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ANCHOR QEA

Memorandum

September 25, 2023

To: Andy Smith, Washington State Department of Ecology

From: Nik Bacher, Anchor QEA, LLC

cc: Sarah Weeks, Port of Tacoma

Re: 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

Introduction

This report summarizes field activities and presents results of a supplemental groundwater sampling event conducted by Anchor QEA, LLC, on behalf of the Port of Tacoma (Port) at the Former Wasser & Winters Log Sort Yard facility located at 1602 Marine View Drive in Tacoma, Washington (Site; Figure 1). Groundwater sampling activities were conducted in accordance with the requirements set forth in Consent Decree 93-2-08684-4, dated August 1993, between the Port and the Washington State Department of Ecology (Ecology; 1993).

In 2011, Ecology approved the removal of copper, lead, and zinc from the Site groundwater monitoring analyte list (Ecology 2011a). In addition, a memorandum of understanding between Ecology and the Port reaffirming the 30-month monitoring frequency was issued on September 12, 2011 (Ecology 2011b). The last compliance groundwater monitoring event was conducted in February 2022 (MFA 2022) and the next compliance groundwater monitoring event is scheduled for August 2024.

In September 2019, Ecology conducted a periodic review of post-cleanup Site conditions and monitoring data to ensure that human health and the environment are being protected (Ecology 2019). The findings of that report concluded that the Site appears to meet the requirements of Chapter 173-340 Washington Administrative Code and the selected remedy continues to be protective of human health and the environment. The next 5-year review is expected in 2024.

The supplemental March 2023 groundwater monitoring event described in this report was conducted to gather additional information on the effectiveness of the low-permeability asphalt cap repairs that were performed in October 2017 and to gather another round of data for the CMW-3 well location.

Site Background

From 1972 to 1984, the Wasser & Winters Company operated the Site as a log sort yard. 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 detected elevated concentrations of metals in surface water samples collected from the Site between November 1983 and June 1984 and concluded that the metals leached from the slag (Norton and Johnson 1985).

In October 1991, Ecology and the Port entered into an Agreed Order (Ecology 1991) to complete a remedial investigation/feasibility study, which was followed by Consent Decree 93-2-08684-4 for remedial action on the 11.4-acre parcel (Ecology 1993).

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 covered the portion of the Site containing Asarco slag.

The property is owned by the Port. The northern part of the Site has been leased to WJR Tacoma, LLC, since 1996 and operated as Calbag Metals (Calbag), a scrap metal recycling facility. In July 2001, the tenant began construction of an 85,080-square-foot building, which was completed in December 2001 on the northern portion of the capped area. In 2007, Calbag leased the southern portion of the cap (3.74 acres) and operated through the Spring of 2016. Calbag vacated the southern 3.4 acres of the property in 2016, at which time portions of the pavement previously under scrap metal piles and equipment were exposed. The Port contracted an engineering consultant to survey the asphalt cap, which found cracks, gouges, alligatoring, and other conditions that needed repair. In October 2017 the Port repaired the southern 3.4 acres of the site by grinding down the top 3/4 inch of asphalt, installing a geotextile fabric, and placing a 2-inch asphalt lift. In 2018 Calbag entered a new lease for the 3.4-acre area; use is restricted to equipment storage. The repairs appeared to be in good condition during the 2019 inspection (Windward 2019).

Groundwater Monitoring

On March 8, 2023, groundwater samples were collected close to low tides[1] from existing site well CMW-3 shown on Figure 2. Groundwater monitoring field forms are included in Appendix A.

