

May 2019 Former Kaiser Aluminum Property



2019 Groundwater Monitoring Report

Prepared for the Port of Tacoma

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Prepared for

Port of Tacoma P.O. Box 1837 Tacoma, Washington 98401

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ABBREVIATIONS

µg/L	micrograms per liter
Ecology	Washington Department of Ecology
Kaiser Aluminum	Kaiser Aluminum & Chemical Corporation
Port	Port of Tacoma
Site	Former Kaiser Aluminum Property located at 3400 Taylor Way in Tacoma, Washington
SPL	Spent Pot Lining

1 Introduction

This report summarizes field activities and presents results of the 2019 annual performance groundwater quality monitoring event conducted by Anchor QEA on behalf of the Port of Tacoma (Port) at the Former Kaiser Aluminum Property located at 3400 Taylor Way in Tacoma, Washington (Site; Figure 1). Groundwater sampling activities were conducted in accordance with the requirements set forth in the public review Consent Decree 16-2-12406-8, dated July 2016, between the Port and the Washington Department of Ecology (Ecology 2016a).

This is the third year of annual performance groundwater quality monitoring and concludes the initial sampling that will be used to establish baseline groundwater conditions to evaluate long-term effectiveness of the remedial action.

2 Site History

The Site encompasses approximately 96 acres of the Blair Hylebos Peninsula in Tacoma, Washington. The Hylebos Waterway is northeast and the Blair Waterway is southwest of the Site (Figure 1). From 1941 to 1947, the Department of Defense built and operated an aluminum smelter at the Site. In 1947, Kaiser Aluminum & Chemical Corporation (Kaiser Aluminum) purchased the Site and operated the aluminum production facility until 2001. In 2002, Kaiser Aluminum closed the plant and, in 2003, the Port purchased the smelter property from Kaiser Aluminum for redevelopment. Between 2003 and 2010, the Port demolished the smelter complex, shipped thousands of tons of waste to approved disposal, treatment, or recycling facilities, and placed a 2- to 6-foot-thick layer of structural fill on approximately 80 of the 96 acres.

The Site is zoned for industrial use and is undergoing redevelopment as an import automotive processing center under a 30-year lease agreement. The facility is expected to be complete by July 2019.

The Remedial Investigation/Feasibility Study (Landau Associates 2012) identified the Spent Pot Lining (SPL) Area, the Rod Mill Area Closed Landfill, and the Former Log Yard Area as requiring further remedial action, which was completed in 2016. Performance groundwater quality monitoring is required in the SPL and Former Log Yard Areas following completion of the remedial action.

3 Groundwater Monitoring

This section summarizes the field observations and laboratory results from the five groundwater monitoring wells sampled on February 28, 2019, in the SPL and Former Log Yard Areas at the Site.

Groundwater sampling activities were conducted in accordance with the *Performance Groundwater Quality Monitoring Plan*, which is included as Appendix A in the *Cleanup Action Plan* (Ecology 2016b).

3.1 Water Level Measurements

Prior to groundwater sampling, water levels were measured to the nearest 0.01 foot in each monitoring well relative to the top of the surveyed casing rim using a water level meter. Table 1 provides the water level measurements converted to elevations referenced to mean lower low water and North American Vertical Datum of 1988. Field records of water level measurements are provided on field forms located in Appendix A.

3.2 Groundwater Sampling

A site map showing well locations is presented in Figure 2. On February 28, 2019, groundwater samples were collected from five monitoring wells, along with two sample duplicates. Three samples were collected from the Former Log Yard, including MW-101(S), MW-102(S), and MW-103(S). Two locations were collected from the SPL Area, including MW-SPL1(S) and MW-SPL2(S).

Groundwater samples were obtained from monitoring wells using a peristaltic pump and dedicated polyethylene tubing. Groundwater was pumped at 0.5 liter per minute or less using a peristaltic pump through tubing placed within the screened interval. A water quality meter with a flow-through cell was used to monitor water quality parameters during purging. Groundwater samples at each location were obtained after ambient groundwater conditions were reached, such that pH, temperature, specific conductance, dissolved oxygen, and turbidity stabilized for three successive readings (i.e., the readings were within ± 0.1 pH units for pH, $\pm 3\%$ for conductivity, and $\pm 10\%$ for dissolved oxygen and turbidity). Field records of water quality parameters are provided in Appendix A.

Groundwater samples were collected directly into laboratory-provided bottles once water quality parameters had stabilized and were subsequently placed in a cooler on ice. All groundwater samples were hand delivered to Analytical Resources, Inc., under chain-of-custody procedures. The groundwater sampling field logs are provided in Appendix A.

Laboratory data were subjected to a standard U.S. Environmental Protection Agency Level 2B data validation review prior to use in data reduction and reporting.

4 Results

Table 2 presents the analytical results for groundwater performance monitoring and includes all data from the 2017, 2018, and 2019 for comparison purposes. Lab reports (2019 only) are provided in Appendix B. The data validation report (2019 only) is included in Appendix C.

4.1 Spent Pot Lining Area

Results of testing for the SPL Area demonstrated compliance with applicable cleanup levels contained in the *Cleanup Action Plan* (Ecology 2016b). The following is a summary of the results:

- Detected cyanide concentrations were below the groundwater cleanup levels established in the *Cleanup Action Plan* (Ecology 2016b) by approximately two orders of magnitude. Total cyanide and weak acid dissociable cyanide were detected in both MW-SPL1(S) and MW-SPL2(S).
- Carcinogenic polycyclic aromatic hydrocarbons were detected in MW-SPL1(S) and MW-SPL2(S), but at concentrations less than the groundwater cleanup levels.

4.2 Former Log Yard Area

Results of testing in the Former Log Yard Area documented current concentrations of total arsenic in groundwater. The results are as summarized as follows:

- MW-101(S): 5.63 micrograms per liter (μg/L)
- MW-102(S): 14.9 μg/L
- MW-103(S): 1.4 μg/L

The result from MW-102(S) exceeded the cleanup level of (8 μ g/L).

5 References

Ecology (Washington Department of Ecology), 2016a. Public Review Consent Decree between the Port of Tacoma and Washington Department of Ecology. July 1, 2016.

Ecology, 2016b. *Ecology Cleanup Action Plan*. Former Kaiser Aluminum Property, 3400 Taylor Way, Tacoma, Washington. Issued by Washington Department of Ecology. July 1, 2016.

Landau Associates, 2012. *Final Remedial Investigation/Feasibility Study, Former Kaiser Aluminum Property, 3400 Taylor Way, Tacoma, Washington*. Prepared for the Port of Tacoma. August 2012.

