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October 11, 2024
Project No. M0615.23.002

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

Re: Groundwater Monitoring Report
Former Wasser & Winters Log Sort Yard
Consent Decree No. 93-2-08684-4
Facility Site ID: 1218
Monitoring Date: August 14, 2024

Dear Scott Hooton:

On August 14, 2024, Maul Foster & Alongi, Inc. (MFA), conducted a groundwater monitoring event on behalf of the Port of Tacoma (the Port) at the former Wasser & Winters Company log sort yard site (Ecology Facility ID 1218), located at 1602 Marine View Drive in Tacoma, Washington (the Site) (Figure 1). Groundwater sampling activities were conducted in August 2024 consistent with the requirements set forth in the Consent Decree No. 93-2-08684-4, between the Port and the Washington State Department of Ecology (Ecology). Field activities and results of the groundwater monitoring event are summarized below.

Site Background

The site is approximately 11.4 acres and encompasses the upland portion of a 13.54-acre parcel, which is owned by the Port. From 1972 to 1984, the Wasser & Winters Company operated the Site as a log sort yard (Ecology 2019). In the 1970s and early 1980s, slag generated by Asarco Incorporated of Tacoma, Washington, was placed on the Site for use as roadbed or ballast.

Ecology conducted a surface water investigation at the Site between November 1983 and June 1984. Elevated concentrations of several metals—including arsenic, copper, lead, and zinc—were detected in surface water samples collected from runoff locations that discharged to the Hylebos Waterway. Ecology concluded that the metals leached from the slag on the Site (Norton and Johnson 1985).

Between 1987 and 1993, several investigations were conducted at the Site to determine concentrations of metals (including arsenic, copper, lead, and zinc) in soil, groundwater, and surface water (Ecology 2019).

Ecology issued Consent Decree No. 93-2-08684-4 in 1993 describing remediation action goals and alternatives for the Site (Ecology 1993) and requiring five-year periodic reviews to assess the progress of the remedial actions. In 1994, monitoring wells CMW-1 through CMW-4 were installed to monitor the effectiveness of the remedial action on the Site (see Figure 2).

Construction of a low-permeability asphalt cap and stormwater drainage system was completed in 1995 in accordance with the Final Engineering and Design Report (Kennedy Jenks 1993). The cap covers the portion of the Site containing the slag from Asarco Incorporated.

The northern portion of the Site has been leased to WJR Tacoma, LLC, since 1996 and operated as Calbag Metals (Calbag), a scrap metal recycling facility. Calbag vacated the southern 3.4 acres of the Site in 2016, at which time portions of the pavement previously under scrap metal piles and equipment were exposed. This area was repaired by the Port in October 2017. Additional minor repairs were generally conducted in the central and northern portion of the Site in 2021, and are documented in the 2022 cap inspection report (MFA 2022b). The most recent cap inspection, completed by MFA in August 2024, is described in a separate report (MFA 2024).

Metals concentrations in groundwater were generally consistent and were below cleanup levels between 1994 and 2009. Wells CMW-1, CMW-2, and CMW-4 were decommissioned in the late 1990s. In 2011, Ecology approved a Port request to discontinue the monitoring of copper, lead, and zinc in groundwater at the Site. In 2019, Ecology requested CMW-1, CMW-2, and CMW-4 be re-installed and sampled and porewater sampling be performed between CMW-3 and Hylebos Creek in response to elevated arsenic observed in CMW-3. Two sampling events were completed at CMW-1, CMW-2, and CMW-4, in August 2019 and February 2020, dissolved arsenic was below the marine chronic criteria at all three locations. In March 2021, a groundwater sample was collected from CMW-3 and porewater samples were collected from between CMW-3 and Hylebos Creek, (within the Mowitch Restoration Site), located adjacent to the Site and downgradient of CMW-3, to evaluate the potential for off-site impacts. The arsenic concentration in the groundwater sample collected from CMW-3 continued to be above the marine chronic criteria, but at lower concentrations than in previous events. The porewater samples remained well below the marine chronic criteria, indicating that the elevated dissolved arsenic concentrations observed in CMW-3 do not extend off-site to Hylebos Creek and the Mowitch Restoration Site (Anchor 2021). The Port elected to perform supplemental annual groundwater sampling events in February 2022 and March 2023 to continue to monitor arsenic concentrations in CMW-3 (MFA 2022a, Anchor 2023).

Groundwater Monitoring Fieldwork

On August 14, 2024, two groundwater samples were collected from monitoring well CMW-3 using low-flow sampling procedures. The groundwater level at CMW-3 was measured prior to sampling (see Table 1). During purging, the flow rates, water levels, and water quality parameters (pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity) were recorded on a field sampling data sheet (see Attachment A). Water quality field parameters were allowed to stabilize before sample collection. A field duplicate was also collected from CMW-3. Groundwater samples were field filtered with a 0.45-micron filter and preserved with nitric acid during sample collection. Samples were collected directly into laboratory-provided bottles and were immediately placed in a cooler on ice. The samples were submitted to Apex Laboratories, LLC, in Tigard, Oregon, under standard chain-of-custody procedures for analysis of dissolved arsenic by U.S. Environmental Protection Agency Method 200.8.

