23	14.68
	02/13/2012	19.91	6.23	13.68
	09/23/2013	19.91	7.98	11.93
	02/12/2015	19.91	4.76	15.15
	08/26/2016	19.91	8.37	11.54
	02/12/2018	19.91	4.77	15.14
	08/23/2019	19.91	8.55	11.36
	02/19/2021	19.91	5.40	14.51
	02/27/2022	19.91	5.58	14.33
	08/21/2022	19.91	7.74	12.17

Notes

Top of casing elevations based on information provided by the Port of Tacoma to the previous consultant.

Depth to water meaurements collected before February 2021 provided to Maul Foster Alongi, Inc., by Port of Tacoma.

-- = not measured.

Cascade Timber = Cascade Timber Company.

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard
Tacoma, Washington

Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L	ug/L	ug/L	ug/L
		Groundwater Cleanup Levels[(a)]:	36	2.9	8.5	86
MW-1	N	11/28/1994	**940**	**8**	<3	<20
	N	12/09/1994	**220**	**4**	<3	<20
	N	12/01/1995	**132**	**4**	<1	53
	N	12/13/1996	**93**	**6**	<1	9
	N	12/09/1997	**60**	2.1	2.4	12
	N	12/07/1998	9.7	**11**	3.6	**510**
	N	12/22/1999	21.0	2.5	<1	**99**
	N	10/11/2000	**73**	<1	<0.5	4.7
	N	11/03/2000	14.0	--	--	--
	N	11/16/2001	7.02	**8.73**	<0.5	<4
	N	11/26/2002	13.4	<2.5	<0.5	<2.5
	N	11/14/2003	18.4	<1.0	<0.5	5.2
	N	10/29/2004	32.4	<2.5	<2.5	12.2
	N	10/26/2005	**46**	<2.5	<2.5	<2.5
	N	01/29/2007	**93**	<2.0	<2.0	<5.0
	N	02/08/2008	**140**	<0.55	<0.22	5.2 J
	N	02/27/2009	**57.2**	<0.5	<1	6
	N	02/04/2010	**50.3**	0.6	<1	<4
	N	02/22/2011	**158**	<0.5	<0.5	0.8
	N	02/13/2012	**53**	<0.5	<0.5	--
	N	08/23/2013	28.6	<0.5	<0.5	--
	N	02/12/2015	**57.7**	0.7	<0.1	--
	N	08/26/2016	24.2	<0.5	<0.1	--
	N	02/12/2018	**66**	<0.5	<0.1	--
	N	08/23/2019	20	<0.5	<0.1	--
	FD	08/23/2019	20.4	<0.5	<0.1	--
	N	02/19/2021	**283**	<2.5	<5.0	<25
	N	02/27/2022	**67.0**	<0.10	<0.020	--
	FD	02/27/2022	**63.5**	<0.10	<0.020	--
	N	08/21/2022	18.9	0.06 J	< 0.006	--
MW-2	N	11/28/1994	10	**3**	<3	<20
	N	12/01/1995	--	--	--	--
	FD	12/01/1995	**132**	**5**	<1	53
	N	12/13/1996	3	**5**	<1	<83
	FD	12/13/1996	**76**	**41**	1	18
	FD	12/09/1997	**54**	**6.1**	2.4	43
	N	12/16/1997	5	<2	<1	6

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard
Tacoma, Washington

Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L	ug/L	ug/L	ug/L
		Groundwater Cleanup Levels[(a)]:	36	2.9	8.5	86
MW-2 (continued)	N	12/07/1998	2.3	1.8	5.1	**360**
	FD	12/07/1998	12	**13**	1.2	**600**
	N	12/22/1999	4.4	<2	**23**	6.9
	FD	12/22/1999	19	**2.9**	<1	38
	N	10/11/2000	<1	<1	<1	**99**
	FD	10/11/2000	**42**	<1	<0.5	6.5
	N	11/03/2000	2	<1	**600**	8.3
	FD	11/03/2000	7	--	--	--
	N	11/13/2000	--	--	**600**	--
	FD	11/16/2001	7.69	**10.2**	<0.5	<4
	N	11/19/2001	1.19	<1	3.74	38.6
	N	11/26/2002	<2.5	<2.5	**180**	3.36
	FD	11/26/2002	19.7	<2.5	<0.5	<2.5
	N	11/14/2003	8.91	<1.0	<0.5	4.64
	FD	11/14/2003	18.5	<1.0	<0.5	3.97
	N	10/29/2004	25.4	<2.5	<2.5	<5
	FD	10/29/2004	31.9	<2.5	<2.5	7.15
	N	10/26/2005	**39**	<2.5	<2.5	<2.5
	FD	10/26/2005	32	<2.5	<2.5	<2.5
	N	01/29/2007	34	<2.0	<2.0	<5.0
	FD	01/29/2007	35	<2.0	<2.0	<5.0
	N	02/08/2008	24	0.78 J	<0.22	5.1 J
	FD	02/08/2008	**140**	<0.55	<0.22	6.0 J
	N	02/27/2009	32.6	1.6	<1	6
	FD	02/27/2009	32.9	1.5	<1	<4
	N	02/04/2010	8.1	**4.1**	<1	<4
	FD	02/04/2010	18.2	5.4	<1	<4
	N	02/22/2011	27.2	<0.5	<0.5	0.8
	FD	02/22/2011	26.9	0.5	<0.5	1.1
	N	02/13/2012	16	0.5	<0.5	--
	FD	02/13/2012	16	0.6	<0.5	--
	N	08/23/2013	4.1	<0.5	<0.5	--
	FD	08/23/2013	4.0	<0.5	<0.5	--
	N	02/12/2015	**41.6**	2.0	0.1	--
	FD	02/12/2015	**40.7**	1.8	0.1	--
	N	08/26/2016	23.6	<0.5	<0.1	--
	FD	08/26/2016	26.5	<0.5	<0.1	--