Tables

Table 1 Groundwater Level Observations

Groundwater Monitoring Well ID	Date Sampled	Time	Depth to Water (TOC)	Top of Well Elevation (feet MLLW)	Groundwater Elevation (feet MLLW)	Top of Well Elevation (NAVD88)	Groundwater Elevation (NAVD88)
MW-101(S)	2/28/2019	9:30	7.53	18.51	10.98	15.84	8.31
MW-102(S)	2/28/2019	10:21	10.69	20.32	9.63	17.65	6.96
MW-103(S)	2/28/2019	11:19	7.1	18.24	11.14	15.57	8.47
MW-SPL1(S)	2/28/2019	12:57	5.81	19.98	14.17	17.31	11.5
MW-SPL2(S)	2/28/2019	14:19	6.17	20.01	13.84	17.34	11.17

Notes:

MLLW: mean lower low water

NADVD88: North American Vertical Datum of 1988

TOC: top of casing

	Conventional Parameters (mg/L) Metals (μg/L) Polycyclic Aromatic Hydrocarbons (μg/L)													
		Vell ID	Duti		Cyanide, Weak Acid		Benzo(a)	Benzo(a)	Benzo(b,j,k)		Dibenzo(a,h)	Indeno (1,2,3-c,d)	Total cPAH TEQ (7 minimum CAEPA	Total cPAH TEQ (7 minimum CAEPA
	_		Date	Cyanide	Dissociable	Arsenic	anthracene	pyrene	fluoranthenes	Chrysene	anthracene	pyrene	2005) (U = 0)	2005) (U = 1/2)
	MICAI	Method B Cleanup Level	2/12/2017	16	0.01	8.0	0.020	0.018	0.018	0.019	0.018	0.018	0.030	0.030
	_	MW-101(S)	2/13/2017			3.43								
	Former Log		2/13/2017			10.1								
	Yard Area	MW-102(S) (Duplicate)	2/13/2017			11.1								
2017		MW-103(S)	2/13/2017			1.25								
		MW-SPL1(S)	2/13/2017	0.103	0.005 U		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
	SPL Area	MW-SPL2(S)	2/13/2017	0.023	0.005 U		0.01 U	0.01 U	0.004 J	0.006 J	0.01 U	0.01 U	0.00046 J	0.00696 J
		MW-SPL2(S) (Duplicate)	2/13/2017	0.023	0.005 U		0.01 U	0.01 U	0.005 J	0.007 J	0.01 U	0.01 U	0.00057 J	0.00707 J
		MW-101(S)	2/19/2018			5.37								
	Former Log	MW-102(S)	2/19/2018			11.9								
	Yard Area	MW-103(S)	2/19/2018			1.03								
2018		MW-103(S) (Duplicate)	2/19/2018			1.05								
		MW-SPL1(S)	2/19/2018	0.054	0.005 U		0.001 J	0.01 U	0.01 U	0.002 J	0.01 U	0.01 U	0.00012 J	0.00662 J
	SPL Area	MW-SPL2(S)	2/19/2018	0.036	0.005 U		0.003 J	0.01 U	0.007 J	0.006 J	0.01 U	0.002 J	0.00126 J	0.00676 J
		MW-SPL2(S) (Duplicate)	2/19/2018	0.027	0.005 U		0.002 J	0.01 U	0.005 J	0.006 J	0.01 U	0.002 J	0.00096 J	0.00646 J
		MW-101(S)	2/28/2019			5.63								
	Former Log	MW-102(S)	2/28/2019			14.9								
	Yard Area	MW-103(S)	2/28/2019			1.38								
2019		MW-103(S) (Duplicate)	2/28/2019			1.4								
		MW-SPL1(S)	2/28/2019	0.021	0.009		0.01 U	0.01 U	0.01 U	0.002 J	0.01 U	0.01 U	0.00002 J	0.00702 J
	SPL Area	MW-SPL101(S) (Duplicate)	2/28/2019	0.017	0.006		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
		MW-SPL2(S)	2/28/2019	0.141	0.009		0.01 U	0.01 U	0.01 U	0.003 J	0.01 U	0.01 U	0.00003 J	0.00703 J

Table 2 Analytical Results

Notes:

Total cPAH TEQ (7 minimum CAEPA 2005) calculation includes benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene. Per MTCA cleanup Regulation, Table 708-2 TEQ for Minimum Required cPAHs under Washington Administrative Code 173-340-708(e).

U.S. Environmental Protection Agency Stage 2B data validation was completed by Laboratory Data Consultants.

: Shading indicates result exceeded MTCA Method B Cleanup Level established for the site.

Bold: detected result

--: not analyzed

µg/L: micrograms per liter

CAEPA: California Environmental Protection Agency

cPAH: carcinogenic polycyclic aromatic hydrocarbon

J: laboratory analytical result was detected above the method detection limit but below the quantitation limit

mg/L: milligrams per liter

MTCA: Model Toxics Control Act

SPL: Spent Pot Lining

TEQ: Toxic Equivalents Quotient

U: compound analyzed, but not detected above detection limit

Figures



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Figure 1 Site Map Groundwater Monitoring Report Former Kaiser Aluminum Property



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Figure 2 Performance Groundwater Quality Monitoring Well Locations Groundwater Monitoring Report Former Kaiser Aluminum Property