Groundwater Monitoring Results

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 are as follows:

- Dissolved arsenic was detected at a concentration of 151 micrograms per liter in CMW-3, exceeding the marine chronic criteria of 36 micrograms per liter.

A plot depicting dissolved arsenic concentrations over time (since monitoring began in 1994) for CMW-3 is presented in Figure 3. The most recent sampling event indicates dissolved arsenic concentrations continue to decrease following the 2017 cap repairs that sealed off surface water infiltration. Natural recovery is anticipated to continue over time. Groundwater monitoring results were submitted to Ecology within 45 days after completion of data validation.

Recommendations

Groundwater quality will continue to be monitored in accordance with the Consent Decree, as amended in the Memorandum of Understanding (MOU). Per the MOU groundwater monitoring is required at the Site every 30 months. Therefore, the next scheduled sampling event is in February 2027.

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.

Audrey Hackett
Senior Environmental Scientist

Carolyn R. Wise, LHG
Senior Hydrogeologist

10-11-2024

Attachments

References

Limitations

Figures

Tables

A—Water Field Sampling Data Sheet

B—Analytical Laboratory Report

C—Data Validation Memorandum

References

Anchor. 2021. N. Bacher, Anchor QEA, LLC. *Supplemental Groundwater and Porewater Sampling Report, Former Wasser & Winters Log Sort Yard, Consent Decree No. 93-2-08684-4, Washington State Department of Ecology Facility Site ID #1218, Monitoring Date: March 8, 2021*. Memorandum to P. Balaraju and A. Smith, Washington State Department of Ecology. June 9.

Anchor. 2023. N. Bacher, Anchor QEA, LLC. *Groundwater Monitoring Report, Former Wasser & Winters Log Sort Yard, Consent Decree No. 93-2-08684-4, Washington State Department of Ecology Facility Site ID #1218, Monitoring Date: March 9, 2023*. Memorandum to A. Smith, Washington State Department of Ecology. September 25.

Ecology. 1993. Consent Decree No. 93-2-08684-4, State of Washington Department of Ecology, plaintiff, v. Port of Tacoma, defendant. August 27.

Ecology. 2019. *Second Periodic Review Report Final, Wasser Winters, Facility Site ID#: 1218, Cleanup Site ID#: 3404, 1602 Marine Drive, Tacoma, Washington*. Washington State Department of Ecology, Southwest Regional Office, Toxics Cleanup Program. September.

Kennedy Jenks. 1993. *Final Engineering and Design Report, Wasser & Winters log sort yard site*. Kennedy Jenks Consultants, Inc. October.

MFA. 2022a. A. Hackett and C. Wise, Maul Foster & Alongi, Inc. *Groundwater Monitoring Report, Former Wasser & Winters Log Sort Yard, Consent Decree No. 93-2-08684-4, Facility Site ID: 1218, Monitoring Date: February 17, 2022.* Letter to Sarah Weeks, Port of Tacoma. June 6.

MFA. 2022b. *Environmental Cap and Drainage System Inspection Report, Former Wasser & Winters Log Sort Yard.* Prepared for Port of Tacoma. Maul Foster & Alongi, Inc.: Seattle, WA. June 17.

MFA. 2024. Environmental Cap and Drainage System Inspection Report, Former Wasser & Winters Log Sort Yard.

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 memorandum. February 27.

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.

Figures

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Source:
U.S. Geological Survey (2021) 7.5-minute topographic quadrangle: Poverty Bay; Township 21 north, range 3 east, section 36; Property boundary obtained from Pierce County GIS.

Legend

Site Boundary

Figure 1
Site Location

Former Wasser & Winters Company
Log Sort Yard
1602 Marine View Drive
Tacoma, Washington

0 1,000 2,000
Feet

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Print Date: 3/24/2022
Reviewed By: chackett
Produced By: jelstrott
Project: M0615.23.001

Figure 2
Site Features

Former Wasser & Winters Company
Log Sort Yard
1602 Marine View Drive
Tacoma, Washington

Legend

- Monitoring Well
- Ecology Block Wall
- Site Boundary
- Tax Lot

NOTE:
Ecology = Washington State Department of Ecology

0 100
Feet

Source:
Aerial photograph obtained from City of Tacoma (2018); tax lot data obtained from Pierce County GIS; monitoring well locations obtained from Anchor QEA Supplemental Groundwater Monitoring and Porewater Sampling Locations figure