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard
Tacoma, Washington

Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L	ug/L	ug/L	ug/L
		Groundwater Cleanup Levels[a]:	36	2.9	8.5	86
MW-2 (continued)	N	02/12/2018	**63.6**	1.96	0.092 J	--
	FD	02/12/2018	**60**	2.43	0.112	--
	N	08/23/2019	**102**	<0.5	<0.1	--
	N	02/19/2021	**42.0**	<2.5	<5.0	<25
	FD	02/19/2021	**43.6**	<2.5	<5.0	<25
	N	02/27/2022	**96.2**	**5.01**	0.125	--
	N	08/21/2022	6.36	2.06 J	0.096 J	--
	FD	08/21/2022	6.40	0.19 J	< 0.020	--
MW-3S	N	11/28/1994	25	**28**	<3	<20
	N	12/01/1995	**54**	**3**	2	65
	N	12/13/1996	**190**	<2	3	9
	N	12/09/1997	**63**	2	4.2	**330**
	N	12/07/1998	**50**	**2.9**	2.2	<5
MW-3D	N	11/28/1994	20	**7**	<3	<20
	N	12/01/1995	3	**4**	<1	35
	N	12/13/1996	4	**14**	<5	18
	N	12/09/1997	27	2.2	2	17
	N	12/07/1998	3	<2	<1	7.8

Notes

Values in **bold** exceed cleanup levels. Non-detect data (indicated by <) were not compared to cleanup levels.

All groundwater analytical results prior to February 2021 provided by Port of Tacoma.

Samples collected in 2019–2021 were analyzed by EPA Method 6020B. All remaining samples were analyzed by EPA Method 200.8.

Zinc analysis was discontinued in 2011 with Ecology approval dated June 28, 2011.

-- = not analyzed.

< = result is non-detect at the detection limit or reporting limit.

Cascade Timber = Cascade Timber Company.

Ecology = Washington State Department of Ecology.

EPA = U.S. Environmental Protection Agency.

FD = field duplicate sample.

J = result is estimated.

N = normal environmental sample.

ug/L = micrograms per liter.

WAC = Washington Administrative Code.

[a]Groundwater cleanup levels are based on EPA chronic marine water quality criteria (WAC 173-201A).

FIGURES

Note:
U.S. Geological Survey 7.5-minute topographic quadrangle: Tacoma North; Township 21 north, range 3 east, section 34.
Cascade Timber = Cascade Timber Company.

Data Source:
Property boundary obtained from Anchor QEA site plan figure.

Legend

Site Boundary

Figure 1
Site Location

Former Cascade Timber
No. 3 Log Sort Yard Site
Tacoma, WA

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0 1,000 2,000
Feet

Figure 2
Site Features

Former Cascade Timber
No. 3 Log Sort Yard Site
Tacoma, WA

Legend

- Monitoring Well
- Site Boundary
- Tax Lot

Note:
Cascade Timber = Cascade Timber Company.

0 100
Feet

Data Sources:
Aerial photograph (2018) obtained from City of Tacoma; tax lot data obtained from Pierce County GIS; monitoring well locations obtained from Anchor QEA site plan figure.

