



June 6, 2022
Project No. M0615.17.002

Sarah Weeks
Environmental Project Manager
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: February 27, 2022

Dear Sarah Weeks:

On February 27, 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 in compliance with 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 at concentrations above the U.S. Environmental Protection Agency (EPA) water-quality standards were detected in stormwater leaving the Site. 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).

The last groundwater monitoring event was conducted by MFA in February 2021 (MFA, 2021). Arsenic results at monitoring well MW-1 were above the Site cleanup level and elevated relative to historical trends. The Port suspected that the elevated arsenic was the result of surface water infiltration that occurred during construction of a new remote truck gate and utilities in May and June 2020. Ecology was briefed prior to construction and approved the scope of work on December 30, 2019 (Ecology, 2019). Cap integrity was restored after subsurface work was completed. Based on the increased dissolved arsenic concentrations observed during this event, the Port elected to conduct an off-schedule groundwater monitoring event in February 2022. MFA conducted the most recent groundwater monitoring event on February 27, 2022. MFA also completed a cap inspection in February 2022 (described in a separate report [MFA, 2022]).

GROUNDWATER MONITORING FIELD PROCEDURES

On February 27, 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). New disposable tubing was used for purging and sampling at each monitoring well location. 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. Under standard chain-of-custody procedures, groundwater samples were submitted to ALS Environmental in Kelso, Washington, for laboratory analysis. Groundwater samples were field filtered with a 0.45-micron filter and preserved with nitric acid during sample collection.

Groundwater samples were prepared by reductive precipitation to remove potential salt interference then analyzed for dissolved arsenic, copper, and lead by EPA Method 200.8.

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 the appropriate data qualifiers assigned. Results from the groundwater monitoring indicate the following:

- Dissolved arsenic was detected at a concentration of 67.0 micrograms per liter (ug/L) in MW-1 and 96.2 ug/L in MW-2. Both values exceed the cleanup level (CUL) of 36 ug/L for dissolved arsenic.
- Dissolved copper was detected at an estimated concentration of 0.08 ug/L in MW-1 and at a concentration of 5.01 ug/L in MW-2. The detection in MW-2 exceeds the CUL of 2.9 ug/L for dissolved copper.
- Dissolved lead was not detected at the method detection limit (0.02 ug/L) in MW-1 but was detected at a concentration of 0.125 ug/L in MW-2. The detection in MW-2 was below the 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. The most recent detections are generally consistent with historical trends. Groundwater monitoring results from this event will be submitted to Ecology within 45 days after completion of data validation.

RECOMMENDATIONS

Based on the recent construction activities and results of this groundwater monitoring event, arsenic concentrations have decreased to historical concentrations and appear to be naturally recovering. Therefore, MFA recommends returning to an 18-month schedule for sampling groundwater from MW-1 and MW-2. As this February 2022 groundwater monitoring event was conducted off-cycle, the next sampling event would occur in August 2022 according to the 18-month schedule.

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

Sarah Weeks
June 6, 2022
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Sincerely,

Maul Foster & Alongi, Inc.



Audrey Hackett
Senior Environmental Scientist

6.6.22

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. Memorandum of understanding, former log yard groundwater monitoring and cap inspection. Washington Department of Ecology. September 12.

Ecology. 2017. Second periodic review report final, Cascade Timber 3 POT. Washington Department of Ecology. January.

P. Balaraju (Ecology). 2019. Email communication (re: Cascade Timber No. 3 - construction in January 2020) with S. Weeks, Port of Tacoma, Tacoma, Washington. December 31.

HLA. 1993. Remedial investigation/feasibility study, Cascade Timber No. 3 Log Sort Yard, Tacoma Washington. March.

HLA. 1994. Engineering design report, remedial action, former Cascade Timber No. 3 Log Sort Yard, Port of Tacoma, Tacoma Washington. Appendix C, Compliance Monitoring Plan. Harding Lawson Associates. April 29.

MFA. 2021. Letter (re: Groundwater Monitoring Report, Former Cascade Timber No. 3 Sort Yard, Consent Decree No. 94-2-03590-3, Washington State Department of Ecology Facility Site ID No. 1206, Monitoring Date: February 19, 2021) to P. Balaraju and A. Smith, Washington State Department of Ecology, from Y. Van, Maul Foster & Alongi, Inc. June 16.