The groundwater level in CMW-3 was measured prior to sampling. The groundwater samples were collected from the well using low-flow sampling techniques. After water quality parameters had stabilized the pump was turned off and a 0.45-micron filter was attached to the sampling tubing prior to the pump being turned back on to collect groundwater samples. The samples were collected directly into laboratory-provided bottles and were immediately placed in a cooler on ice. The cooler

[1] High tide (11.76 feet mean lower low water) occurred at 05:46 and low tide (3.55 feet mean lower low water) occurred at 11:50 on March 8, 2023. Groundwater samples were collected between 13:05 and 13:10.

was kept under standard chain-of-custody procedures prior to being delivered to Analytical Resources, Inc. Samples were analyzed for dissolved arsenic via U.S. Environmental Protection Agency (EPA) Method 200.8. Data validation was performed under Stage 2B guidelines in accordance with EPA *National Functional Guidelines for Inorganic Superfund Methods Data Review* (EPA 2017).

Results

Analytical results are presented in Table 1 and water level data are presented in Table 2. Both these tables include historical data collected by prior consultants for reference. Laboratory data reports are included in Appendix B and the data validation report is included in Appendix C. Key findings were as follows:

- Dissolved arsenic was detected in groundwater monitoring well CMW-3 at a concentration of 205 micrograms per liter (µg/L). The value for CMW-3 exceeds the groundwater cleanup level of 36 µg/L and the concentration is on the same order of magnitude as results from recent (2018, 2019, 2021, and 2022) groundwater sampling events.

Dissolved arsenic concentrations in CMW-3 from 1994 to present are presented in Figure 3. The concentration trend was stable until after the July 2009 sampling event. Measured dissolved arsenic concentrations from monitoring events conducted after July 2009 through February 2017 were all higher than the values collected during monitoring events up until 2009. The cap was repaired in October 2017 and since then the dissolved arsenic concentrations in CMW-3 have decreased, indicating that the cap repair has sealed off surface water infiltration over the cap area allowing for the higher arsenic concentrations previously observed in CMW-3 to naturally recover over time.

Recommendations

The dissolved arsenic concentrations in groundwater will continue to be monitored in accordance with the Consent Decree, as amended. The next scheduled sampling event will occur in August 2024. Groundwater monitoring results will be submitted to Ecology within 45 days after completion of data validation.

References

Ecology (Washington State Department of Ecology), 1991. Agreed Order DE 91-S248. Washington State Department of Ecology. October 1991.

Ecology, 1993. Consent Decree 93-2-08684-4. Washington State Department of Ecology. August 1993.

Ecology, 2011a. Email correspondence to M. Rettman, Port of Tacoma from D. Reale, Washington State Department of Ecology. June 28, 2011.

Ecology, 2011b. Memorandum of Understanding, Former Log Yard Groundwater Monitoring and Cap Inspection, Washington Department of Ecology. September 2011.

Ecology, 2019. Second Periodic Review Report Final. Wasser Winters, Facilities Site ID# 1218. Washington State Department of Ecology, Southwest Regional Office, Toxics Cleanup Program, September 2019.

EPA (U.S. Environmental Protection Agency), 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review.

Kennedy Jenks, 1993. *Final Engineering and Design Report, Wasser & Winters Site Log Sort Yard Site, Kennedy Jenks Consultants, Inc*. October 1993.

MFA (Maul Foster Alongi), 2022. Groundwater Monitoring Report. Former Wasser and Winters Log Sort Yard. Prepared by Maul Foster Alongi for Port of Tacoma. June 6, 2022.

Norton, D., and Johnson, A., 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, 1985.

Windward, 2019. *Environmental Cap and Drainage System Inspection Report: Former Wasser & Winters Log Sort Yard*. Prepared by Windward Environmental for Port of Tacoma. October 30, 2019