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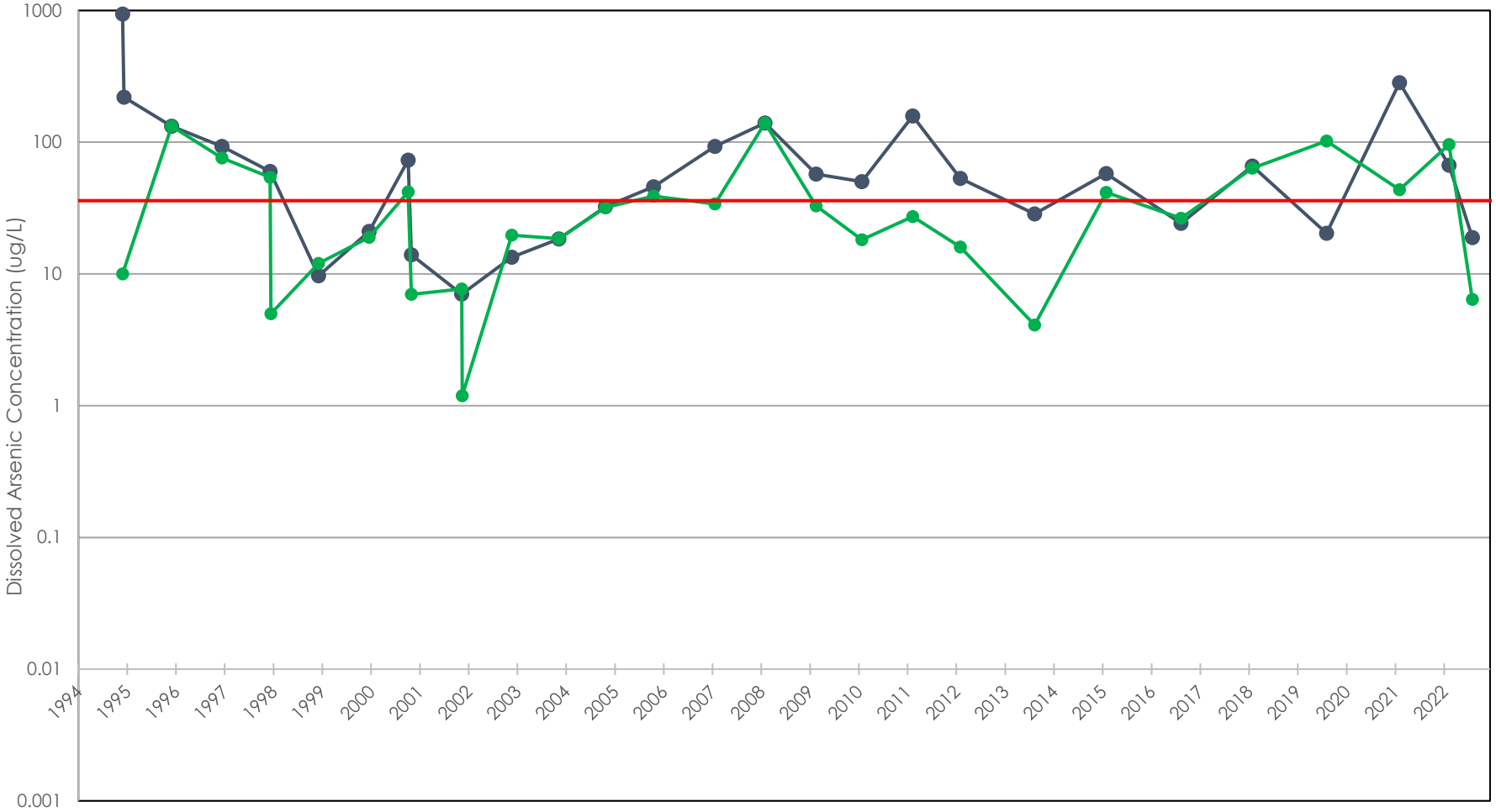
Figure 3
Dissolved Arsenic Trend Plot
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington



Notes
Cascade Timber = Cascade Timber Company.
See Table 2 for analytical data.
Non-detect results are plotted at the detection limit or reporting limit.
Concentrations plotted on a logarithmic scale.
ug/L = micrograms per liter.

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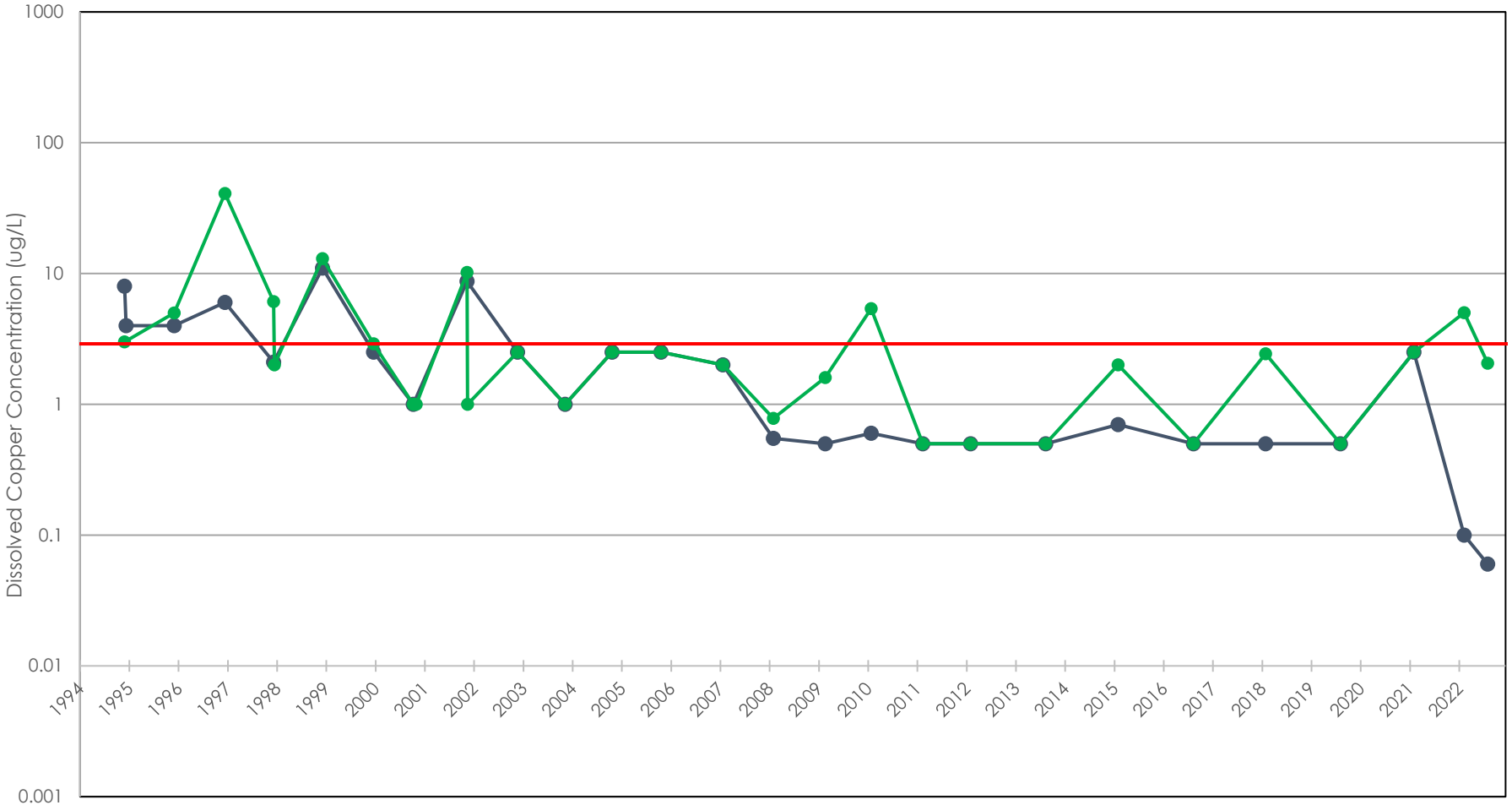
Figure 4
Dissolved Copper Trend Plot
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington