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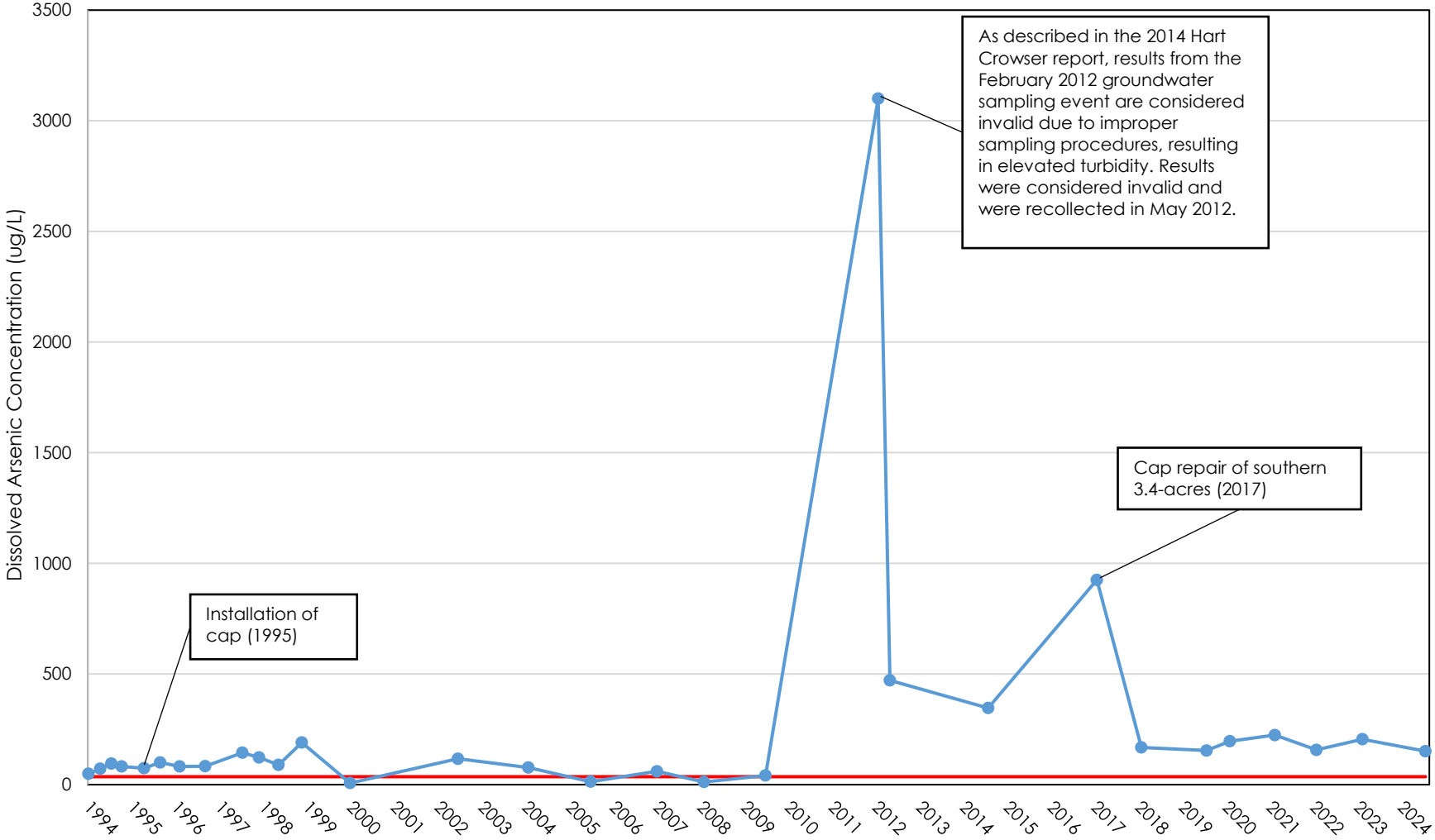
Figure 3
Dissolved Arsenic Trend Plot
Former Wasser Winters Company Log Sort Yard
Tacoma, Washington



Notes:
See Table 2 for analytical data.
ug/L = micrograms per liter.

Reference:
EPA. 2020. Washington Administrative Code 173-201A-240. Toxic substances. Table 240. U.S. Environmental Protection Agency. January.

Tables

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Table 1
Water Levels
Former Wasser & Winters Company Log Sort Yard, Tacoma, Washington
Port of Tacoma

Location:	Date:	Top of Casing Elevation (feet MLLW)	Depth of Water Below Top of Casing (feet)	Water Level Elevation (feet)
CMW-1	8/16/2019	16.72	6.46	10.26
	2/27/2020		5.9	10.82
CMW-2	8/16/2019	19.08	8.82	10.26
	2/27/2020		8.3	10.78
CMW-3	2/7/1994	20.34	9.72	10.62
	5/17/1994		9.83	10.51
	8/17/1994		10.24	10.1
	11/11/1994		10.47	9.87
	5/17/1995		9.48	10.86
	9/29/1995		10.37	9.97
	3/9/1996		8.51	11.83
	10/8/1996		10.24	10.1
	8/14/1997		9.76	10.58
	12/30/1997		8.8	11.54
	6/11/1998		9.68	10.66
	12/22/1998		8.75	11.59
	8/13/1999		10.05	10.29
	1/28/2000		8.76	11.58
	1/8/2001		9.92	10.42
	7/16/2002		9.81	10.53
	2/23/2004		9.45	10.89
	7/26/2005		10.04	10.3
	1/30/2007		9.88	10.46
	2/26/2008		9.24	11.1
	7/23/2009		10.18	10.16
	2/17/2012		10.21	10.13
	5/25/2012		9.85	10.49
	8/22/2014		9.98	10.36
	2/13/2017		8.82	11.52
	8/16/2019		10.05	10.29
	2/27/2020		9.36	10.98
	3/8/2021		9.28	11.06
	2/17/2022		9.55	10.79
	3/8/2023		9.37	10.97
	8/14/2024		10.08	10.26
CMW-4	8/16/2019	20.12	8.87	11.25
	2/27/2020		8.74	11.38

Table 1
Water Levels
Former Wasser & Winters Company Log Sort Yard, Tacoma, Washington
Port of Tacoma

Notes

Top of casing elevation surveyed by Sitts & Hill Engineers, Inc., September 2019.