MFA. 2022. Environmental cap and drainage system inspection report, Former Cascade Timber No. 3 Log Sort Yard Site.

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. Interoffice memorandum, subject: Cascade Timber 2020 cap repairs. Port of Tacoma. April 22.

TABLES



Table 1
Water Level Data
Former Cascade Timber No. 3 Log Sort Yard



Well ID	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	

Table 1
Water Level Data
Former Cascade Timber No. 3 Log Sort Yard



Well ID	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	
<p>NOTES:</p> <p>Top of casing elevations based on information provided by the Port of Tacoma to the previous consultant.</p> <p>-- = not measured.</p> <p>Cascade Timber = Cascade Timber Company.</p> <p>ID = identification.</p>				

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



Well ID	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	--	
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
	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

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



Well ID	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)	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	--	
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	

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



Well ID	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	02/27/2022	96.2	5.01	0.125	--
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.

ID = identification.

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:
 Cascade Timber = Cascade Timber Company.

Source:
 U.S. Geological Survey (2021) 7.5-minute
 topographic quadrangle: Tacoma North;
 Township 21 north, range 3 east, section 34;
 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, Washington

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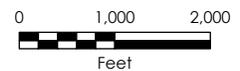




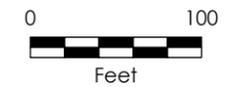
Figure 2 Site Features

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

Legend

-  Monitoring Well
-  Site Boundary
-  Tax Lot

NOTE:
Cascade Timber = Cascade Timber
Company.