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Table 1
Analytical Results

Well ID	Date	Concentration (µg/L)			
		Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
Cleanup Criteria Levels[a]		36	2.9	8.5	86
CMW-1	2/7/1994	**2**	**5**	**4**	**45**
	5/17/1994	**2**	2 U	**4**	**6**
	8/17/1994	**4**	2 U	**3**	**5**
	11/11/1994	**3**	2 U	**1**	**8**
	5/17/1995[c]	**6**	2 U	1 U	4 U
		5	2 U	1 U	4 U
	9/29/1995	5 U	2 U	**1**	4 U
	3/9/1996	**5**	2 U	**1**	4 U
	10/8/1996	1 U	2 U	**1**	4 U
	8/14/1997	**2**	2 U	1 U	4 U
	12/30/1997	**4**	2 U	1 U	**133**
	6/11/1998	1 U	2 U	2 U	4 U
	12/22/1998	1 U	2 U	5 U	4 U
	8/16/2019	**6.12**	--	--	--
	2/27/2020	**12.7**	--	--	--
CMW-2	2/7/1994[c]	1 U	**7**	**2**	**5**
		1	**12**	**1**	**8**
	5/17/1994	1 U	**7**	**2**	**16**
	8/17/1994	**2**	2 U	**4**	**17**
	11/11/1994	**7**	**3**	**4**	**10**
	5/17/1995	**3**	2 U	**4**	**17**
	9/29/1995	**23**	2 U	1 U	4 U
	3/9/1996	**10**	2 U	**1**	4 U
	10/8/1996	**12**	2 U	1 U	4 U
	8/14/1997	**18**	2 U	1 U	**4**
	12/30/1997[c]	**10**	2 U	1 U	**92**
		11	2 U	1 U	**16**
	6/11/1998	**8**	2 U	1 U	**4**
	12/22/1998	**8**	2 U	1 U	4 U
	8/16/2019	**11**	--	--	--
	2/27/2020	**7.84**	--	--	--
CMW-3	2/7/1994	**49**	2 U	1 U	**8**
	5/17/1994[c]	**72**	2 U	**1**	**7**
		74	2 U	**2**	**5**
	8/17/1994[c]	**95**	2 U	1 U	**5**
		86	2 U	**2**	**8**
	11/11/1994[c]	**82**	2 U	**2**	**8**
		25	2 U	**2**	4 U
	5/17/1995	**74**	2 U	1 U	**7**
	9/29/1995[c]	**100**	2 U	1 U	**5**
		102	2 U	1 U	4 U
	3/9/1996	**82**	2 U	1 U	4 U
	10/8/1996[c]	**83**	2 U	1 U	4 U
		84	2 U	1 U	4 U
	8/14/1997[c]	**144**	2 U	1 U	**5**
		135	2 U	1 U	**7**
	12/30/1997	**123**	2 U	1 U	**139**
	6/11/1998[c]	**89**	2 U	1 U	4 U
		86	2 U	1 U	4 U
	12/22/1998[c]	**190**	2 U	1 U	2 U
		170	2 U	1 U	2 U
	1/28/2000	**7.2**	1 U	0.5 U	**99**
	7/16/2002[c]	**117**	**1.02**	0.5 U	**3.32**
		111	**0.979**	0.5 U	**4.67**
	2/23/2004[c]	**77.2**	**1.07**	0.2 U	**3.98**
		77.5	**1.06**	**0.675**	**4.79**
	7/26/2005[c]	**13.1**	**2.63**	2.5 U	5 U
		12.9	2.5 U	2.0 U	5 U
	1/30/2007	**60**	**4.6**	2.0 U	**34**
	2/26/2008[c]	**12**	1.2 J	2.0 U	**47**
		11	0.8 J	2.0 U	**35**
	7/23/2009[c]	**41.3**	**1.5**	2.0 U	**2.7**
		41.7	**1.4**	0.2 U	**1.4**
	2/17/2012[c]	**2750[b]**	--	--	--
		3100[b]	--	--	--
	5/25/2012[c]	**471**	--	--	--
		455	--	--	--
	8/22/2014[c]	**346**	--	--	--
		353	--	--	--
	2/13/2017[c]	**925**	--	--	--
		899	--	--	--
	2/19/2018[c]	**168**	--	--	--
		201	--	--	--
	8/16/2019	**154**	--	--	--
	2/27/2020	**196**	--	--	
	3/8/2021[c]	**224**	--	--	--
		214	--	--	--
	2/17/2022[c]	**157**			
		155			
	3/8/2023[c]	**202**	--	--	--
		205	--	--	--