Notes
Cascade Timber = Cascade Timber Company.
See Table 2 for analytical data.
Non-detect results are plotted at the detection limit or reporting limit.
Concentrations plotted on a logarithmic scale.
ug/L = micrograms per liter.

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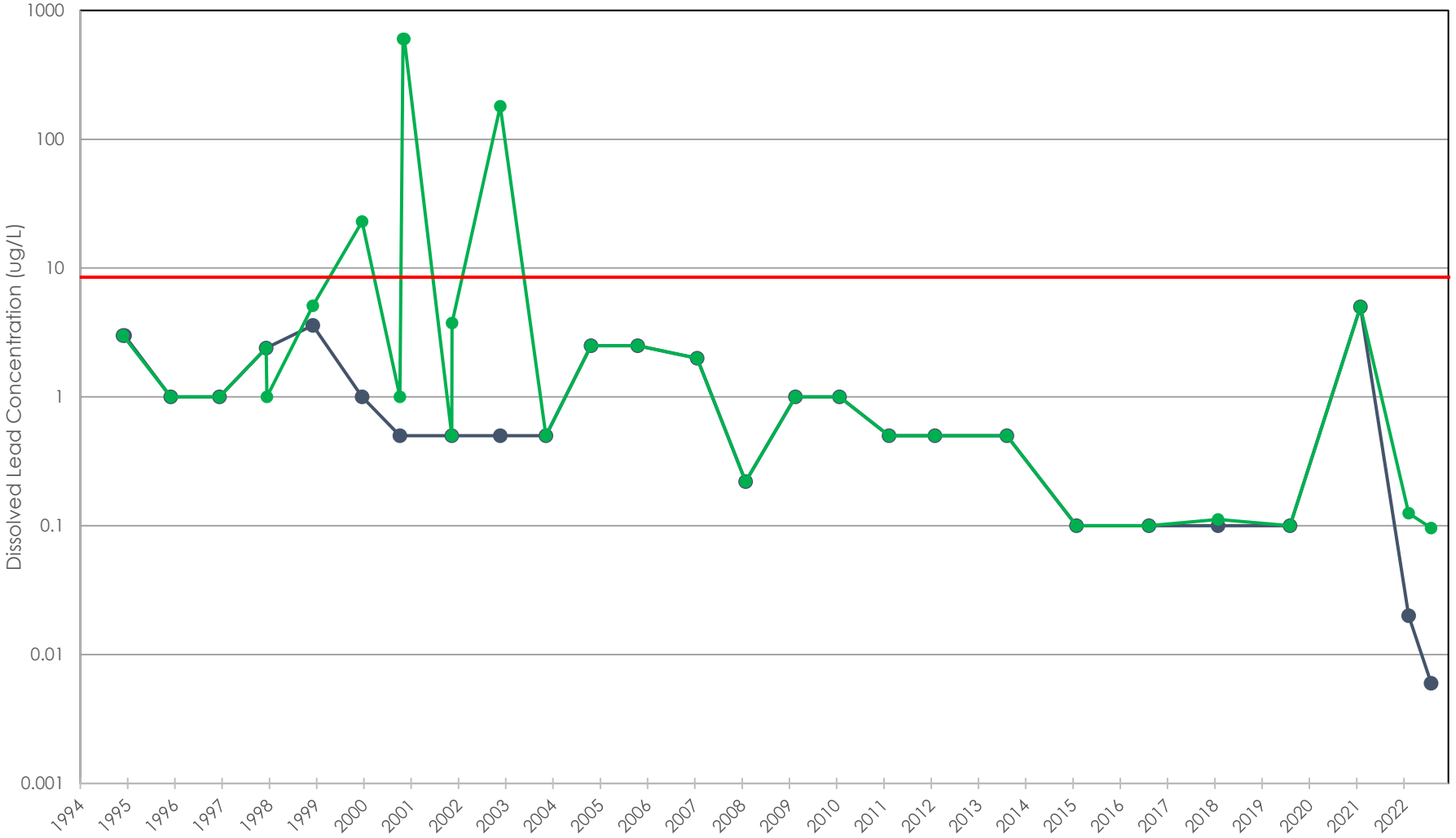
Figure 5
Dissolved Lead Trend Plot
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington