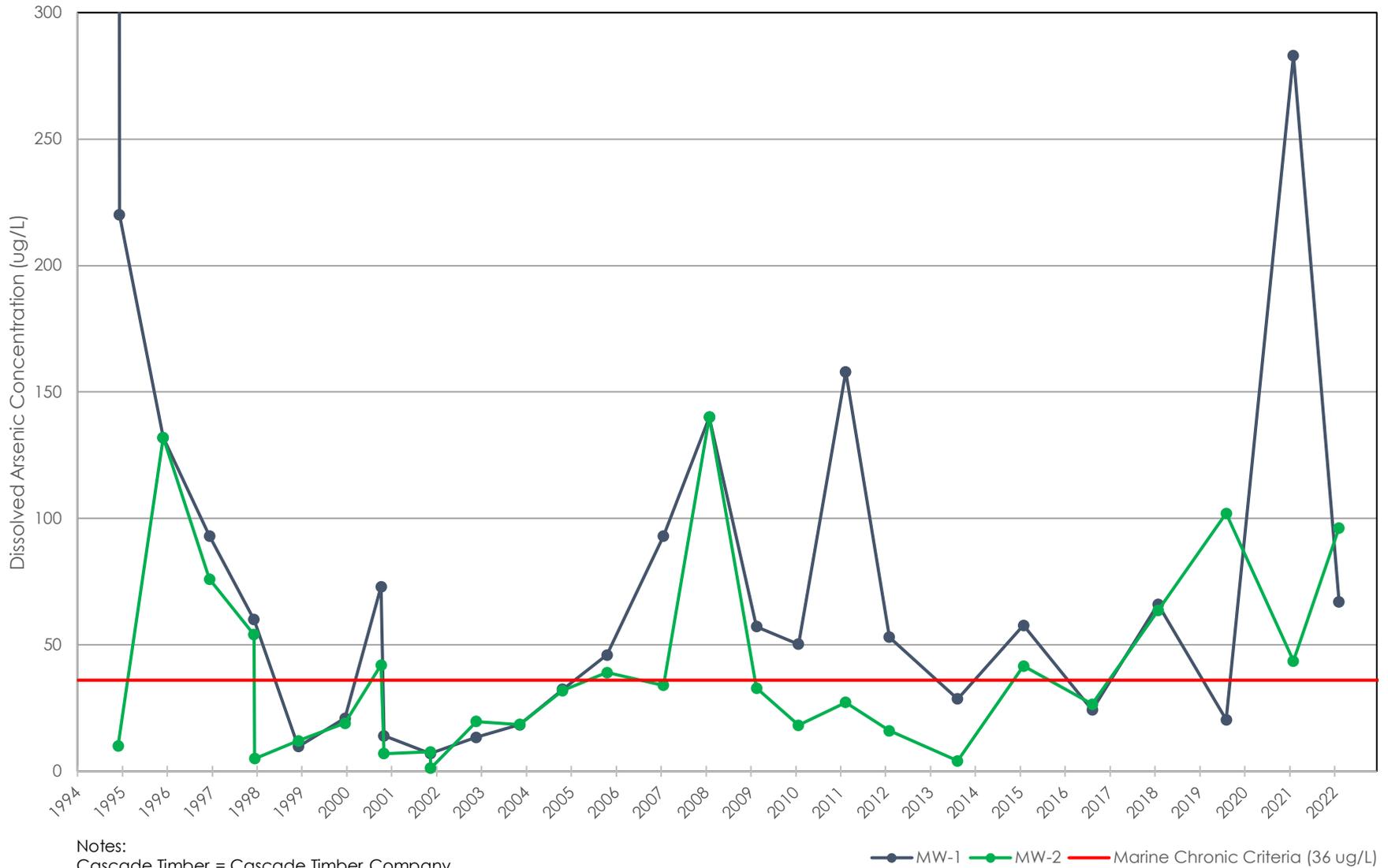


Source:
Aerial photograph (2018) obtained from City of
Tacoma; tax lot data obtained from Pierce County
GIS; monitoring well locations obtained from Anchor
QEA site plan figure.

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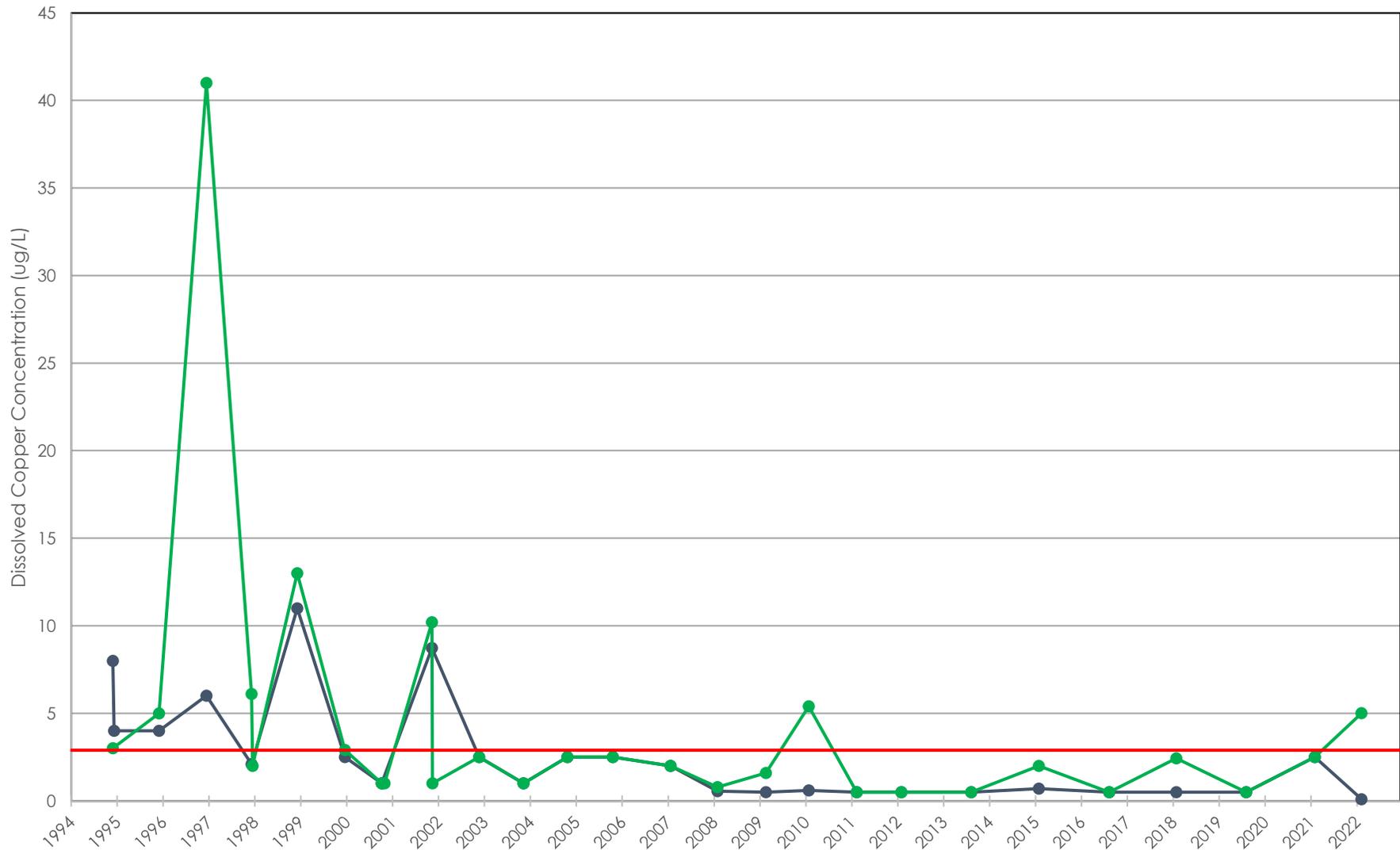
Figure 3
Dissolved Arsenic Trend Plot
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington



Notes:
 Cascade Timber = Cascade Timber Company.
 11/28/1994 result = 940 ug/L.
 See Table 2 for analytical data.
 Undetected results are plotted at the reporting limit or are estimated values.

—●— MW-1 —●— MW-2 — Marine Chronic Criteria (36 ug/L)

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



Notes:

Cascade Timber = Cascade Timber Company.

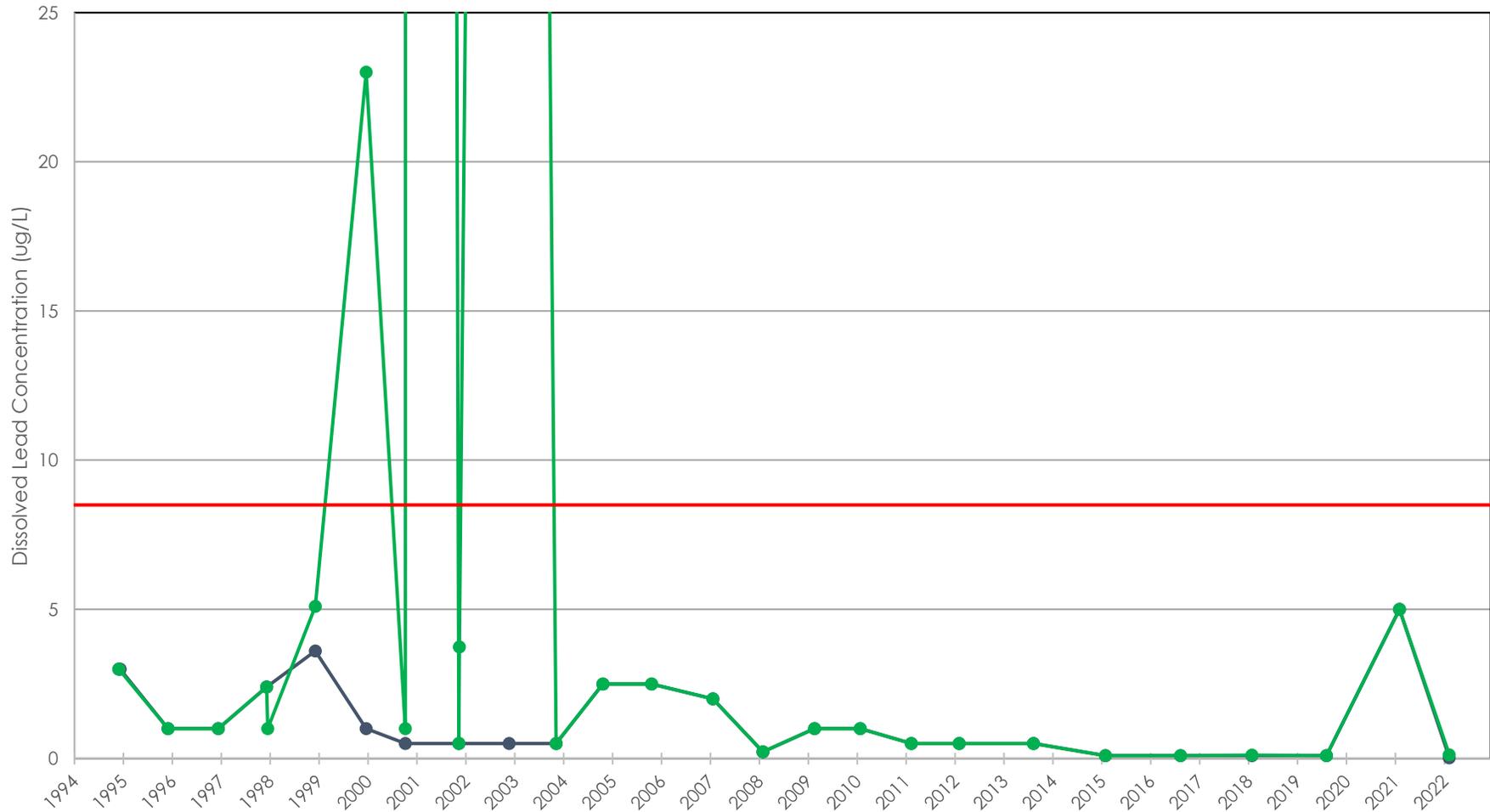
See Table 2 for analytical data.