Appendix A Field Forms

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					art Time:	0	933	T	Sampling	; Method: (A) 3X volu	me purge I	(B) Lov	v-flow (C) Grab (D) Went dry
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1	B	0937	0.8	7,54	7.17		2644	7.9	0.71	-92.4	15.86	CI	ear	, colorless
1 2	B	0941	0,8	7,54 7.53	7.17		2715	7.9	0,71	-92.4	15.86			, colorless
	BB	0941 0945	0.8 1.6 24	7,54 7.53 753	725		2715	7.9	0,43	-108.5	17.70			
2 3 4	BB	0941 0945	0.8 1.6 24	7,54 7.53 753	725		2715	7.9	0,43	-108.5	17.70	21		N
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1 2 3 4 5 6	BBBB BB	(24hr) 1027 1031 1035 1039 1039 1047	(gal) 1.2 2.4 3.6 4.8 6.0 7.2	(ft TOC) 10.83 10.81 10.81 10.83 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.66 6.66		(µ\$/cm) 1272 1289 1653 1804 1894 1894 1957	(°C) 10.8 10.9 11.3 11.3 11.2 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27	(mV) -66.0 -70.6 -788-9 -96.2 -101.4 -105.2	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55	ligh Orean Vary Clea Li	t Gran	nge clasty tint w/ 1. He orange ti colortess 1)
1 2 3 4 5	BBBB BBB BBB	(24hr) 1027 1031 1035 1039 1047 1047 1047 1051	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82	6.67 6.68 6.65 6.65 6.66 6.66 6.65	-	(µS/cm) 1272 1289 1653 1804 1804 1804 1894 1957 1978	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.26	(mV) -66.0 -70.6 -88-9 -96.2 -101.4 -105.2 -106-7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10	ligh Oreon Very Clee II II II	t Gran	nge clashy tint w/ 1. He orange ti color less 1) 1)
1 2 3 4 5 6 7	BBBB BBBB	(24hr) 1027 1037 1037 1039 1047 1047 1051 1055	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.63 6.63 6.65 6.65 6.66 6.65 6.65	-	(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.32 0.27 0.26 0.23	(mV) -66.0 -70.6 -78.9 -96.2 -101.4 -105.2 -105.2 -105.7 -105.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69	ligh Oreon Very Clea II II II	t Gran	nge closely tint w/ 1. He orange ti colorless i) i) i)
1 2 3 4 5 6 7 8	BB BB BB BB BB BB BB BB BB BB BB BB BB	(24hr) 1027 1037 1035 1039 1047 1047 1051 1055 1055 1057	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6 10.8	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.65 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028 2059	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.2 -105.2 -105.2 -105.7 -105.7 -109.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Orean Very Clea Li II II II	t Gran	nge closely int w/ 1. He orange to colorless 1) 1) 1) 1) 1)
1 2 3 4 5 6 7 8 9	BB BB BB BB BB BB BB BB BB BB BB BB BB	(24hr) 1027 1037 1035 1039 1047 1047 1051 1055 1055 1057	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.63 6.63 6.65 6.65 6.66 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.4 -105.2 -105.2 -105.7 -105.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Oreon Very Clea II II II	t Gran	nge closely tint w/ 1. He orange ti colorless i) i) i)
1 2 3 4 5 6 7 8 9 10	BB BB BB BB BB BB BB BB BB BB BB BB BB	(24hr) 1027 1037 1035 1039 1047 1047 1051 1055 1055 1057	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6 10.8	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.65 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028 2059	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.2 -105.2 -105.2 -105.7 -105.7 -109.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Orean Very Clea Li II II II	t Gran	nge closely int w/ 1. He orange to colorless 1) 1) 1) 1) 1)
1 2 3 4 5 6 7 8 9 10 11	BB BB BB BB BB BB BB BB BB BB BB BB BB	(24hr) 1027 1037 1035 1039 1047 1047 1051 1055 1055 1057	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6 10.8	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.65 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028 2059	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.2 -105.2 -105.2 -105.7 -105.7 -109.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Orean Very Clea Li II II II	t Gran	nge closely int w/ 1. He orange to colorless 1) 1) 1) 1) 1)
1 2 3 4 5 6 7 8 9 10 11 12	BB BB BB BB BB BB BB BB BB BB BB BB BB	(24hr) 1027 1037 1035 1039 1047 1047 1051 1055 1055 1057	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6 10.8	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.65 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028 2059	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.2 -105.2 -105.2 -105.7 -105.7 -109.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Orean Very Clea Li II II II	t Gran	nge closely int w/ 1. He orange to colorless 1) 1) 1) 1) 1)
1 2 3 4 5 6 7 8 9 10 11 12 13	BB BB BB BB BB BB BB BB BB BB BB BB BB	(24hr) 1027 1037 1035 1039 1047 1047 1051 1055 1055 1057	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6 10.8	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.65 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028 2059	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.2 -105.2 -105.2 -105.7 -105.7 -109.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Orean Very Clea Li II II II	t Gran	nge closely int w/ 1. He orange to colorless 1) 1) 1) 1) 1)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB	(24hr) 1037 1037 1039 1039 1039 1039 1039 1047 1051 1057 1103 1103	(gal) 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6 10.8 12.0	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.65 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028 2059	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.2 -105.2 -105.2 -105.7 -105.7 -109.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Orean Very Clea Li II II II	t Gran	nge clash tint w/ 1. He orange tin colorkess 1) 1) 1) 1) 1)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	B B B B B B B B B B B B B B B B B B B	(24hr) 1027 1037 1037 1037 1037 1047 1055 1057 1103 1103 1103	(gal)() 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6 10.8 12.0 	(ft TOC) 10.83 10.81 10.83 10.83 10.82 10.82 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.65 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028 2059	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.2 -105.2 -105.2 -105.7 -105.7 -109.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Orean Very Clea Li II II II	t Gran	nge closely tint w/ 1. He orange ti colorless 1) 1) 1) 1) 1)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	B B B B B B B B B B B B B B B B B B B	(24hr) 1027 1037 1037 1037 1037 1037 1057 1057 1057 1103 110	(gal)() 1.2 2.4 3.6 4.8 6.0 7.2 8.4 9.6 10.8 12.0 	(ft TOC) 10.83 10.81 10.82 10.82 10.82 10.82 10.82 10.82 10.82	6.71 6.68 6.65 6.65 6.65 6.65 6.65		(µS/cm) 1272 1289 1653 1804 1894 1894 1957 1978 2028 2059	(°C) 10.8 10.9 11.3 11.3 11.2 11.3 11.3 11.3 11.3 11.3 11.3	(mg/l) 0.36 0.34 0.40 0.37 0.32 0.27 0.22 0.22 0.22	(mV) -66.0 -70.6 -78.9 -96.2 -101.2 -105.2 -105.2 -105.7 -105.7 -109.7	Turbidity (NTU) 77.54 32.09 11.07 8.74 5.71 4.55 4.10 2.69 2.31	ligh Orean Very Clea Li II II II	t Gran	nge clash tint w/ 1. He orange tin colorkess 1) 1) 1) 1) 1)