Depth to water measured from reference point on top of well casing.

MLLW = mean lower low water.

Table 2
Summary of Groundwater Analytical Results
Former Wasser & Winters Company Log Sort Yard, Tacoma, Washington
Port of Tacoma

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Location:	Collection Date:	Sample Type:	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L			
		Cleanup Levels:[a][1][2]	36	2.9	8.5	86
CMW-1	02/07/1994	N	2	5	4	45
	05/17/1994	N	2	2 U	4	6
	08/17/1994	N	4	2 U	3	5
	11/11/1994	N	3	2 U	1	8
	05/17/1995	N	6	2 U	1 U	4 U
	05/17/1995	FD	5	2 U	1 U	4 U
	09/29/1995	N	5 U	2 U	1	4 U
	03/09/1996	N	5	2 U	1	4 U
	10/08/1996	N	1 U	2 U	1	4 U
	08/14/1997	N	2	2 U	1 U	4 U
	12/30/1997	N	4	2 U	1 U	133
	06/11/1998	N	1 U	2 U	2 U	4 U
	12/22/1998	N	1 U	2 U	5 U	4 U
	08/16/2019	N	6.12	--	--	--
	02/27/2020	N	12.7	--	--	--
CMW-2	02/07/1994	N	1 U	7	2	5
	02/07/1994	FD	1	12	1	8
	05/17/1994	N	1 U	7	2	16
	08/17/1994	N	2	2 U	4	17
	11/11/1994	N	7	3	4	10
	05/17/1995	N	3	2 U	4	17
	09/29/1995	N	23	2 U	1 U	4 U
	03/09/1996	N	10	2 U	1	4 U
	10/08/1996	N	12	2 U	1 U	4 U
	08/14/1997	N	18	2 U	1 U	4
	12/30/1997	N	10	2 U	1 U	92
	12/30/1997	FD	11	2 U	1 U	16
	06/11/1998	N	8	2 U	1 U	4
	12/22/1998	N	8	2 U	1 U	4 U
	08/16/2019	N	11	--	--	--
	02/27/2020	N	7.84	--	--	--
CMW-3	02/07/1994	N	49	2 U	1 U	8
	05/17/1994	N	72	2 U	1	7
	05/17/1994	FD	74	2 U	2	5
	08/17/1994	N	95	2 U	1 U	5
	08/17/1994	FD	86	2 U	2	8
	11/11/1994	N	82	2 U	2	8

Table 2
Summary of Groundwater Analytical Results
Former Wasser & Winters Company Log Sort Yard, Tacoma, Washington
Port of Tacoma

Location:	Collection Date:	Sample Type:	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L			
		Cleanup Levels:[a][1][2]	36	2.9	8.5	86
CMW-3 (continued)	11/11/1994	FD	25	2 U	2	4 U
	05/17/1995	N	74	2 U	1 U	7
	09/29/1995	N	100	2 U	1 U	5
	09/29/1995	FD	102	2 U	1 U	4 U
	03/09/1996	N	82	2 U	1 U	4 U
	10/08/1996	N	83	2 U	1 U	4 U
	10/08/1996	FD	84	2 U	1 U	4 U
	08/14/1997	N	144	2 U	1 U	5
	08/14/1997	FD	135	2 U	1 U	7
	12/30/1997	N	123	2 U	1 U	139
	06/11/1998	N	89	2 U	1 U	4 U
	06/11/1998	FD	86	2 U	1 U	4 U
	12/22/1998	N	190	2 U	1 U	2 U
	12/22/1998	FD	170	2 U	1 U	2 U
	01/28/2000	N	7.2	1 U	0.5 U	99
	07/16/2002	N	117	1.02	0.5 U	3.32
	07/16/2002	FD	111	0.979	0.5 U	4.67
	02/23/2004	N	77.2	1.07	0.2 U	3.98
	02/23/2004	FD	77.5	1.06	0.675	4.79
	07/26/2005	N	13.1	2.63	2.5 U	5 U
	07/26/2005	FD	12.9	2.5 U	2.0 U	5 U
	01/30/2007	N	60	4.6	2.0 U	34
	02/26/2008	N	12	1.2 J	2.0 U	47
	02/26/2008	FD	11	0.8 J	2.0 U	35
	07/23/2009	N	41.3	1.5	2.0 U	2.7
	07/23/2009	FD	41.7	1.4	0.2 U	1.4
	02/17/2012	N	2,750[b]	--	--	--
	02/17/2012	FD	3,100[b]	--	--	--
	05/25/2012	N	471	--	--	--
	05/25/2012	FD	455	--	--	--
	08/22/2014	N	346	--	--	--
	08/22/2014	FD	353	--	--	--
	02/13/2017	N	925	--	--	--
	02/13/2017	FD	899	--	--	--
	02/19/2018	N	168	--	--	--
	02/19/2018	FD	201	--	--	--
	08/16/2019	N	154	--	--	--