Notes
Cascade Timber = Cascade Timber Company.
See Table 2 for analytical data.
Non-detect results are plotted at the detection limit or reporting limit.
Concentrations plotted on a logarithmic scale.
ug/L = micrograms per liter.

ATTACHMENT A

WATER FIELD SAMPLING DATA SHEETS

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	**Sample Location**	MW-1				
Project #	M0615.17.003	**Sampler**	C. Sifford				
Project Name	Cascade Timber GW Monitoring	**Sampling Date**	8/21/2022				
Sampling Event	August 2022	**Sample Name**	MW-1-GW-14.0				
Sub Area		**Sample Depth**	14				
FSDS QA:	A. Bixby 8/31/2022	**Easting**		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
8/21/2022	9:05	16.15		12.13		4.02	0.66

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**ORP**	**Turbidity**
(2) Peristaltic Pump	10:29:00 AM	4	0.2	6.24	18.7	488.7	0.36	-22.9	2.03
	10:33:00 AM	4.1	0.2	6.22	18.7	486.3	0.22	-30.3	1.5
	10:36:00 AM	4.3	0.2	6.21	18.7	484.1	0.18	-33.6	1.59
	10:39:00 AM	4.5	0.2	6.23	18.7	483.2	0.18	-35.6	1.41
	10:43:00 AM	4.7	0.2	6.23	18.6	481.2	0.17	-37.9	1.19
Final Field Parameters	10:46:00 AM	4.8	0.2	6.21	18.6	480.8	0.16	-39.1	1.27

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Clear; yellow tint; strong sulfur odor; blocky sheen.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	10:50:00 AM	VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly	2	Yes
			Total Bottles	2	

General Sampling Comments

Began purge at 9:07.
Water level 12.13' at 09:07, 12.16' at 10:29, and 12.15' at 10:46

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	**Sample Location**	MW-2				
Project #	M0615.17.003	**Sampler**	C. Sifford				
Project Name	Cascade Timber GW Monitoring	**Sampling Date**	8/21/2022				
Sampling Event	August 2022	**Sample Name**	MW-2-GW-12.0				
Sub Area		**Sample Depth**	12				
FSDS QA:	A. Bixby 8/31/2022	**Easting**		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
8/21/2022	8:45	17.88		7.74		10.14	1.65

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**ORP**	**Turbidity**
(2) Peristaltic Pump	9:40:00 AM	2.7	0.22	6.64	17.9	914	0.33	-88.7	7.02
	9:43:00 AM	2.9	0.22	6.57	17.8	807	0.23	-80.3	2.08
	9:46:00 AM	3.1	0.22	6.59	17.8	755	0.19	-79.6	1.98
	9:49:00 AM	3.3	0.22	6.6	17.8	728	0.15	-78.8	1.15
	9:52:00 AM	3.4	0.22	6.6	17.8	715	0.15	-78.7	1.34
	9:55:00 AM	3.6	0.22	6.59	17.8	705	0.14	-78.2	1.3
Final Field Parameters	10:00:00 AM	3.9	0.22	6.59	17.8	699	0.13	-77.6	1.28

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Clear; yellow-green tint; slight sulfur odor; ribbon sheen.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	10:05:00 AM	VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly	2	Yes
			Total Bottles	2	

General Sampling Comments

Began purge at 8:51.
Field duplicate sample, MWDUP-GW-12.0, collected here.
Water level 7.74' at 08:51, 8.52' at 09:20, and 8.41' at 10:00.

ATTACHMENT B

ANALYTICAL LABORATORY REPORT

September 07, 2022 Service Request No:K2209720

Audrey Hackett
Maul Foster & Alongi, Incorporated
2815 2nd Avenue, Suite 540
Seattle, WA 98121

Laboratory Results for: Cascade Timber

Dear Audrey,

Enclosed are the results of the sample(s) submitted to our laboratory August 24, 2022
For your reference, these analyses have been assigned our service request number **K2209720.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3377. You may also contact me via email at Sydney.Wolf@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Sydney A. Wolf
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

ALS Environmental

Client: Maul Foster & Alongi, Incorporated
Project: Cascade Timber
Sample Matrix: Water

Service Request: K2209720
Date Received: 08/24/2022

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Three water samples were received for analysis at ALS Environmental on 08/24/2022. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

Method 200.8, 08/31/2022:Based on the client sample labels, sample MW-Dup-DW-12.0, would appear to be a duplicate. However, the analysis of MW-Dup-DW-12.0 did not match either remaining samples in the sample delivery group. The bottles were screened and confirmed the initial results.