Undetected results are plotted at the reporting limit or are estimated values.

ug/L = micrograms per liter.

—●— MW-1 —●— MW-2 — Marine Chronic Criteria (2.9 ug/L)

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



Notes:

Cascade Timber = Cascade Timber Company.

11/3/2000 result = 600 ug/L

11/13/2000 result = 600 ug/L

11/26/2002 result = 180 ug/L

See Table 2 for analytical data.

Undetected results are plotted at the reporting limit or are estimated values.

ug/L = micrograms per liter.

● MW-1
 ● MW-2
 — Marine Chronic Criteria (8.5 ug/L)

ATTACHMENT A

WATER FIELD SAMPLING DATA SHEETS



Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	Sample Location	MW-1		
Project #	M0615.17.001	Sampler	E. Lundeen		
Project Name	Former Cascade Timber Property	Sampling Date	2/27/2022		
Sampling Event	February 2022	Sample Name	MW-1-GW-15.0		
Sub Area		Sample Depth	15		
FSDS QA:	J. Lenahansen 3/10/2022	Easting		Northing	
		TOC			

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT-Product	DT-Water	(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
					DTP-DTW	DTB-DTW	Pore Volume
2/27/2022	9:40	16.14		12.46		3.68	0.59

(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	10:55:00 AM	3.5	0.2	6.39	9.7	843	0.59	41	6.8
	11:00:00 AM	3.7	0.2	6.39	9.7	842	0.55	40.4	1.2
	11:05:00 AM	3.9	0.2	6.38	9.7	841	0.56	39.6	1.5
Final Field Parameters	11:10:00 AM	4.1	0.2	6.38	9.7	840	0.55	39.1	1.3

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; pale yellow tint; no odor; slight brittle sheen.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	11:15:00 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 @ 9:50.
MW-DUP-GW-15.0 collected here.