Table 2
Summary of Groundwater Analytical Results
Former Wasser & Winters Company Log Sort Yard, Tacoma, Washington
Port of Tacoma

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Location:	Collection Date:	Sample Type:	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L			
		Cleanup Levels:[a][1][2]	36	2.9	8.5	86
CMW-3 (continued)	02/27/2020	N	196	--	--	
	03/08/2021	N	224	--	--	--
	03/08/2021	FD	214	--	--	--
	02/17/2022	N	157	--	--	--
	02/17/2022	FD	155	--	--	--
	03/08/2023	N	202	--	--	--
	03/08/2023	FD	205	--	--	--
	08/14/2024	N	151	--	--	--
	08/14/2024	FD	150	--	--	--
CMW-4	02/07/1994	N	6	3	2	13
	05/17/1994	N	23	2 U	3	8
	08/17/1994	N	33	2 U	2	6
	11/11/1994	N	26	3	14	10
	05/17/1995	N	24	2 U	1 U	4 U
	09/29/1995	N	34	2 U	1 U	6
	03/09/1996	N	18	2 U	1 U	4 U
	03/09/1996	FD	18	2 U	1 U	4 U
	10/08/1996	N	26	2 U	1 U	4 U
	08/14/1997	N	27	2 U	1 U	4 U
	12/30/1997	N	21	2 U	1 U	146
	06/11/1998	N	22	2 U	1 U	4
	12/22/1998	N	28	2 U	1 U	9
	08/16/2019	N	3.22	--	--	--
	08/16/2019	FD	4.38	--	--	--
	02/27/2020	N	7.52	--	--	--
	02/27/2020	FD	7.31	--	--	--
PW-U[c]	03/08/2021	N	2.53	--	--	--
PW-D[c]	03/08/2021	N	2.28	--	--	--

Table 2
Summary of Groundwater Analytical Results
Former Wasser Winters Company Log Sort Yard, Tacoma, Washington
Port of Tacoma

Notes

Shading (color key below) indicates values that exceed screening criteria; non-detects (U and UJ) were not compared with cleanup level.

Lead, zinc, and copper analyses were discontinued in 2011 with Ecology approval, dated June 28, 2011.

Monitoring wells CMW-1, CMW-2, and CMW-4 were decommissioned in 2000. During an in-person meeting on April 3, 2019, Ecology requested that the three wells be re-installed, and the wells were re-installed on July 10, 2019.

-- = not analyzed

Ecology = Washington State Department of Ecology.

EPA = United States Environmental Protection Agency.

FD = field duplicate sample.

J = result is estimated.

N = normal environmental sample.

U = result is non-detect at the detection limit.

ug/L = micrograms per liter.

WAC = Washington Administrative Code.

[a]Cleanup levels established by Ecology Consent Decree No. 93-2-08684-4 and EPA aquatic life criteria, marine water, chronic (WAC 173-201A).

[b]Results from the February 2012 sampling event are considered invalid due to improper sampling procedures, resulting in higher-than-normal turbidity.

[c]Pore water sample collected using a passive nylon mesh diffusion sampler and processed as a groundwater sample.

References

[1]Ecology. 1993. Consent Decree No. 93-2-08684-4. Washington State Department of Ecology. August.

[2]EPA. 2020. WAC 173-201A-240. Toxic substances. Table 240. U.S. Environmental Protection Agency. January.

Attachment A

Water Field Sampling Data Sheet

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Groundwater Field Sampling Data Sheet

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Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M0615.23.002	Port of Tacoma	Wasser Winters	August 2024	B. Murphy

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
CMW-3	Monitoring	Stick-up	Top of Casing	2.0	--	11.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTP - DTW*	*DTB - DTW*	*(gal/ft x water column)*
08/14/2024	8:45	12.44	--	10.08	--	2.36	0.38

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	Peristaltic Pump	*Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, other*

Purge Start Time	8:52	*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*
Time	**Cumulative Purge Volume**	**Flowrate**	**Water Level**	**pH**	**Temperature**	**Conductivity**	**Dissolved Oxygen**	**ORP**	**Turbidity**
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
9:00	0.2	0.2	10.18	6.16	15.5	887	0.27	18.9	0.80
9:03	0.4	0.2	10.20	6.28	15.5	833	0.20	3.9	0.48
9:06	0.6	0.2	10.22	6.29	15.6	807	0.16	-17.9	0.49
9:09	0.7	0.2	10.23	6.30	15.7	777	0.13	-27.3	0.48
9:12	0.9	0.2	10.24	6.32	15.8	754	0.12	-32.8	0.47
9:15	1.1	0.2	10.24	6.33	15.8	733	0.12	-37.1	0.11

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Clear; colorless; moderate sulfur-like odor; no sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	CMW-3-081424		
Sample Date	08/14/2024	Sample Time	9:15

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA			
Amber glass			
Poly	HNO3	Y	2
		Total No. Containers:	2

General Comments

Duplicate sample CMW-DUP-081424 collected at this location.