Approved by Sydney A Wolfe Date 09/07/2022

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: MW-2-GW-12.0			Lab ID: K2209720-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	6.36		0.09	0.50	ug/L	200.8
Copper, Dissolved	2.06		0.05	0.10	ug/L	200.8
Lead, Dissolved	0.096		0.006	0.020	ug/L	200.8

CLIENT ID: MW-DUP-GW-12.0			Lab ID: K2209720-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	6.40		0.09	0.50	ug/L	200.8
Copper, Dissolved	0.19		0.05	0.10	ug/L	200.8
Lead, Dissolved	0.015	J	0.006	0.020	ug/L	200.8

CLIENT ID: MW-1-GW-14.0			Lab ID: K2209720-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Arsenic, Dissolved	18.9		0.09	0.50	ug/L	200.8
Copper, Dissolved	0.06	J	0.05	0.10	ug/L	200.8

Sample Receipt Information

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Maul Foster & Alongi, Incorporated **Service Request:**K2209720
Project: Cascade Timber/M0615.17.003

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K2209720-001	MW-2-GW-12.0	8/21/2022	1005
K2209720-002	MW-DUP-GW-12.0	8/21/2022	1005
K2209720-003	MW-1-GW-14.0	8/21/2022	1050

ALS Environmental

CHAIN OF CUSTODY
125549

001

SR# K220720

COC Set 1 of 1

COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: Cascade Timber	Project Number: M0615.17.003
Project Manager: Carolyn Wise	
Company: Maul Foster & Alongi	
Address: 2815 2nd Ave, Suite 540, Seattle WA	
Phone #: 360-594-6255	email: cwise@maulfoster.com
Sampler Signature:	Sampler Printed Name: Christian Sifford

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	200.8 / Metals	180D	1	2	3	4	5	Remarks
1. MW-2-GW-12.0		8/21/22	10:05	Water	2	X							Field filtered 0.45 micron
2. MWDup-GW-12.0			10:05		2	X							
3. MW-1-GW-14.0			10:30		2	X							
4.													
5.													
6.													
7.													
8.													
9.													
10.													

Report Requirements

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. CLP Like Summary (no raw data)

___ IV. Data Validation Report

___ V. EDD

Invoice Information

P.O.# M0615.17.003-003

Bill To: Carolyn Wise

cwise@maulfoster.com

360-594-6255

Turnaround Requirements

___ 24 hr. ___ 48 hr.

___ 5 Day

X Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al (As) Sb Ba Be B Ca Cd Co Cr (Cu) Fe (Pb) Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments: No reductive precipitation analysis

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: Christian Sifford	Printed Name: Linzey Mejia	Printed Name	Printed Name	Printed Name	Printed Name
Firm: MFA	Firm: ALS	Firm	Firm	Firm	Firm
Date/Time: ~~8/24/22 5:00~~ 8/23/22 16:15	Date/Time: 8/24/22 1020	Date/Time	Date/Time	Date/Time	Date/Time

PM SEO

Cooler Receipt and Preservation Form

Client Maul Foster & ALONG Service Request K22 09720

Received: 8/24/22 Opened: 8/24/22 By: LM Unloaded: 8/24/22 By: LM

1. Samples were received via? *USPS* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 1 Front IR Gun
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
1.7	—	IR02	125549	—	—	277136201263	

4. Was a Temperature Blank present in cooler? NA (Y) N If yes, notate the temperature in the appropriate column above:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA (Y) N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y (N)

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

6. Packing material: *Inserts* (*Baggies*) *Bubble Wrap* *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
8. Were samples received in good condition (unbroken) NA (Y) N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA (Y) N
10. Did all sample labels and tags agree with custody papers? NA (Y) N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
13. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
14. Was C12/Res negative? (NA) Y N
15. Were 100ml sterile microbiology bottles filled exactly to the 100ml mark? (NA) Y N Under filled Overfilled

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: _____

:_____

Miscellaneous Forms

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Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client:	Maul Foster & Alongi, Incorporated	**Service Request:**	K2209720
Project:	Cascade Timber/M0615.17.003		

Sample Name:	MW-2-GW-12.0	**Date Collected:**	08/21/22
Lab Code:	K2209720-001	**Date Received:**	08/24/22
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	EMCALLISTER

Sample Name:	MW-DUP-GW-12.0	**Date Collected:**	08/21/22
Lab Code:	K2209720-002	**Date Received:**	08/24/22
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	EMCALLISTER

Sample Name:	MW-1-GW-14.0	**Date Collected:**	08/21/22
Lab Code:	K2209720-003	**Date Received:**	08/24/22
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
200.8	ABOYER	EMCALLISTER

Sample Results

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Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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www.alsglobal.com