Table 1
Analytical Results

Well ID	Date	Concentration (µg/L)			
		Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
Cleanup Criteria Levels[a]		36	2.9	8.5	86
CMW-4	2/7/1994	**6**	**3**	**2**	**13**
	5/17/1994	**23**	2 U	**3**	**8**
	8/17/1994	**33**	2 U	**2**	**6**
	11/11/1994	**26**	**3**	**14**	**10**
	5/17/1995	**24**	2 U	1 U	4 U
	9/29/1995	**34**	2 U	1 U	**6**
	3/9/1996[c]	**18**	2 U	1 U	4 U
		18	2 U	1 U	4 U
	10/8/1996	**26**	2 U	1 U	4 U
	8/14/1997	**27**	2 U	1 U	4 U
	12/30/1997	**21**	2 U	1 U	**146**
	6/11/1998	**22**	2 U	1 U	**4**
	12/22/1998	**28**	2 U	1 U	**9**
	8/16/2019[c]	**3.22**	--	--	--
		4.38	--	--	--
	2/27/2020[c]	**7.52**	--	--	--
		7.31	--	--	--
PW-U[d]	3/8/2021	**2.53**	--	--	--
PW-D[d]	3/8/2021	**2.28**	--	--	--

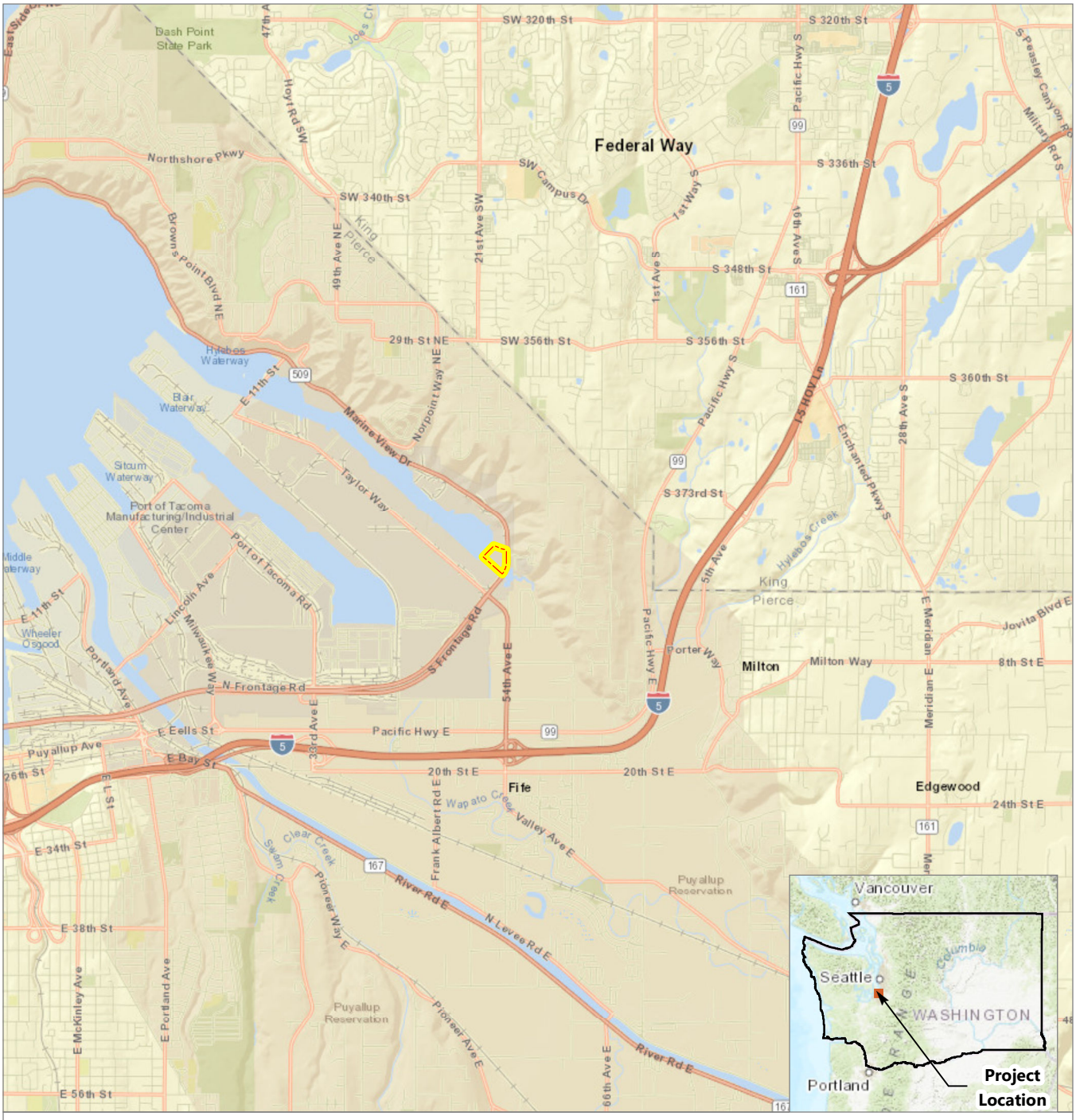
Notes:
Lead, zinc, and copper analyses were discontinued in 2011 with Ecology approval dated June 28, 2011 (Ecology 2011a)
Groundwater samples were analyzed for dissolved metals by EPA Method 200.8
Monitoring wells CMW-1, CMW-2, and CMW-4 were decommissioned in 2000 (Boateng & Associates 2000). During an in-person meeting on April 3, 2019, Ecology requested that the three wells be re-installed. The wells were subsequently re-installed on July 10, 2019.
a. Groundwater cleanup levels established from EPA chronic marine criteria (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. A duplicate sample was collected on this date. The duplicate sample results is the second row under this date.
d. Sample collected using a passive nylon mesh diffusion sampler and processed as a groundwater sample
Green Box Indicates exceedance of site cleanup level, as established in Consent Decree No. 93-2-08684-4
Bold: Detected result above laboratory reporting limit
--: Not analyzed
µg/L: micrograms per liter
Ecology: Washington State Department of Ecology
EPA: United State Environmental Protection Agency
J: Laboratory analytical result was detected above the method detection limit but below the quantitation limit
U: Compound analyzed, but not detected above detection limit