Signature _____

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	Sample Location	MW-2
Project #	M0615.17.001	Sampler	E. Lundeen
Project Name	Former Cascade Timber Property	Sampling Date	2/27/2022
Sampling Event	February 2022	Sample Name	MW-2-GW-15.0
Sub Area		Sample Depth	15
FSDS QA:	J. Lenahansen 3/10/2022	Easting	<input style="width: 50px;" type="text"/>
		Northing	<input style="width: 50px;" type="text"/>
		TOC	<input style="width: 50px;" type="text"/>

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT-Product	DT-Water	(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
					DTP-DTW	DTB-DTW	Pore Volume
2/27/2022	9:17	17.87		5.58		12.29	2

(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	10:05:00 AM	2.2	0.3	6.47	10.4	1079	0.62	56	10.74
	10:15:00 AM	2.8	0.3	6.52	10.5	834	0.75	15.9	8.73
	10:20:00 AM	3	0.2	6.53	10.4	799	0.35	11.9	8.91
	10:25:00 AM	3.2	0.2	6.54	10.5	798	0.36	8.3	8.85
Final Field Parameters	10:30:00 AM	3.4	0.2	6.54	10.5	802	0.36	13.2	8.99

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:

Slightly turbid with orange particulates; reddish-orange tint; no odor; slight blocky sheen.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	10:35:00 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 9:30.

Signature _____

ATTACHMENT B

ANALYTICAL LABORATORY REPORT





March 11, 2022

Revised Service Request No: K2202093.01

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

Laboratory Results for: Port of Tacoma - Cascade Timber

Dear Audrey,

Enclosed is the revised of the sample(s) submitted to our laboratory March 01, 2022.

For your reference, these analyses have been assigned our service request number **K2202093**.

Revised report to a Tier II.

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



Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber
Sample Matrix: Brackish Water

Service Request: K2202093
Date Received: 03/01/2022

CASE NARRATIVE

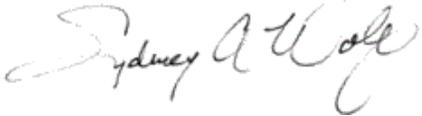
All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Three brackish water samples were received for analysis at ALS Environmental on 03/01/2022. 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:

No significant anomalies were noted with this analysis.

Approved by 

Date 03/11/2022



SAMPLE DETECTION SUMMARY

CLIENT ID: MW-1-GW-15.0 **Lab ID: K2202093-001**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	67.0		0.06	0.50	ug/L	200.8
Copper, Dissolved	0.08	J	0.02	0.10	ug/L	200.8

CLIENT ID: MW-DUP-GW-15.0 **Lab ID: K2202093-002**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	63.5		0.06	0.50	ug/L	200.8
Copper, Dissolved	0.08	J	0.02	0.10	ug/L	200.8

CLIENT ID: MW-2-GW-15.0 **Lab ID: K2202093-003**

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	96.2		0.06	0.50	ug/L	200.8
Copper, Dissolved	5.01		0.02	0.10	ug/L	200.8
Lead, Dissolved	0.125		0.020	0.050	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
Project: Port of Tacoma - Cascade Timber/M0615.17.002

Service Request:K2202093

SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
K2202093-001	MW-1-GW-15.0	2/27/2022	1115
K2202093-002	MW-DUP-GW-15.0	2/27/2022	1115
K2202093-003	MW-2-GW-15.0	2/27/2022	1035

PM SW

Cooler Receipt and Preservation Form

Client MFA Service Request K22
Received: 3/1/22 Opened: 3/1/22 By: [Signature] Unloaded: 3/1/22 By: [Signature]

- 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? 2 front & back
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
<u>2.8</u>	<u>—</u>	<u>1201</u>				<u>29032726 6510</u>	

- 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:
<u>MW-1-GW-15.0</u>	<u>MW-2-GW-15.0</u>	<u>Time Sampled</u>

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/analyte 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.

ALS Group USA, Corp.
dba ALS Environmental

Analyst Summary report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002

Service Request: K2202093

Sample Name: MW-1-GW-15.0
Lab Code: K2202093-001
Sample Matrix: Brackish Water

Date Collected: 02/27/22
Date Received: 03/1/22

Analysis Method
200.8

Extracted/Digested By
ABOYER

Analyzed By
JCHAN

Sample Name: MW-DUP-GW-15.0
Lab Code: K2202093-002
Sample Matrix: Brackish Water

Date Collected: 02/27/22
Date Received: 03/1/22

Analysis Method
200.8

Extracted/Digested By
ABOYER

Analyzed By
JCHAN

Sample Name: MW-2-GW-15.0
Lab Code: K2202093-003
Sample Matrix: Brackish Water

Date Collected: 02/27/22
Date Received: 03/1/22

Analysis Method
200.8

Extracted/Digested By
ABOYER

Analyzed By
JCHAN



Sample Results

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1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
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Metals