						D		10.75	100	Conception of the local division of the loca	SHEE	ET		
		17	R AN	CHOR A :	L ·		1119 Pac Tacoma,		Suite 160	0		t.	Office	: 253-572-0927
	ECTN			A $$		1 122							Once	. 233-372-0927
	ECT NA								WELL ID		1-103			
DIE	ADDRI	E35:	3	400 Tayor	way, Tac	oma	a, WA	ł		: mw	The contraction			
	TAZENIE	ERON								: mw - :	_		719 Time	
			SUNN		SE LY CLDY	S	SW W			IGHT	MED		HEAVY	
							OUDY	RAIN	No	Wind	TE.	MPERA	TURE	43
				ASUREMI					ict Thickness]	[Wate	r Column]	-		[Water Column x Gal/ft]
_	Date	Ti		DT-Water	DT-Prod	uct	DT-Botton	n DT	B-DTP	DTE	B-DTW			Volume (gal)
2 12	8/17	11	19	7.10	-			-	_			X 1		
/	/		<u> </u>									X 3		
	$ft = (dia./2)^2$			1" = 0.041			2" = 0.1			= 1.469		8'' = 2.611		
						ole Bail	ler (D) Waterra in	ertial pump (E) Dedicated Pne	umatic Pump (F	Other			
RO	UNDWA	ATER S	AMPLI	NG DAT	A						1	· · · · ·		[√ if used]
Bott	le Type	Da	ite	Time	Method §	#	Volume	P	reservative	(circle)	Ice	Filter	pН	\checkmark
	er Glass	M	/			-	1 L		None		YES	NO		
	en Poly					-	500 ml		NaOH		YES	NO		
	l Poly	2/281	19	12:19	B	10	500 ml		HNO3)	YES	NO		
	er Glass				-	-					YES	NO		
Oth	er Poly			:	-	~					YES	NO		
_			and the second se	nclude duplie		1	71(00	-	2		& MSD (circ	le if collected))	
mhor	BOTTLE	ТҮРЕ		ALYSIS PER	BOTTLE TYP	E (Cir	cle applicable o	or write non-	-standard ana	lysis below)			3	
	- Poly			al & WAD Cyani	ida									
ed - I				enic										
Other -	Glass		4	/										
Other -	Poly													
ATE	R QUA	LITY D	ATA	Purge St	tart Time:		1121		Sampling	Method: (A) 3X volu	me purge	(B) Lou	w-flow (C) Grab (D) Went dr
leas.	Method §	Time (24hr)	Purged (gal)(L)		pН		Spec Cond (µS/cm)	Temp (°C)	DO (mg/l)	ORP (mV)	Turbidity (NTU)			Water Quality
1	0	1125	1.2		120	-								
2	B	1129	2.4	7.20	6.35		241.2	7.2	2.69	6.8	45.26	Ligt		lowly gray
3	BB	1133	3.6	7.21	6.33		240.6 255.3	7.2	1.94	15.5	29,00	10	ray	Tint
4	B	1137	4.8	7.21	6.30	-	318,2	7.2	1.45	21.	27.47 8.46	- 1	11	()
5	B	1141	6.0	7.20	6.27	-	and the second division of the second divisio		1.03	37.2		Ue		wheress
6	B	1145	7.2	7.20	6.29	-	386.6	7.3	0.79	44.3	7.11	1)		2
7	B	1149	8.4	7.20	6.30		491.8	7.4	0.72	48.5	5.47	1		1)
8	B	1153	9.6	7.20	6.28		521.9	7.4	0.57	59.2	3.64		1	y
9	B	1157	10.8	7.20	6.29		537.2	7.3	0.56			1		<i>L</i>)
10	B	1201	12.0	7.20	6.28		569.7	7.3	0.53	65.3	2.17		1	1)
	B	1205	13.2	7.20	6.29		580.3	7.4	0.46	68.8	1.86		11	5
11			14.4	7.20	6.30		590.8	7.4	0.46	70.6	1.68	1		1)
_		1204	11.1	7.20	6.29		593.8	7.3	0.46	72.5	2.41	1		<u>1</u>
11 12 13	B	1209	15.6			-	597.5	7.4	0.45	74.8	1.91	1	1000 C	1)
12	B	1213	15.6	1 1	6.29					11.0	1-71	50		v 1
12 13 14	B B		15.6	7.20	6,29						I			
12 13 14 .5	B B	1213		1 1	6,29									
12 13 14 5 6	B B	1213		7.20	6,29									[Clarity, Color]
12 13 14 15 16	13 13 13 13 13 13 13 13 13 13	1213	16.8	7.20	6,29									[Clarity, Color]
12 13 14 15 16	13 13 D [Select A-G]	jz13 1217	16.8	7.20	6,29									[Clarity, Color]
12 13 14 15 16	13 13 D [Select A-G]	jz13 1217	16.8	7.20	6,29									[Clarity, Color]
12 13 14 15 16	13 13 D [Select A-G]	jz13 1217	16.8	7.20	6,29									[Clarity, Color]
2 3 4 5 6	13 13 D [Select A-G]	jz13 1217	16.8	7.20	6,29									[Clarity, Color]
2 3 4 5 6	13 13 D [Select A-G]	jz13 1217	16.8	7.20	6,29									[Clarity, Color]
2 3 4 5 5	13 13 D [Select A-G]	jz13 1217	16.8	7.20	6,29				2			4		[Clarity, Color]