Attachment B

Analytical Laboratory Report

MAUL FOSTER ALONGI

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Friday, September 6, 2024

Audrey Hackett
Maul Foster & Alongi, Inc-Seattle
2815 2nd Ave Suite 540
Seattle, WA 98121

RE: A4H1236 - Wasser Winters, Port of Tacoma - M0615.23.002

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A4H1236, which was received by the laboratory on 8/16/2024 at 10:55:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information
Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.
(See Cooler Receipt Form for details)
Default Cooler 4.7 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, Inc-Seattle	Project:	**Wasser Winters, Port of Tacoma**	
2815 2nd Ave Suite 540	Project Number:	**M0615.23.002**	**Report ID:**
Seattle, WA 98121	Project Manager:	**Audrey Hackett**	**A4H1236 - 09 06 24 1428**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
CMW-3-081424	A4H1236-01	Water	08/14/24 09:15	08/16/24 10:55
CMW-DUP-081424	A4H1236-02	Water	08/14/24 09:15	08/16/24 10:55

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL SAMPLE RESULTS

Dissolved Metals by EPA 200.8 (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CMW-3-081424 (A4H1236-01)				**Matrix: Water**				
Batch: 24H0882								
Arsenic	**151**	---	0.360	ug/L	1	09/04/24 16:50	EPA 200.8 (Diss)	
CMW-DUP-081424 (A4H1236-02)				**Matrix: Water**				
Batch: 24H0882								
Arsenic	**150**	---	0.360	ug/L	1	09/04/24 16:54	EPA 200.8 (Diss)	

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ANALYTICAL REPORT

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2815 2nd Ave Suite 540	Project Number:	M0615.23.002
Seattle, WA 98121	Project Manager:	Audrey Hackett

Report ID:
A4H1236 - 09 06 24 1428

QUALITY CONTROL (QC) SAMPLE RESULTS

Dissolved Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24H0882 - Matrix Matched Direct Inject								Water				
Blank (24H0882-BLK2)			Prepared: 09/04/24 12:36 Analyzed: 09/04/24 16:59									
EPA 200.8 (Diss)												
Arsenic	ND	---	0.360	ug/L	1	---	---	---	---	---	---	Q-16
LCS (24H0882-BS2)			Prepared: 09/04/24 12:36 Analyzed: 09/04/24 17:04									
EPA 200.8 (Diss)												
Arsenic	9.79	---	0.360	ug/L	1	10.0	---	98	85-115%	---	---	Q-16
Duplicate (24H0882-DUP1)			Prepared: 09/04/24 12:36 Analyzed: 09/04/24 16:03									
QC Source Sample: Non-SDG (A4H1235-01)												
Arsenic	**0.465**	---	0.360	ug/L	1	---	0.487	---	---	5	20%	
Matrix Spike (24H0882-MS1)			Prepared: 09/04/24 12:36 Analyzed: 09/04/24 16:08									
QC Source Sample: Non-SDG (A4H1235-01)												
EPA 200.8 (Diss)												
Arsenic	10.8	---	0.360	ug/L	1	10.0	0.487	104	70-130%	---	---	

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ANALYTICAL REPORT

Maul Foster & Alongi, Inc-Seattle	Project:	**Wasser Winters, Port of Tacoma**	
2815 2nd Ave Suite 540	Project Number:	**M0615.23.002**	**Report ID:**
Seattle, WA 98121	Project Manager:	**Audrey Hackett**	**A4H1236 - 09 06 24 1428**

SAMPLE PREPARATION INFORMATION

Dissolved Metals by EPA 200.8 (ICPMS)

Prep: Matrix Matched Direct Inject

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 24H0882							
A4H1236-01	Water	EPA 200.8 (Diss)	08/14/24 09:15	09/04/24 12:36	10mL/20mL	45mL/50mL	1.80
A4H1236-02	Water	EPA 200.8 (Diss)	08/14/24 09:15	09/04/24 12:36	10mL/20mL	45mL/50mL	1.80

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Seattle, WA 98121	Project Manager: **Audrey Hackett**	**A4H1236 - 09 06 24 1428**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

Q-16 Reanalysis of an original Batch QC sample.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Validated Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ). If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

Results for Volatiles analyses on soils and sediments that are reported on a “dry weight” basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an “As Received” basis do not have the WMS correction applied, as dry weight was not performed.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories

Philip Nerenberg, Lab Director

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Maul Foster & Alongi, Inc-Seattle	Project:	**Wasser Winters, Port of Tacoma**	
2815 2nd Ave Suite 540	Project Number:	**M0615.23.002**	**Report ID:**
Seattle, WA 98121	Project Manager:	**Audrey Hackett**	**A4H1236 - 09 06 24 1428**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to one half of the Reporting Limit (RL).
Blank results for gravimetric analyses are evaluated to the Reporting Level, not to half of the Reporting Level.
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.
-Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.
'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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2815 2nd Ave Suite 540	Project Number: M0615.23.002	Report ID:
Seattle, WA 98121	Project Manager: Audrey Hackett	A4H1236 - 09 06 24 1428