Analytical Report

Client:	Maul Foster & Alongi, Incorporated	**Service Request:**	K2209720
Project:	Cascade Timber/M0615.17.003	**Date Collected:**	08/21/22 10:05
Sample Matrix:	Water	**Date Received:**	08/24/22 10:20
Sample Name:	MW-2-GW-12.0	**Basis:**	NA
Lab Code:	K2209720-001		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**6.36**	ug/L	0.50	0.09	1	08/31/22 18:37	08/30/22	
Copper	200.8	**2.06**	ug/L	0.10	0.05	1	08/31/22 18:37	08/30/22	
Lead	200.8	**0.096**	ug/L	0.020	0.006	1	08/31/22 18:37	08/30/22	

Analytical Report

Client:	Maul Foster & Alongi, Incorporated	**Service Request:**	K2209720
Project:	Cascade Timber/M0615.17.003	**Date Collected:**	08/21/22 10:05
Sample Matrix:	Water	**Date Received:**	08/24/22 10:20
Sample Name:	MW-DUP-GW-12.0	**Basis:**	NA
Lab Code:	K2209720-002		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**6.40**	ug/L	0.50	0.09	1	08/31/22 18:42	08/30/22	
Copper	200.8	**0.19**	ug/L	0.10	0.05	1	08/31/22 18:42	08/30/22	
Lead	200.8	**0.015 J**	ug/L	0.020	0.006	1	08/31/22 18:42	08/30/22	

Analytical Report

Client:	Maul Foster & Alongi, Incorporated	**Service Request:**	K2209720
Project:	Cascade Timber/M0615.17.003	**Date Collected:**	08/21/22 10:50
Sample Matrix:	Water	**Date Received:**	08/24/22 10:20
Sample Name:	MW-1-GW-14.0	**Basis:**	NA
Lab Code:	K2209720-003		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	**18.9**	ug/L	0.50	0.09	1	08/31/22 18:44	08/30/22	
Copper	200.8	**0.06 J**	ug/L	0.10	0.05	1	08/31/22 18:44	08/30/22	
Lead	200.8	ND U	ug/L	0.020	0.006	1	08/31/22 18:44	08/30/22	

QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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Metals

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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Maul Foster & Alongi, Incorporated	**Service Request:**	K2209720
Project:	Cascade Timber/M0615.17.003	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ2214614-01		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.09	1	08/31/22 18:33	08/30/22	
Copper	200.8	ND U	ug/L	0.10	0.05	1	08/31/22 18:33	08/30/22	
Lead	200.8	**0.006 J**	ug/L	0.020	0.006	1	08/31/22 18:33	08/30/22	

Client:	Maul Foster & Alongi, Incorporated	**Service Request:**	K2209720
Project:	Cascade Timber/M0615.17.003	**Date Collected:**	08/21/22
Sample Matrix:	Water	**Date Received:**	08/24/22
		Date Analyzed:	08/31/22
		Date Extracted:	08/30/22

Matrix Spike Summary
Dissolved Metals

Sample Name:	MW-2-GW-12.0	**Units:**	ug/L
Lab Code:	K2209720-001	**Basis:**	NA
Analysis Method:	200.8		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ2214614-03

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	6.36	55.3	50.0	98	70-130
Copper	2.06	14.3	12.5	98	70-130
Lead	0.096	49.1	50.0	98	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

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QA/QC Report

Client:	Maul Foster & Alongi, Incorporated	**Service Request:**	K2209720
Project	Cascade Timber/M0615.17.003	**Date Collected:**	08/21/22
Sample Matrix:	Water	**Date Received:**	08/24/22
		Date Analyzed:	08/31/22

Replicate Sample Summary

Dissolved Metals

Sample Name:	MW-2-GW-12.0	**Units:**	ug/L
Lab Code:	K2209720-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ2214614-04 Result	Average	RPD	RPD Limit
Arsenic	200.8	0.50	0.09	6.36	6.35	6.36	<1	20
Copper	200.8	0.10	0.05	2.06	1.97	2.02	4	20
Lead	200.8	0.020	0.006	0.096	0.088	0.092	9	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

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QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project: Cascade Timber/M0615.17.003
Sample Matrix: Water

Service Request: K2209720
Date Analyzed: 08/31/22

Lab Control Sample Summary
Dissolved Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2214614-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	48.5	50.0	97	85-115
Copper	200.8	12.7	12.5	101	85-115
Lead	200.8	50.5	50.0	101	85-115

ATTACHMENT C

DATA VALIDATION MEMORANDUM

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. M0615.17.003 | SEPTEMBER 6, 2022 | PORT OF TACOMA

Maul Foster & Alongi, Inc. (MFA), conducted an independent stage 2A review of the quality of analytical results for groundwater samples and associated quality control samples collected at the former Cascade Timber Company No. 3 Log Sort Yard Site, located along Maxwell Way between Port of Tacoma Road and Thorne Road in Tacoma, Washington. Samples were collected on August 21, 2022.

ALS Group USA Corp. dba ALS Environmental (ALS) performed the analyses. ALS report number K2209720 was reviewed. The analysis performed and samples analyzed are listed below.

Analysis	Reference
Dissolved metals	EPA 200.8
Note EPA = U.S. Environmental Protection Agency.	