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1317 South 13th Avenue, Kelso, WA 98626
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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Brackish Water
Sample Name: MW-1-GW-15.0
Lab Code: K2202093-001

Service Request: K2202093
Date Collected: 02/27/22 11:15
Date Received: 03/01/22 09:45

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	67.0	ug/L	0.50	0.06	1	03/08/22 08:47	03/03/22	
Copper	200.8	0.08 J	ug/L	0.10	0.02	1	03/08/22 08:47	03/03/22	
Lead	200.8	ND U	ug/L	0.050	0.020	1	03/08/22 08:47	03/03/22	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Brackish Water
Sample Name: MW-DUP-GW-15.0
Lab Code: K2202093-002

Service Request: K2202093
Date Collected: 02/27/22 11:15
Date Received: 03/01/22 09:45

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	63.5	ug/L	0.50	0.06	1	03/08/22 08:49	03/03/22	
Copper	200.8	0.08 J	ug/L	0.10	0.02	1	03/08/22 08:49	03/03/22	
Lead	200.8	ND U	ug/L	0.050	0.020	1	03/08/22 08:49	03/03/22	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Brackish Water
Sample Name: MW-2-GW-15.0
Lab Code: K2202093-003

Service Request: K2202093
Date Collected: 02/27/22 10:35
Date Received: 03/01/22 09:45

Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	96.2	ug/L	0.50	0.06	1	03/08/22 08:55	03/03/22	
Copper	200.8	5.01	ug/L	0.10	0.02	1	03/08/22 08:55	03/03/22	
Lead	200.8	0.125	ug/L	0.050	0.020	1	03/08/22 08:55	03/03/22	



QC Summary Forms

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



Metals

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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Brackish Water
Sample Name: Method Blank
Lab Code: KQ2203364-01

Service Request: K2202093
Date Collected: NA
Date Received: NA
Basis: NA

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	0.06	1	03/08/22 08:32	03/03/22	
Copper	200.8	0.03 J	ug/L	0.10	0.02	1	03/08/22 08:32	03/03/22	
Lead	200.8	ND U	ug/L	0.050	0.020	1	03/08/22 08:32	03/03/22	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Ocean Water

Service Request: K2202093
Date Collected: N/A
Date Received: N/A
Date Analyzed: 03/8/22
Date Extracted: 03/3/22

Matrix Spike Summary
Total Metals

Sample Name: Batch QC
Lab Code: K2201959-008
Analysis Method: 200.8
Prep Method: EPA 1640

Units: ug/L
Basis: NA

Matrix Spike
KQ2203364-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	1.42	3.36	2.00	97	50-147
Copper	0.24	1.99	2.00	88	50-120
Lead	ND U	1.86	2.00	93	55-118

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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Wastewater

Service Request: K2202093
Date Collected: N/A
Date Received: N/A
Date Analyzed: 03/8/22
Date Extracted: 03/3/22

Matrix Spike Summary
Total Metals

Sample Name: Batch QC
Lab Code: K2202136-001
Analysis Method: 200.8
Prep Method: EPA 1640

Units: ug/L
Basis: NA

Matrix Spike
KQ2203364-06

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	6.38	7.39	2.00	51	50-147
Copper	0.43	2.27	2.00	92	50-120
Lead	ND U	1.82	2.00	91	55-118

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.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Ocean Water

Service Request: K2202093
Date Collected: NA
Date Received: NA
Date Analyzed: 03/08/22

Replicate Sample Summary

Total Metals

Sample Name: Batch QC
Lab Code: K2201959-008

Units: ug/L
Basis: NA

Table with 9 columns: Analyte Name, Analysis Method, MRL, MDL, Sample Result, Duplicate Sample KQ2203364-03 Result, Average, RPD, RPD Limit. Rows include Arsenic, Copper, and Lead.