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nerenberg, Lab Director

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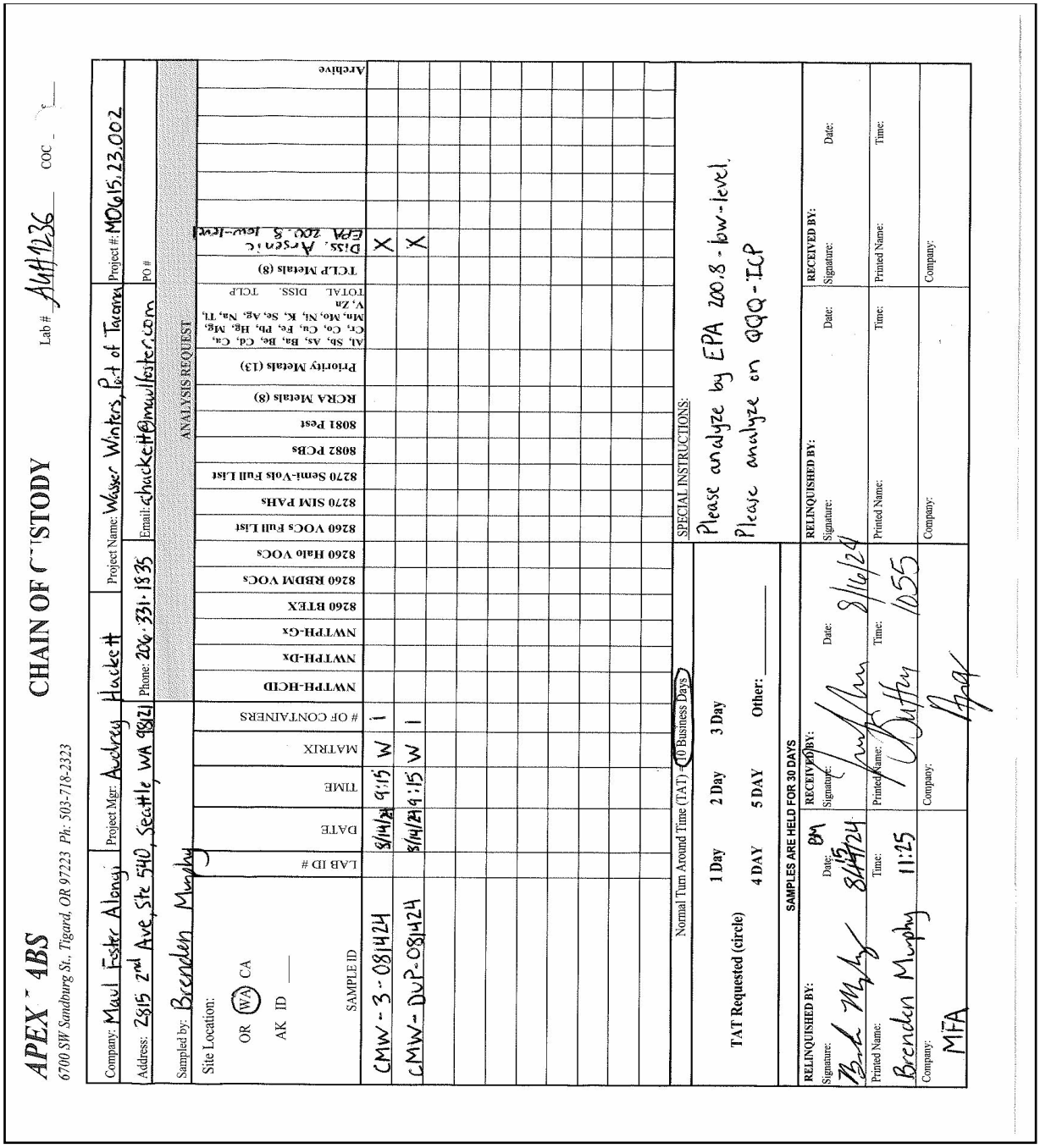

APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A4H1236 COC _

Company: Maul Foster Alongi | Project Mgr: Audrey Hackett | Project Name: Wasser Winters, Port of Tacoma | Project #: M0615.23.002
Address: 2815 2nd Ave, Ste 540, Seattle WA 98121 | Phone: 206-331-1835 | Email: ahackett@maulfoster.com | PO #
Sampled by: Brenden Murphy

Site Location: OR (WA) CA AK ID ____

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	D155. Arsenic EPA 200.8 low-level	Archive
CMW-3-083124		8/14/24	9:15	W	1															X	
CMW-DUP-083124		8/14/24	9:15	W	1															X	

Normal Turn Around Time (TAT) (10 Business Days)
TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ____

SPECIAL INSTRUCTIONS:
Please analyze by EPA 200.8 - low-level
Please analyze on QQQ-ICP

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:
Date: 8/16/24	Date: 8/16/24	Date: 8/16/24	Date:
Time: 11:25	Time: 10:55	Time:	Time:
Printed Name: Brenden Murphy	Printed Name:	Printed Name:	Printed Name:
Company: MFA	Company:	Company:	Company:

Apex Laboratories

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Seattle, WA 98121	Project Manager: **Audrey Hackett**	**A4H1236 - 09 06 24 1428**

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster Alongi Element WO#: A4 H1236

Project/Project #: Wasser Winters, Port of Tacoma M0615.23.002

Delivery Info:

Date/time received: 8/16/24 @ 1055 By: JS

Delivered by: Apex__Client__ESS___FedEx_X_UPS__Radio__Morgan ___SDS___Evergreen___Other ___