NAME: DRESS: DRESS: ND FROM WEATHER LOGY/LEV Tin ?? 1.2 : ia./2) ² x 0.163 A) Dedicated Subm DWATER S pe Da ass 2./2.87 ly / y /	34 N NE SUNN EL MEA ne D 5 7 S ersible Pump (AMPLIN te	E E PRTL SUREM DT-Water SUREM DT-Water DT-WATER	Caiser Alu Way, Tacc SE LY CLDY ENTS (Near DT-Produ 1 ump (C) Disposabl A	S CL rest (uct	Tacoma, inum a, WA SW W .OUDY 0.01 ft) DT-Bottor	WA 984	WELL II BLIND II DUP II	D: MW- D: MW-S IGHT Wind	- SPL 1 SPL - JOI MED TEM rColumn] 3-DTW	(s) -	5) - +2 2 ₂₈ Time:	HEAVY
TNAME: DRESS: ND FROM WEATHER LOGY/LEV Tin ?? 122 : ia./2) ² x 0.163 A) Dedicated Subm DWATER S pe Da ass 2/237 ly hj y /	Fc 34 SUNNY EL MEA EL MEA EL MEA EL MEA EL MEA EL MEA EL MEA EL MEA EL EL MEA EL EL MEA EL EL MEA EL EL MEA EL EL MEA EL EL EL EL EL EL EL EL EL EL EL EL EL	E E PRTL SUREM DT-Water SUREM DT-Water DT-WATER	Caiser Alu Way, Tacc SE LY CLDY ENTS (Near DT-Produ 1 ump (C) Disposabl A	S CL rest (uct	a, WA SW W .OUDY 0.01 ft) DT-Bottor	I NW RAIN [Produ n DT	BLIND II DUP II Q Nc uct Thickness]	P: MW-S IGHT Wind	SPL 1 PL-/01 MED TEN r Column]	(s) (s) ium MPERA	278 Time:	HEAVY HEAVY Water Column x Gal/ft]
DRESS: ND FROM WEATHER LOGY/LEV Tin 2 12 12 12 12 12 12 12 12 12	EL MEAN EL MEAN Ne D 575 ersible Pump (AMPLIN te	E E PRTL SUREM DT-Water T-Water 1" = 0.04 B) Peristaltic Ph IG DAT Time	SE LY CLDY ENTS (Near DT-Produ 1 ump (C) Disposabl	S CL rest (SW W OUDY 0.01 ft) DT-Bottor 2" = 0.1	I NW RAIN [Produ n DT	BLIND II DUP II Q Nc uct Thickness]	P: MW-S IGHT Wind	SPL 1 PL-/01 MED TEN r Column]	(s) (s) ium MPERA	278 Time:	HEAVY HEAVY Water Column x Gal/ft]
WEATHER LOGY/LEV Tin ?? 12 : ia./2) ² x 0.163 A) Dedicated Subm DWATER S rpe Da ass 2/287 ly /	EL MEA ne D 57 57 ersible Pump (AMPLIN te	PRTL SUREM DT-Water 5.87/ 1" = 0.04 B) Peristaltic Po NG DAT. Time	ENTS (Near DT-Produ	CL rest (uct	0.01 ft) DT-Bottor	7 NW RAIN [Produ n DI	DUP II DUP II Nc act Thickness]	IGHT Wind	PL-/01 MED TEN	(s)-s IUM MPERA	ZS Time:	HEAVY HEAVY Water Column x Gal/ft]
WEATHER LOGY/LEV Tin ?? 12 : ia./2) ² x 0.163 A) Dedicated Subm DWATER S rpe Da ass 2/287 ly / / /	EL MEA ne D 57 57 ersible Pump (AMPLIN te	PRTL SUREM DT-Water 5.87/ 1" = 0.04 B) Peristaltic Po NG DAT. Time	ENTS (Near DT-Produ	CL rest (uct	0.01 ft) DT-Bottor	RAIN [Produ n DT	NC	Wind	MED TEN	IUM MPERA	TURE:	HEAVY HEAVY [Water Column x Gal/ft]
LOGY/LEV Tir 77 12 : ia./2) ² x 0.163 A) Dedicated Subm DWATER S pe Da ass 2/257 ly h y / 4	EL MEAS ne D 575	SUREM DT-Water 1" = 0.04 B) Peristaltic Pr NG DAT. Time	ENTS (Near DT-Produ	rest (uct	0.01 ft) DT-Bottor 2'' = 0.1	(Produ n DT	uct Thickness]	[Wate	r Column]]	TURE:	[Water Column x Gal/ft]
Tin Tin Tin Tin Tin Tin Tin Tin	ne D 57 5 ersible Pump (AMPLIN te	DT-Water 1" = 0.04 B) Peristaltic Po IG DAT. Time	DT-Produ	uct	DT-Bottor	n DI		1		X 1		
Tin Tin Tin Tin Tin Tin Tin Tin	ne D 57 5 ersible Pump (AMPLIN te	DT-Water 1" = 0.04 B) Peristaltic Po IG DAT. Time	DT-Produ	uct	DT-Bottor		TB-DTP	DTI	3-DTW	X1		Volume (gal)
ia./2) ² x 0.163 A) Dedicated Subm DWATER S pe Da ass 2/237 ly h y /	ersible Pump (AMPLIN te	1" = 0.04 ^{B) Peristaltic Pr IG DAT Time}	ump (C) Disposabl	le Bai		163				X1		
A) Dedicated Subm DWATERS pe Da ass 2/287 ly / 4 y / 4	AMPLIN te	^{B) Peristaltic Pr IG DAT Time}	ump (C) Disposabl	le Bai		163						
A) Dedicated Subm DWATERS pe Da ass 2/287 ly / 4 y / 4	AMPLIN te	^{B) Peristaltic Pr IG DAT Time}	ump (C) Disposabl	le Bai		163		1		X 3		
DWATER S pe Da asss 2/28/ ly //// y /////	AMPLIN te	I G DAT . Time	A	le Bai	ler (D) Waterra in			= 1.469		" = 2.611		
pe Da ass 2/281 ly NJ y / J	te	Time	TT		1	nertial pump (E	E) Dedicated Pne	umatic Pump (F	Other			
ass 2/287 ly NJ y /J				i na		1			1			[√ if used]
y /	19 1	1	Method §	#	Volume	P	reservative	[circle]	Ice	Filter	pН	\checkmark
y /		3:50	B	2	GL CL		None)	YES	NO		V
		V	J.	1	500 ml		NaOH		YES	NO		V
iss / / /		-		-	500 ml		HNO3		YES	NO		
		<u>·</u>		-					YES	NO		
				- 0	.2/				YES	NO		
TTLE TYPE	-		cate count): BOTTLE TYPE	3	+3 (ou		2		& MSD (circl	e if collected)	
185			DOTTLETITE		rcie applicable	or write non-	-stanuaru ana	lysis below)				
1	Total	& WAD Cyan	ide									
	Arsen	ic										
s												
							1					
	AIA	Purge S	tart Time:		301	1	Sampling	; Method: (A) 3X volur	ne purge	(B) Lov	v-flow (C) Grab (D) Went
nod ^s (24hr)	Purged (gal)(L)	DTW (ft TOC)	pН		(µS/cm)	Temp (°C)	DO (mg/l)	ORP (mV)	Turbidity (NTU)			Water Quality
						8.6	0.54	2.4	145.1	Ligh	tura	inge cloudy
		6.00	6.98			0.6	0,36	-10.7	74.52	Ora	ing.e	tint
			6.97					-28.8		11		1)
			and a second sec				-					totorkes ting
				- 1		1.						()
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			and the second se									77
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§ METHOD	S: (A) Dedie	cated Subm	ersible Pump	(B) Peristaltic P	ump (C) Disposa	ble Baile	er (D) Waterra ir	ertial pump (E) Dedicated Pne	umatic Pump (F				
GROU	NDWA	TER S	AMPLIN	NG DAT.	A			1			1			[√if used]
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Green		1/1/		5:00	B	1	500 ml	-	NaOH)	YES	NO		V
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Other	Poly	1-1			-	-					YES	NO		
				clude duplie		3					& MSD (circl	le if collected)	
Amber -	BOTTLE	ГҮРЕ	CPAH		BOTTLE TYP	E (Circ	cle applicable	or write non-	standard ana	lysis below)				
Green - P			The second s	1 & WAD Cyani	ide									
Red - Pol	-		Arsei	nic				1.52						
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	1ethod §	Time (24hr)	(gal)(L)	(ft TOC)	pН		Spec Cond (µS/cm)	Temp (°C)	DO (mg/l)	ORP (mV)	Turbidity (NTU)			Water Quality
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5	B B	KJUKI	6.0	6,21	7.91	-	4186	2.2	0.15	-96.j -104.4	3.54	11		
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5 6 7 8 9 10	B	448	7:2 8.4 9.6	6.21 6.21 6.21	7.92	i	4159	2.1 2.3	0.13 0.12 6.12	-104.4 -108.6 -113.2	2.69	1) 1) (($\frac{1}{1} \frac{1}{1} \frac{1}{1}$
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Analytical Resources, Incorporated	4611 South 134th Place, Suite 100 Tribwils, MA 08168	206-695-6200 206-695-6201 (fax)	Notes/Comments							Cycan's Not	Example with	Cyre w V Not				Received by:	(Signature) Printed Name:		Company:	Date & Time:
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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-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 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