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.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Wastewater

Service Request: K2202093
Date Collected: NA
Date Received: NA
Date Analyzed: 03/08/22

Replicate Sample Summary

Total Metals

Sample Name: Batch QC
Lab Code: K2202136-001

Units: ug/L
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate	Average	RPD	RPD Limit
					Sample KQ2203364-05 Result			
Arsenic	200.8	0.50	0.06	6.38	6.18	6.28	3	20
Copper	200.8	0.10	0.02	0.43	0.44	0.44	2	20
Lead	200.8	0.050	0.020	ND U	ND U	ND	-	20

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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project: Port of Tacoma - Cascade Timber/M0615.17.002
Sample Matrix: Brackish Water

Service Request: K2202093
Date Analyzed: 03/08/22

Lab Control Sample Summary
Dissolved Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2203364-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	1.94	2.00	97	71-124
Copper	200.8	1.95	2.00	98	63-128
Lead	200.8	1.96	2.00	98	82-113

ATTACHMENT C

DATA VALIDATION MEMORANDUM



DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. M0615.17.002 | MARCH 10, 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 No. 3 Log Sort Yard Site, in Tacoma, Washington on February 27, 2022.

ALS Group USA Corp. dba ALS Environmental (ALS) performed the analyses. ALS report number K2202093 was reviewed. The analysis performed and samples analyzed are listed below.

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

Samples Analyzed
Report K2202093
MW-1-GW-15.0
MW-DUP-GW-15.0
MW-2-GW-15.0

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, 2020; 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 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.

BLANKS

Method Blanks

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

According to report K2202093, the EPA Method 200.8 method blank (KQ2203364-01) had a dissolved copper detection between the MDL and MRL, at a concentration of 0.03 micrograms per liter. Associated sample MW-2-GW-15.0 had a dissolved copper result greater than ten times the method blank concentration, and thus did not require qualification. Associated samples MW-1-GW-15.0 and MW-DUP-GW-15.0 had dissolved copper results between the MDL and MRL. The sample detection limits were raised to the MRL, and sample results were qualified as not detected at the MRL, as shown in the table below.

Report	Sample	Component	Method Blank Result (ug/L)	Original Result (ug/L)	Qualified Result (ug/L)
K2202093	MW-1-GW-15.0	Dissolved copper	0.03 J	0.08 J	0.10 U
	MW-DUP-GW-15.0			0.08 J	0.10 U
NOTES: J = result is estimated. U = result is non-detect at the reporting limit. ug/L = micrograms per liter.					

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

Equipment Rinse Blanks

Equipment rinse 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.

Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during sample storage and shipment between the sampling location and the laboratory. No trip blank samples were submitted for this sampling event because samples were not analyzed for volatile organic compounds.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

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

ALS did not report LCS duplicate 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. Laboratory duplicate results within five times the MRL were not evaluated for precision.

All laboratory duplicate samples were extracted and analyzed at the required frequency, and all laboratory duplicate results met relative percent difference (RPD) acceptance criteria.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike (MS) and MS duplicate 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 MS duplicate 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. According to report K2202093, the following field duplicate and parent sample pair was submitted for analysis (MW-1-GW-15.0 and MW-DUP-GW-15.0). 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. Non-detect data are not used in the evaluation of field duplicate results.

All field duplicate results met the RPD acceptance criteria.

REPORTING LIMITS

ALS used routine MDLs for non-detect results. Results between the MDL and 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 revised report for K2202093 on March 11, 2022, with tier II information only. ALS included tier IV information in the original report, which was not required for this project.

The chain of custody form accompanying report K2202093 lists instructions for the laboratory to prepare samples using reductive precipitation procedures. No action by the reviewer was required.

According to the cooler receipt and preservation form accompanying report K2202093, sample MW-2-GW-15.0 was incorrectly labeled on the sample container. The laboratory was able to accurately identify samples based on the sample collection times on the containers. No action by the reviewer was required.

No other issues were found.

REFERENCES

ALS. 2020. Quality assurance manual. Revision 28. ALS Group USA Corp. dba ALS Environmental. Kelso, Washington. October 21.

EPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d 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).

EPA. 2020. EPA contract laboratory program, 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. November.