Samples Analyzed
Report K2209720
MW-2-GW-12.0
MW-DUP-GW-12.0
MW-1-GW-14.0

DATA QUALIFICATION

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2020) and appropriate laboratory- and method-specific guidelines (ALS 2021, EPA 1986).

Based on the results of the data quality review procedures described below, the data are considered acceptable for their intended use, with the appropriate final data qualifiers assigned. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, as well as data qualifiers assigned by the reviewer during validation.

- Final data qualifiers:
  - J = result is estimated.
  - U = result is non-detect at the method detection limit (MDL) or the method reporting limit (MRL).

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

Field samples for dissolved EPA Method 200.8 analysis were filtered in the field during sample collection with a 0.45-micron filter.

BLANKS

Method Blanks

Laboratory method blanks are used to assess whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analysis was performed at the required frequency. For purposes of data qualification, the laboratory method blank was associated with all samples prepared in the analytical batch.

According to report K2209720, the EPA Method 200.8 laboratory method blank had a dissolved lead detection at the MDL, at a concentration of 0.006 micrograms per liter. An associated sample had a dissolved lead result between the MDL and the MRL; the reviewer raised the sample MDL to the MRL and qualified the sample as non-detect at the MRL, as shown in the following table. All remaining associated dissolved lead sample results were non-detect or were more than ten times the concentration found in the blank; thus, qualification was not required.

Report	Sample	Component	Method Blank Result (ug/L)	Original Result (ug/L)	Qualified Result (ug/L)
K2209720	MW-DUP-GW-12.0	Dissolved lead	0.006 J	0.015 J	0.020 U

Notes
J = result is estimated.
U = result is non-detect at the method reporting limit.
ug/L = micrograms per liter.

All remaining laboratory method blank results were non-detect to MDLs.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate field equipment decontamination. These blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

Filter Blanks

Filter blanks were not submitted for analysis. The reviewer could not evaluate whether metals contamination was introduced during field-filtering procedures.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample (LCS) and a laboratory control sample duplicate (LCSD) are spiked with target analytes to provide information about laboratory precision and accuracy.

ALS did not report LCSD results. The LCS sample was extracted and analyzed at the required frequency, and all LCS results were within acceptance limits for percent recovery.

LABORATORY DUPLICATE RESULTS

Laboratory duplicate results are used to evaluate laboratory precision. The laboratory duplicate sample was extracted and analyzed at the required frequency.

Laboratory duplicate results greater than five times the MRL were compared to laboratory relative percent difference (RPD) control limits. Where laboratory duplicate results were less than five times the MRL, the reviewer compared the absolute difference of the laboratory duplicate and parent sample result to the MRL of the parent sample.

All laboratory duplicate results met the acceptance criteria.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike (MS) matrix spike duplicate (MSD) results are used to evaluate laboratory precision and accuracy as well as the effect of the sample matrix on sample preparation and analysis.

ALS did not report MSD results. The MS samples were extracted and analyzed at the required frequency, and all MS results were within acceptance limits for percent recovery.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. The following field duplicate and parent sample pair was submitted for analysis:

Report	Parent Sample	Field Duplicate Sample
K2209720	MW-2-GW-12.0	MW-DUP-GW-12.0

MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL, or 50 percent RPD for results that are greater than five times the MRL.

Field duplicate results that exceeded the acceptance criteria were qualified by the reviewer with "J," as shown in the following table. The laboratory noted that samples had been reanalyzed and that results had confirmed the initial analyses.

Report	Sample	Component	RPD (%)	Original Result (ug/L)	Qualified Result (ug/L)
K2209720	MW-2-GW-12.0	Dissolved copper	170	2.06	2.06 J
	MW-DUP-GW-12.0			0.19	0.19 J
	MW-2-GW-12.0	Dissolved lead	150	0.096	0.096 J
	MW-DUP-GW-12.0			0.015 J	0.020 U[a]

Notes
J = result is estimated.
RPD = relative percent difference.
U = result is non-detect at the method reporting limit.
ug/L = micrograms per liter.
[a]The result has already been qualified by the reviewer because of an associated laboratory method blank detection. Additional qualification by the reviewer based on field duplicate RPD is not required.

The remaining field duplicate result met RPD acceptance criterion.

REPORTING LIMITS

ALS reported results using routine MDLs and MRLs. Results between the MDL and the MRL were qualified by the laboratory with "J," as estimated.

DATA PACKAGE

The data package was reviewed for transcription errors, omissions, and anomalies.

At MFA's request, ALS released a revision for report K2209720 on September 8, 2022, with tier II information only, as well as a sample name correction to match the chain-of-custody form. ALS's original report had included tier IV information, which was not required for this project.

No other issues were found.

REFERENCES

ALS. 2021. *Quality Assurance Manual.* Rev. 29.0. ALS Group USA Corp. dba ALS Environmental: Kelso, WA. July 16.

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* EPA publication SW-846. 3rd ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019), VII phase I (2019), and VII phase II (2020).

EPA. 2020. *National Functional Guidelines for Inorganic Superfund Methods Data Review.* EPA 542-R-20-006. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation: Washington, DC. November.