Appendix C Data Validation Report



Anchor QEA, LLC 1201 Third Ave. Suite 2600 Seattle, WA 98101 ATTN: Ms. Delaney Peterson <u>dpeterson@anchorgea.com</u> April 5, 2019

SUBJECT: Port of Tacoma, Kaiser, Data Validation

Dear Ms. Peterson,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on March 22, 2019. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #44606:

SDG # Fraction

19C0006 Polynuclear Aromatic Hydrocarbons, Arsenic, Wet Chemistry

The data validation was performed under Stage 2B guidelines. The analyses were validated using the following documents, as applicable to each method:

- Ecology Cleanup Action Plan, Former Kaiser Aluminum Property, 3400 Taylor Way, Tacoma, Washington, July 2016
- USEPA, National Functional Guidelines Organic Superfund Methods Data Review, January 2017
- USEPA, National Functional Guidelines Inorganic Superfund Methods Data Review, January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

eisting Rink

Christina Rink crink@lab-data.com Project Manager/Senior Chemist

LDC	EDD Stage SDG# Water/Sediment 19C0006	DATE REC'D	(3) DATE DUE	PA (82	Hs	446	606	(A)	nch	or	Env	viro			437 pages-ADV Attachment 1 EDD Stage 2B LDC #44606 (Anchor Environmental-Seattle WA / Port of Tacoma, Kaiser)																					
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Port of Tacoma, Kaiser

LDC Report Date: April 3, 2019

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc.

Sample Delivery Group (SDG): 19C0006

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-SPL1(S)-022819	19C0006-05	Water	02/28/19
MW-SPL101(S)-022819	19C0006-06	Water	02/28/19
MW-SPL2(S)-022819	19C0006-07	Water	02/28/19

1

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Ecology Cleanup Action Plan, Former Kaiser Aluminum Property, 3400 Taylor Way, Tacoma, Washington (July 2016) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polynuclear Aromatic Hydrocarbons (PAHs) by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. Surrogate recoveries (%R) were not within QC limits for samples MW-SPL1(S)-022819 and MW-SPL101(S)-022819. Using professional judgment, no data were qualified when one surrogate %R was outside the QC limits and the %R was greater than or equal to 10%.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples MW-SPL1(S)-022819 and MW-SPL101(S)-022819 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ug/L)		
Compound	MW-SPL1(S)-022819	MW-SPL101(S)-022819	RPD
Chrysene	0.002	0.010U	Not calculable

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Port of Tacoma, Kaiser Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 19C0006

No Sample Data Qualified in this SDG

Port of Tacoma, Kaiser

Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 19C0006

No Sample Data Qualified in this SDG

LDC #: <u>44606A2b</u>	VALIDATION COMPLETENESS WORKSHEET	Date: 4/3/19
SDG #: 19C0006	Stage 2B	Page:_/of/
Laboratory: Analytical Re	sources, Inc.	Reviewer: <u>F7</u>

2nd Reviewer:

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
<u>I.</u>	Sample receipt/Technical holding times	AIA	
<u>II.</u>	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	AIA	% BD ≤ 20 101 = 30
IV.	Continuing calibration	<u>A</u>	$\frac{0}{0}$ PSD ≤ 20 ICN ≤ 30 CCN ≤ 20
<u>V</u> .	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	N	د>
IX.	Laboratory control samples	A	1C)
X .	Field duplicates	SW	D = 1, 2
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data		

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

SB=Source blank OTHER:

	Client ID		Lab ID	Matrix	Date
1	MW-SPL1(S)-022819	0	19C0006-05	Water	02/28/19
2	MW-SPL101(S)-022819	P	19C0006-06	Water	02/28/19
3	MW-SPL2(S)-022819	e	19C0006-07	Water	02/28/19
4					
5					
6					
7					
8					
Note	S:		 		

BHCO141-BLFI			

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

WETTOD. GONIS SVOA				
A. Phenol	CC. Dimethylphthalate	EEE. Bis(2-ethylhexyl)phthalate	GGGG. C30-Hopane	11. Methyl methanesulfonate
B. Bis (2-chloroethyl) ether	DD. Acenaphthylene	FFF. Di-n-octylphthalate	HHHH. 1-Methylphenanthrene	J1. Ethyl methanesulfonate
C. 2-Chlorophenol	EE. 2,6-Dinitrotoluene	GGG. Benzo(b)fluoranthene	IIII. 1,4-Dioxane	K1. o,o',o''-Triethylphosphorothioate
D. 1,3-Dichlorobenzene	FF. 3-Nitroaniline	HHH. Benzo(k)fluoranthene	JJJJ. Acetophenone	L1. n-Phenylene diamine
E. 1,4-Dichlorobenzene	GG. Acenaphthene	III. Benzo(a)pyrene	KKKK. Atrazine	M1. 1,4-Naphthoquinone
F. 1,2-Dichlorobenzene	HH. 2,4-Dinitrophenol	JJJ. Indeno(1,2,3-cd)pyrene	LLLL. Benzaldehyde	N1. N-Nitro-o-toluidine
G. 2-Methylphenol	II. 4-Nitrophenol	KKK. Dibenz(a,h)anthracene	MMMM. Caprolactam	O1. 1,3,5-Trinitrobenzene
H. 2,2'-Oxybis(1-chloropropane)	JJ. Dibenzofuran	LLL. Benzo(g,h,i)perylene	NNNN. 2,6-Dichlorophenol	P1. Pentachlorobenzene
I. 4-Methylphenol	KK. 2,4-Dinitrotoluene	MMM. Bis(2-Chloroisopropyl)ether	OOOO. 1,2-Diphenylhydrazine	Q1. 4-Aminobiphenyl
J. N-Nitroso-di-n-propylamine	LL. Diethylphthalate	NNN. Aniline	PPPP. 3-Methylphenol	R1. 2-Naphthylamine
K. Hexachloroethane	MM. 4-Chlorophenyl-phenyl ether	OOO. N-Nitrosodimethylamine	QQQQ. 3&4-Methylphenol	S1. Triphenylene
L. Nitrobenzene	NN. Fluorene	PPP. Benzoic Acid	RRRR. 4-Dimethyldibenzothiophene (4MDT)	T1. Octachlorostyrene
M. Isophorone	OO. 4-Nitroaniline	QQQ. Benzyl alcohol	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	U1. Famphur
N. 2-Nitrophenol	PP. 4,6-Dinitro-2-methylphenol	RRR. Pyridine	TTTT. 1-Methyldibenzothiophene (1MDT)	V1. 1,4-phenylenediamine
O. 2,4-Dimethylphenol	QQ. N-Nitrosodiphenylamine	SSS. Benzidine	UUUU 2,3,4,6-Tetrachlorophenol	W1. Methapyrilene
P. Bis(2-chloroethoxy)methane	RR. 4-Bromophenyl-phenylether	TTT. 1-Methylnaphthalene	VVVV. 1,2,4,5-Tetrachlorobenzene	X1. Pentachloroethane
Q. 2,4-Dichlorophenol	SS. Hexachlorobenzene	UUU.Benzo(b)thiophene	WWWW. 2-Picoline	Y1. 3,3'-Dimethylbenzidine
R. 1,2,4-Trichlorobenzene	TT. Pentachlorophenol	VVV.Benzonaphthothiophene	XXXX. 3-Methylcholanthrene	Z1. o-Toluidine
S. Naphthalene	UU. Phenanthrene	WWW.Benzo(e)pyrene	YYYY. a,a-Dimethylphenethylamine	A2. 1-Naphthylamine
T. 4-Chloroaniline	VV. Anthracene	XXX. 2,6-Dimethylnaphthalene	ZZZZ. Hexachloropropene	B2. 4-Aminobiphenyl
U. Hexachlorobutadiene	WW. Carbazole	YYY. 2,3,5-Trimethylnaphthalene	A1. N-Nitrosodiethylamine	C2. 4-Nitroquinoline-1-oxide
V. 4-Chloro-3-methylphenol	XX. Di-n-butylphthalate	ZZZ. Perylene	B1. N-Nitrosodi-n-butylamine	D2. Hexachloropene
W. 2-Methylnaphthalene	YY. Fluoranthene	AAAA. Dibenzothiophene	C1. N-Nitrosomethylethylamine	E2. Bis (2-chloro-1-methylethyl) ether
X. Hexachlorocyclopentadiene	ZZ. Pyrene	BBBB. Benzo(a)fluoranthene	D1. N-Nitrosomorpholine	F2. Bifenthrin
Y. 2,4,6-Trichlorophenol	AAA. Butylbenzylphthalate	CCCC. Benzo(b)fluorene	E1. N-Nitrosopyrrolidine	G2. Cyfluthrin
Z. 2,4,5-Trichlorophenol	BBB. 3,3'-Dichlorobenzidine	DDDD. cis/trans-Decalin	F1. Phenacetin	H2. Cypermethrin
AA. 2-Chloronaphthalene	CCC. Benzo(a)anthracene	EEEE. Biphenyl	G1. 2-Acetylaminofluorene	I2. Permethrin (cis/trans)
BB. 2-Nitroaniline	DDD. Chrysene	FFFF. Retene	H1. Pronamide	J2. 5-Nitro-o-toluidine