Table 2
Water Level Data

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

Notes:
Top of Casing elevation from Sitts & Hill Survey, September 2019.
Depth to water measured from reference point on top of well casing.
MLLW: mean lower low water

Figures



LEGEND:

Wasser Winter Site Boundary

0 2

Miles

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ANCHOR QEA

Figure 1
Site Vicinity Map
Groundwater Monitoring Report
Former Wasser & Winters Log Sort Yard

LEGEND:

- Monitoring Well Location [1]
- Catch Basin
- Manhole
- Oil/Water Separator (Former Spill Containment Vessel)
- Stormwater Conveyance System
- Existing Ecology Block Wall
- Property Boundary

NOTES:

1. Monitoring wells CMW-2 and CMW-3 arelocated outside the wall.
2. Imagery from City of Tacoma 2018.

0 100
Feet

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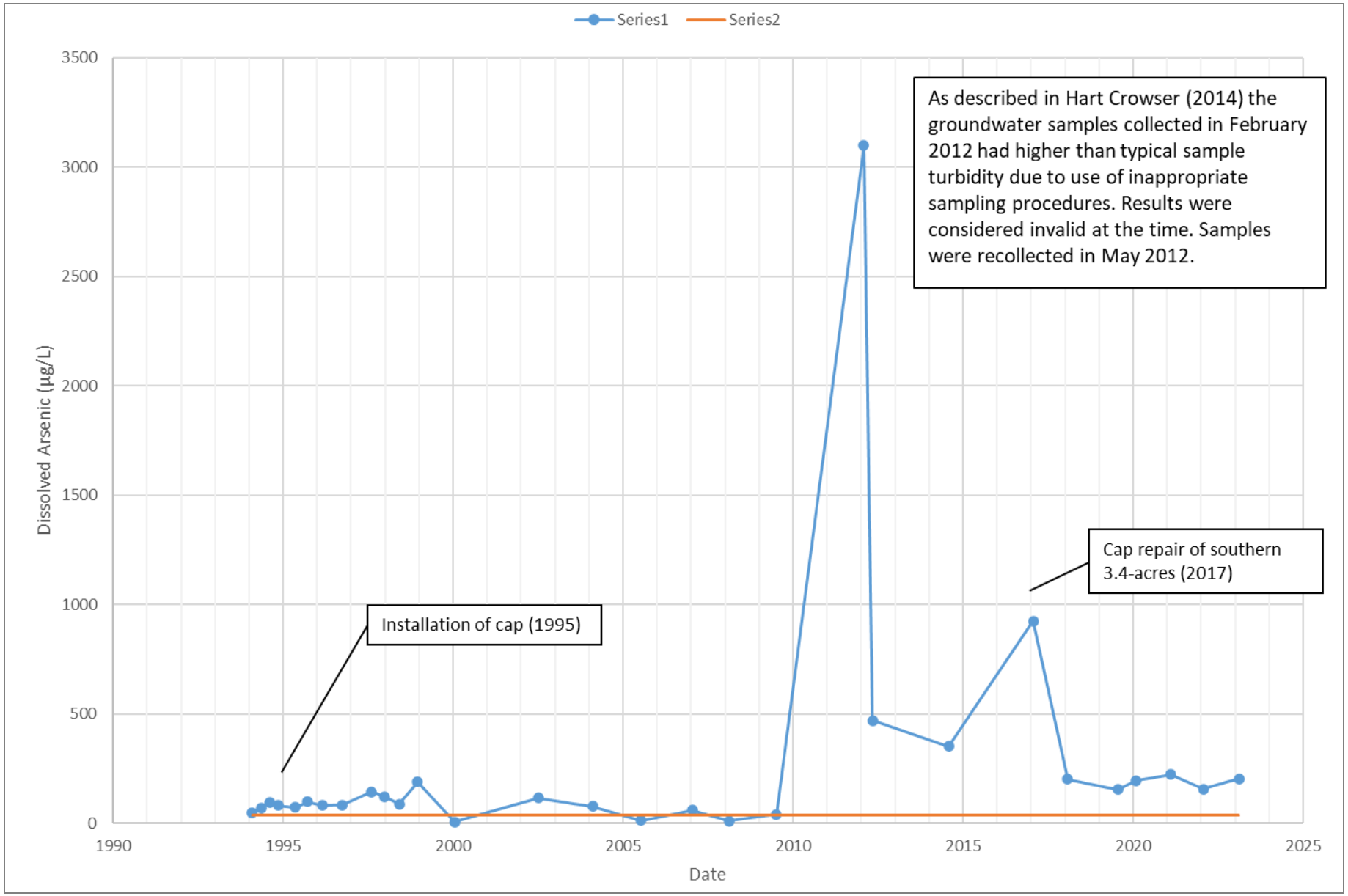
Figure 2
Compliance Groundwater Quality Monitoring Locations
Former Wasser & Winters Log Sort Yard
Port of Tacoma



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ANCHOR QEA

Figure 3
Dissolved Arsenic Concentration Trends
Groundwater Monitoring Report
Former Wasser & Winters Log Sort Yard

Appendix A
Field Forms

Daily Safety Briefing Form

Date: 3-Feb-2023
Project No: 230092-01.01
Project Name: PORT OF TACOMA - WATSON WINTER

Person Conducting Meeting: Stephen Strehl
Health & Safety Officer: Timothy Shaner
Project Manager: NIK BACHER

TOPICS COVERED:

- [x] Emergency Procedures and Evacuation Route
- [x] Directions to Hospital
- [x] HASP Review and Location
- [x] Safety Equipment Location
- [x] Proper Safety Equipment Use
- [x] Employee Right-to-Know/ SDS Location
- [x] Fire Extinguisher Location
- [x] Eye Wash Station Location
- [x] Buddy System
- [x] Self and Coworker Monitoring
- [x] Lines of Authority
- [x] Communication
- [x] Site Security
- [ ] Vessel Safety Protocols
- [x] Work Zones
- [x] Vehicle Safety and Driving/ Road Conditions
- [x] Equipment Safety and Operation
- [x] Proper Use of PPE
- [x] Decontamination Procedures
- [x] Near Miss Reporting Procedures
- [x] Lifting Techniques
- [x] Slips, Trips, and Falls
- [x] Hazard Exposure Routes
- [x] Heat and Cold Stress
- [x] Overhead and Underfoot Hazards
- [x] Chemical Hazards
- [x] Flammable Hazards
- [x] Biological Hazards
- [x] Eating/Drinking/Smoking
- [ ] Reviewed Prior Lessons Learned
- [ ] Field Team Medical Conditions for Emergency Purposes (Confidential): _____
- [x] Other: TRAFFIC

Weather Conditions: CLOUDY, LIGHT RAIN, 45 F

Daily Work Scope: GW MONITORING

Site-specific Hazards: TRAFFIC, COLD

Safety Comments:

Attendees

Printed Name	Signature
LEXUS SULLIVAN	

End of Day Wellness Check

PLAYING IT SAFE

ON STA 1130
CHECKED FW

ANCHOR QEA
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Seattle, Washington 98101
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www.anchorqea.com

Groundwater Collection Form: Water Quality Monitoring, Port of Tacoma

Well ID: CMW-3		**Date:** 3-9-23	**Sampler:** S. Strehl
Project Name: Port of Tacoma Wasser Winter		**Project Number:** 230092-01.01	
Method: ~~Peristaltic Pump~~/Low Flow			
Initial Depth to Water	9.37	Total Depth to Well	12.49

Weather Observations: CLOUDY, LIGHT RAIN, 45°F

Time	Depth to Water (feet)	Rate (mL/m)	Cum. Vol (mL)	Temp (°C)	pH	Spec. Cond. (mS/cm)	ORP (mV)	Turbidity (NTU)	Comments
1225	9.44	150	1050	—	COMMENCE PURGE		YSI	—	CLEAR, NO ODORS
1230	9.44	150	1800	9.5	6.63	0.634	104.0	8.64	" "
1235	9.49	150	2550	9.5	6.68	0.602	34.0	3.20	" "
1240	9.49	150	3300	9.5	6.71	0.582	7.9	3.02	" "
1245	9.49	150	4050	9.5	6.72	0.570	4.3	3.00	" "
1250	9.49	150	4800	9.5	6.73	0.564	-20.3	1.35	" "
1255	9.49	150	5550	9.5	6.72	0.571	-23.2	1.28	" "
1300	9.50	150	6300	9.5	6.72	0.572	-27.1	1.31	" "
1305	BYPASS YSI / SAMPLES								
1310	SAMPLES		MS/MSD						

Notes: BEGIN PURGE 1218 @ 150 mL/m ; INITIALLY CLEAR, NO ODORS

Controller Setting: 50%

Total Volume Purged: 6300 mL

Sample ID: CMW-3-20230309 @ 1305

Duplicate ID: CMW-1003-20230309 @ 1310

Other: X

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: STANDARD	Page: 1	of 1
ARI Client Company: ANCHOR QEA	Phone: 206 287 9130	Date: 7-9-22	Ice Present? Yes
Client Contact: ALI JUDKINS (AJUDKINS@ANCHORQEA.COM)		No. of Coolers: 1	Cooler Temps: 3.6
Client Project Name: PORT OF TACOMA - WASSON WINCH			
Client Project #: 230092-01.01	Samplers: S. STUCHY		