From USDA Regulated Origin? Yes _____ No _X_

Cooler Inspection Date/time inspected: 8/16/24 @ 1057 By: JS

Chain of Custody included? Yes _✓_ No _____

Signed/dated by client? Yes _✓_ No _____

Contains USDA Reg. Soils? Yes _____ No _X_ Unsure (email RegSoils) _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	4.7						
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Real						
Condition (In/Out):	In						

Cooler out of temp? (Y/(N)) Possible reason why: _____

Green dots applied to out of temperature samples? Yes (No)

Out of temperature samples form initiated? Yes (No)

Sample Inspection: Date/time inspected: 8/16/24 @ 13:23 By: ZA

All samples intact? Yes _X_ No ___ Comments: _____

Bottle labels/COCs agree? Yes _X_ No ___ Comments: _____

COC/container discrepancies form initiated? Yes ___ No _X_

Containers/volumes received appropriate for analysis? Yes _X_ No ___ Comments: _____

Do VOA vials have visible headspace? Yes ___ No ___ NA _X_

Comments _____

Water samples: pH checked: Yes _X_ No ___ NA ___ pH appropriate? Yes _X_ No ___ NA ___ pH ID: A23172

Comments: 2783 3801 2421

Labeled by: ZA Witness: KN Cooler Inspected by: JS

Form Y-003 R-02

Apex Laboratories

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Attachment C

Data Validation Memorandum

MAUL
FOSTER
ALONGI

Data Validation Memorandum

Project No. M0615.23.002 | September 11, 2024 | Port of Tacoma

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for groundwater and associated quality control samples collected on August 14, 2024, at the former Wasser Winters Log Sort Yard in Tacoma, Washington

Apex Laboratories LLC (Apex) performed the analyses. MFA reviewed Apex report number A4H1236. The analyses performed and the samples analyzed are listed in the following tables.

Analysis	Reference
Dissolved arsenic	EPA 200.8

Notes
EPA = U.S. Environmental Protection Agency.

Samples Analyzed	
Report A4H1236	
CMW-3-081424	CMW-DUP-081424

Data Validation Procedures

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 (Apex 2023, EPA 1986).

Based on the data quality assurance/quality control review described herein, the data, with the appropriate final data qualifiers assigned, are considered acceptable for their intended use. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, and data qualifiers assigned by the reviewer during validation.

No sample results were qualified

Sample Conditions

Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) form accompanying the report.

The reviewer confirmed that the gap in custody on the COC form accompanying report A4H1236 is due to shipment via a third-party service.

Holding Times

Extractions and analyses were performed within the recommended holding times.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

Sample Filtration

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

Reporting Limits

The laboratory evaluated results to method reporting limits (MRLs).

Blank Results

Method Blanks

Laboratory method blanks are used to evaluate whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analyses were performed at the required frequencies, in accordance with laboratory- and method-specific requirements.

All laboratory method blank results were non-detect to MRLs.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate the adequacy of the field equipment decontamination process when decontaminated sampling equipment is used to collect samples.

These blanks were not required for this sampling event, as all samples were collected using dedicated or single-use equipment.

Field Filter Blanks

Field filter blanks are used to evaluate whether contamination was introduced during field filtering procedures.

The reviewer could not evaluate whether metals contamination was introduced during field filtering procedures.

Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during shipping and field handling procedures.

Trip blank samples were not required for this sampling event because samples were not analyzed for volatile organic compounds.

Laboratory Control Sample and Laboratory Control Sample Duplicate Results

Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) results are used to evaluate laboratory precision and accuracy. Where LCSD results were not reported, laboratory precision was evaluated using laboratory duplicate results. The LCS samples were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

All LCS results were within acceptance limits for percent recovery.

Laboratory Duplicate Results

Laboratory duplicate results are used to evaluate laboratory precision and sample homogeneity. All laboratory duplicate samples were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

All laboratory duplicate results met the acceptance criteria.

Matrix Spike and Matrix Spike Duplicate Results

Matrix spike (MS) and matrix spike duplicate (MSD) results are used to evaluate laboratory precision, accuracy, and the effect of the sample matrix on sample preparation and target analyte recovery.

Where MSD results were not reported, laboratory precision was evaluated using laboratory duplicate results. The MS sample was prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

When the MS was prepared with samples from unrelated projects, the MS percent recovery exceedances did not require qualification because these sample matrices were not representative of project sample matrices.

All MS results were within acceptance limits for percent recovery.

Field Duplicate Results

Field duplicate results are used to evaluate field precision and sample homogeneity. The following field duplicate and parent sample pair was submitted for analysis:

Report	Parent Sample	Field Duplicate Sample
A4H1236	CMW-3-081424	CMW-DUP-081424

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.

All field duplicate results met the RPD acceptance criteria.

Data Package

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

The reviewer confirmed with the laboratory that EPA Method 200.8-low level was used, and the samples were run on triple quadrupole inductively coupled plasma-mass spectrometry, as requested on the COC.

None were found.

References

Apex. 2023. Quality Systems Manual. Rev. 11. Apex Laboratories, LLC: Tigard, OR. June 20.

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.