LDC #: 44606 A 26

VALIDATION FINDINGS WORKSHEET

Surrogate Recovery

Page: / of _____ Reviewer: FT 2nd Reviewer: _____

METHOD: GC/MS BNA (EPA SW 846 Method 8270D)

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N/N/A) Were percent recoveries (%R) for surrogates within QC limits?

Y N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

Y N N/A/ If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Sample ID	Surrogate	%R (Limits)	Qualifications
		YY-d10	53.4 (57-120)	no qua
	· · · · · · · · · · · · · · · · · · ·		()	lV
	2		51.2 ()	
			()	
			()	
		· · · · · · · · · · · · · · · · · · ·		
			()	
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(NBZ) = Nitrobenzene - d5 (FBP) = 2-Fluorobiphenyl (TPH) = Terphenyl - d14 (2FP) = 2-Fluorophenol (TBP) = 2,4,6 -Tribromophenol (2CP) = 2-Chlorophenol - d4 LDC #: 44606A26

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

Page: _____of____ Reviewer: _____7 2nd reviewer: _____

METHOD: GC/MS BNA (EPA SW 846 Method 8270D)

YN N/A YN N/A

Were field duplicate pairs identified in this SDG? Were target compounds identified in the field duplicate pairs?

	Concentration	ng L		
Compound)	2	RPD (≤%)	QUAL
000	0.002	0.0104	NC	
			•	
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				· · · · · · · · · · · · · · · · · · ·
· · · · · · · · · · · · · · · · · · ·				

Compound	Concentration	()	RPD (≤ %)	QUAL
			· · · · · · · · · · · · · · · · · · ·	

Compound	Concentration (}	RPD (≤ %)	QUAL

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Port of Tacoma, Kaiser

LDC Report Date: March 27, 2019

Parameters: Arsenic

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc.

Sample Delivery Group (SDG): 19C0006

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-101(S)-022819	19C0006-01	Water	02/28/19
MW-102(S)-022819	19C0006-02	Water	02/28/19
MW-103(S)-022819	19C0006-03	Water	02/28/19
MW-203(S)-022819	19C0006-04	Water	02/28/19

1

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Ecology Cleanup Action Plan, Former Kaiser Aluminum Property, 3400 Taylor Way, Tacoma, Washington (July 2016) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Arsenic by Environmental Protection Agency (EPA) Method 200.8

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

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

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the method.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

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

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

IX. Serial Dilution

Serial dilution was not performed for this SDG.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples MW-103(S)-022819 and MW-203(S)-022819 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ug/L)		
Analyze	MW-103(S)-022819	MW-203(S)-022819	RPD
Arsenic	1.38	1.4	1

XII. Internal Standards (ICP-MS)

Internal standards were not reviewed for Stage 2B validation.

XIII. Sample Result Verification

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

4

Port of Tacoma, Kaiser Arsenic - Data Qualification Summary - SDG 19C0006

No Sample Data Qualified in this SDG

Port of Tacoma, Kaiser Arsenic - Laboratory Blank Data Qualification Summary - SDG 19C0006

No Sample Data Qualified in this SDG

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

LDC #: <u>44606A4a</u> SDG #: <u>19C0006</u>

Laboratory: Analytical Resources, Inc.

Date: 3/26/14	1
Page: 1 of 1	
Reviewer: KK	-
2nd Reviewer	

METHOD: Arsenic (EPA SW 848 Method 200.8)

The samples listed below were reviewed for each of the following validation areas.	Validation findings are noted in attached
validation findings worksheets.	