Analytical Resources, LLC
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: DISSOLVED ARSENIC	Notes/Comments
CMW-3-20230309	3-9-23	1305	H_2O	1	X	FIELD FILTERED DISSOLVED ARSENIC
CMW-1003-20230309	3-9-23	1310	H_2O	1	X	FIELD FILTERED DISSOLVED ARSENIC
	3-9-23					

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Stephen Stuchy	Printed Name: Jamie Galt	Printed Name:	Printed Name:
	Company: AQ	Company: ARLLC	Company:	Company:
	Date & Time: 3-9-23 / 1407	Date & Time: 03/09/23 1407	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Appendix B
Laboratory Data Reports

Appendix C
Data Validation Report

1201 3rd Ave Suite 2600
Seattle, Washington 98101
206.287.9130

Data Validation Report – EPA Stage 2B

May 23, 2023

Project: Wasser Winter – 2023 Groundwater Monitoring

Project Number: 230092-01.01

Validation ID: AQ-2023-0098

This report summarizes the review of analytical results for one groundwater sample and one field duplicate sample collected on March 9, 2023. The samples were collected by Anchor QEA, LLC and submitted to Analytical Resources, LLC. (ARL) in Tukwila, Washington. The following analytical parameter results were reviewed in this report:

- Dissolved metals by U.S. Environmental Protection Agency (USEPA) method 200.8

ARL sample delivery group number (SDG) 23C0225 was reviewed in this report. Sample IDs, matrix, and analyses are presented in Table 1.

Table 1
Sample IDs, Matrix, and Analyses

Sample ID	Lab Sample ID	Matrix	Analyses
CMW-3-20230309	23C0225-01	Groundwater	Dissolved Metals
CMW-1003-20230309	23C0225-02	Groundwater	Dissolved Metals

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures. Laboratory results were reviewed using the following guidelines:

- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA 2020)

Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custody (COC) form was signed by ARL the time of sample receipt. Samples were received in good condition and within the recommended temperature range.

Sample Preservation and Holding Times

Samples were appropriately preserved and analyzed within holding times.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies and were free of target analytes.

Field Quality Control

One field duplicate sample was collected in association with this sample set. Detected results are summarized in Table 2. Results were within project-required relative percent difference (RPD) values.

Table 2
Field Duplicate Detection Summary

Analyte	CW-3-20230309	CW-1003-20230309	RPD
Dissolved arsenic	202 µg/L	205 µg/L	1%

Notes:
µg/L: microgram per liter

Laboratory Control Samples

Laboratory control samples (LCS) were analyzed at the required frequency and resulted in recoveries within project-required control limits.

ICP-MS Tune

The mass calibration was within 0.1 AMU and the relative standard deviation (RSD) was less than or equal to 5%.

Instrument Calibration

Initial and continuing calibrations were performed as required by the method. The correlation coefficient (r^2) of the calibration curve was greater than or equal to 0.995. The initial calibration verification (ICV) and continuing calibration verification (CCV) were within QC limits.

ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

Matrix Spike Samples

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not performed for this SDG.

Laboratory Duplicates

Laboratory duplicate analyses were not performed for this SDG.

Serial Dilution

Serial dilution was not performed for this SDG.

Method Detection and Reporting Limits

Detection and reporting limits were acceptable as reported and all screening levels were met. All values were reported using the laboratory detection limits and results detected below the reporting limit were reported to the MDLs as estimated values. Values were reported as undiluted or when diluted, the detection and reporting limits reflect the dilution factor.

Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical methods and all requested sample analyses were completed. Accuracy was acceptable as demonstrated by the LCS recovery value. Precision was acceptable as demonstrated by the field duplicate RPD. All data are acceptable as reported.

References

USEPA 2020. National Functional Guidelines for Inorganic Superfund Methods Data Review. Office of Superfund Remediation and Technology Innovation. United States Environmental Protection Agency. EPA-540-R-20-006. November 2020.