L	Validation Area		Comments
Ι.	Sample receipt/Technical holding times	A,A	
١١.	ICP/MS Tune	A	
111.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	N	<i>LS</i>
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	N	
Х.	Laboratory control samples	A	LUS
XI.	Field Duplicates	SW	(3+4)
XII.	Internal Standard (ICP-MS)	N	not reviewed for stage 2B
XIII.	Sample Result Verification	N	
	Overall Assessment of Data	A	

Note: A = A

A = Acceptable N = Not provided/applicable SW = See worksheet ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank OTHER:

	Client ID	Lab ID	Matrix	Date
1	MW-101(S)-022819	19C0006-01	Water	02/28/19
2	MW-102(S)-022819	19C0006-02	Water	02/28/19
3	MW-103(S)-022819	19C0006-03	Water	02/28/19
4	MW-203(S)-022819	19C0006-04	Water	02/28/19
5			· · · ·	
6				
7				
8				
9				
10				
11				
12				
Notes:				

LDC#:<u>44606A4a</u>

VALIDATION FINDINGS WORKSHEET Field Duplicates

'	Page:of_(
	Reviewer: KK
	2nd Reviewer:
	\mathcal{U}

METHOD: Metals (EPA Method 200.8)

	Concentration (ug/L)					
Analyte	3	4	RPD	Difference	Limits	Qualifiers
Arsenic	1.38	1.4	1			

LDC Report# 44606A6

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Port of Tacoma, Kaiser

LDC Report Date: March 27, 2019

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Analytical Resources, Inc.

Sample Delivery Group (SDG): 19C0006

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
MW-SPL1(S)-022819	19C0006-05	Water	02/28/19
MW-SPL101(S)-022819	19C0006-06	Water	02/28/19
MW-SPL2(S)-022819	19C0006-07	Water	02/28/19
MW-SPL1(S)-022819MS	19C0006-05MS	Water	02/28/19
MW-SPL1(S)-022819DUP	19C0006-05DUP	Water	02/28/19

1

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Ecology Cleanup Action Plan, Former Kaiser Aluminum Property, 3400 Taylor Way, Tacoma, Washington (July 2016) and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Total Cyanide by Standard Method 4500-CN E Weak Acid Dissociable Cyanide by Standard Method 4500-CN I

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples MW-SPL1(S)-022819 and MW-SPL101(S)-022819 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (mg/L)		
Compound	MW-SPL1(S)-022819	MW-SPL101(S)-022819	RPD
Cyanide	0.0210	0.0170	21
Weak acid dissociable cyanide	0.009	0.006	40

X. Sample Result Verification

Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

4

Port of Tacoma, Kaiser Wet Chemistry - Data Qualification Summary - SDG 19C0006

No Sample Data Qualified in this SDG

Port of Tacoma, Kaiser Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 19C0006

No Sample Data Qualified in this SDG

LDC #: 44606A6	VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Laboratory: Analytical Resources, Inc.

SDG #: 19C0006

	Date: 3/26/19
	Page: 1 of 1
	Reviewer: MC
2nd	Reviewer:

(SM4500-CN-E) (SM4500-CN-I)

METHOD: (Analyte) Cyanide & WAD Cyanide (Method SM 4500)-

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area			Comme	nts	
1.	Sample receipt/Technical holding times	A, A				
	Initial calibration	A				
	Calibration verification	A				
IV	Laboratory Blanks	A				
V	Field blanks	N				
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS			
VII.	Duplicate sample analysis	A	DUP			
VIII.	Laboratory control samples	A	605			
IX.	Field duplicates	SW	(1+2)			
Х.	Sample result verification	N				
LxL	Overall assessment of data	A				
Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source N = Not provided/applicable R = Rinsate TB = Trip blank OTHER: SW = See worksheet FB = Field blank EB = Equipment blank Samples appended with "F" were analyzed as dissolved OTHER:						
	Client ID			Lab ID	Matrix	Date
1	MW-SPL1(S)-022819			19C0006-05	Water	02/28/19
2	MW-SPL101(S)-022819			19C0006-06	Water	02/28/19
3	MW-SPL2(S)-022819			19C0006-07	Water	02/28/19
4	MW-SPL1(S)-022819MS			19C0006-05MS	Water	02/28/19
5	MW-SPL1(S)-022819DUP			19C0006-05DUP	Water	02/28/19
6						
7						
8						
9						
10						
11						
12						
13						
14						
Notes	6:					

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VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

 Page:
 1 of
 1

 Reviewer:
 KK

 2nd reviewer:
 C______

All circled methods are applicable to each sample.

Sample ID	PArameter pH TDS CI F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ CIO4 (N- Weak Acrd Dissourchele)
. /	
QC:	pH TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
4-5	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄ $(WHD-CN)$
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CLF NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄ pH TDS CI F NO NO SO O PO Alk CN NH TKN TOC Cr6+ ClO
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄ pH TDS CI F NO NO SO O PO Alk CN NH TKN TOC Cr6+ ClO
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄ pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄ P
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄ PO_4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄ PO_4
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄
	pH TDS CI F NO ₃ NO ₂ SO ₄ O-PO ₄ Alk CN NH ₃ TKN TOC Cr6+ ClO ₄

Comments:_____

LDC#: 44606A6

VALIDATION FINDINGS WORKSHEET Field Duplicates

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METHOD: Inorganics (See cover)

	Concentration (mg/L)					
Analyte	1	× J	RPD	Difference	Limits	Qualifiers
Cyanide	0.0210	0.0170	21			
WAD Cyanide	0.009	0.006	40			

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EDD POPULATION COMPLETENESS WORKSHEET

Anchor

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The LDC job number listed above was entered by	FI	$\overline{\bigvee}$
Entered from Body or Summary	-	

	EDD Process	Y/N	Ini	tial	Comments/Action
I.	EDD Completeness	-	F	M	
Ia.	- All methods present?	Ч			
Ib.	- All samples present/match report?	4			
Ic.	- All reported analytes present?	M			
Id.	- 10% or 100% verification of EDD?	Y	1	U	
<u>II.</u>	EDD Preparation/Entry		Ŧ	\mathbb{M}	
IIa.	- QC Level applied? (EPAStage2B or EPAStage4)	Ч	1		
IIb.	- Laboratory EMPC qualified results qualified (J with reason code 23)?				•
<u>III.</u>	Reasonableness Checks	-	FI	\mathcal{M}	
IIIa.	- Do all qualified ND results have ND qualifier (e.g. UJ)?				
IIIb.	- Do all qualified detect results have detect qualifier (e.g. J)?				
IIIc.	- If reason codes are used, do all qualified results have reason code field populated, and vice versa?				
IIId.	- Do blank concentrations in report match EDD, where data was qualified due to blank?				
IIIe.	- Is the detect flag set to "N" for all "U" qualified blank results?			A FAR MARK AND A FAR A F	
IIIf.	- Were there multiple results due to dilutions/reanalysis? If so, were results qualified appropriately?	-1		Name of the second second second second	
IIIg.	-Are all results marked reportable "Yes" unless rejected for overall assessment in the data validation report?	******			
IIIh.	-Are there any lab "R" qualified data? / Are the entry columns blank for these results?	-1_	¥780-t∂r rittinagaanakoitattiik		
IIIi.	-Are there any discrepancies between the data packet and the EDD?	N			

Notes: <u>*see discrepancy sheet</u>

EDD Populatoin Checklist-Anchor (word).docx