



OFFICE OF ENVIRONMENT, HEALTH AND SAFETY  
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March 3, 2020

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700 Heinz Avenue  
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U.S. Environmental Protection Agency, Region 9  
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San Francisco, California 94105

**Subject:            Sampling Results for Western Stege Marsh Near-Surface Sediment Samples  
                         January 31, 2020 Sampling Event  
                         Richmond Field Station Site, University of California, Berkeley**

Dear Ms. Nakashima and Ms. Ziff:

University of California, Berkeley Office of Environment, Health & Safety staff conducted the annual Public Health Assessment recommended marsh sediment sampling at the Richmond Field Station Site on January 31, 2020. The objective of the sampling effort was to characterize near-surface sediment in remediated portions of the Western Stege Marsh, as well as to evaluate incidental sediment contact by marsh restoration workers. This sampling event replicates the near-surface sediment sampling conducted annually in January or February from 2008-2019. This letter provides the rationale for the selected sampling locations, a summary of field sampling protocols, including minor adjustments from previous years, and sample results. A figure showing the sampling locations is presented at the end of this letter. Complete analytical results are presented in Attachment 1.

### **Sample Locations**

Incremental sampling methodology (ISM) sampling was selected for this project to provide a comprehensive and thorough evaluation of chemical concentrations in a specific area of potential exposure, or decision unit. The ISM sampling strategy for this project was based on selecting a decision unit to best represent potential exposure by workers involved in restoration activities within remediated marsh areas.

In January 2008, UC Berkeley established site-specific boundaries of the areas where marsh restoration activities may be performed. Based on this information, one decision unit, identified as Western Stege

Marsh Decision Unit 1, was identified to evaluate possible exposure areas within remediated portions of the marsh under this sampling activity. This decision unit was first sampled in January 2008, and then once every subsequent year. The location and extent of the Western Stege Marsh Decision Unit 1 are presented on the figure at the end of this sampling letter. The decision unit encompassed an area recommended for sampling in the Public Health Assessment, Evaluation of Exposure to Contaminants at the University of California, Berkeley, Richmond Field Station, as prepared by the California Department of Public Health and Agency for Toxic Substances and Disease Registry, dated March 13, 2008. The health assessment report concluded that there was an unknown potential health risk to marsh restoration workers posed by recontamination of sediment in the remediated marsh.

Surface samples at depths of 0 to 2 inches below ground surface (bgs) were collected because the decision unit is intended to characterize near-surface soils. The rationale for this sampling interval is that the sediment which workers may be exposed to during planting or weeding on the marsh plain. The near-surface sediment also represents any sediment that may be migrating within slough channels and being deposited on top of clean Bay Mud used as backfill in 2002 to 2004. Two previous sampling events were conducted in this decision unit in 2005 and 2006 using a discrete sampling methodology.

### **Field Sampling Protocols**

The near-surface sediment sample was collected on January 31, 2020. The decision unit was identified in the field based on the description above and consistent with previous sampling events. One ISM surface soil sample was collected from the decision unit. The ISM soil sample consisted of 80 subsamples, or increment locations, collected from 0 to 2 inches bgs. The number of increments was increased from 50 in previous samples to 80 samples in January 2018 due to guidance from Federal EPA that recommends a minimum of 75 increments be collected for assessment of PCB concentrations using ISM methodology.<sup>1,2</sup>

The ISM sampling technique was used to obtain sufficient near-surface soft sediments from the decision unit to account for both compositional and distributional heterogeneity of any possible contamination. The sampling protocol followed these steps:

1. The field sampler began at a corner of the decision unit and sampled in an orthogonal pattern, moving from east to west to collect subsamples from 80 locations with the decision unit. The location of these subsamples, shown in approximation on the attached figure, was not critical as long as they were distributed throughout the decision unit. The subsamples were collected using one clean metal spoon or disposable trowel for the decision unit.
2. The 80 subsamples were placed into clean, unused 32 ounce glass jars as they were collected. The final sample consisted of two nearly full 32 ounce jars.

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<sup>1</sup> U.S. Environmental Protection Agency. (2019). *Incremental Sampling Methodology (ISM) at Polychlorinated Biphenyl (PCB) Cleanup Sites*. Retrieved February 28, 2020 from EPA: <https://www.epa.gov/pcbs/incremental-sampling-methodology-ism-pcb-cleanup-sites>

<sup>2</sup> Ibid. (2017). *PCB Facility Approval Streamlining Toolbox: A Framework for Streamlining PCB Site Cleanup Approvals*. Retrieved February 28, 2020 from EPA: [https://www.epa.gov/sites/production/files/2017-06/documents/06072017\\_final\\_pcbfast\\_toolbox\\_508compliant.pdf](https://www.epa.gov/sites/production/files/2017-06/documents/06072017_final_pcbfast_toolbox_508compliant.pdf)

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Ms. Sara Ziff  
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3. The entire sample was immediately delivered to Enthalpy Analytical in Berkeley, California, after the sampling event, on January 31, 2020 for analysis by the Enthalpy Analytical Multi-Incremental Sub-Sampling (MIS) Procedure with subsampling to 30 gram sample for PCBs and a 10 gram subsample for metals analyses. A copy of the chain-of-custody form is presented in Attachment 1.

### **Sample Results**

The sample was submitted for analysis of metals and polychlorinated biphenyls (PCB) using the methods listed below.

- Preparation of Sample: U.S. Environmental Protection Agency Methods 3665A and 3050B
- Metals by EPA Method 6010; Mercury by EPA Method 7471A
- PCB analysis by EPA Method 8082 with Soxhlet Extraction Method 3540C

Pesticide analysis was excluded from this year's sampling event because review of pesticide analyses from previous sampling events dating from 2008 to 2017 determined that pesticides are not a chemical of concern. This is consistent with the March 17, 2010 Final CDPH and ATSDR Public Health Assessment's evaluation of marsh sediments and surface water at the RFS which identifies PCB and metals and potential exposure risks. Previous pesticide analyses are included for reference and will be included in future reports.

PCBs were reported at concentrations less than the commercial/industrial screening levels. Arsenic was reported at a concentration exceeding its background concentration of 16 milligrams per kilogram. All other metals analyzed were detected at concentrations less than the applicable commercial/industrial screening level or not detected. The sampling results and screening criteria are presented in the tables following this letter.

The January 2020 sampling results were compared with the 2008 through 2019 sampling results from the same decision unit, as well as with averages from discrete samples collected from the same area during sampling events in 2005 and 2006. The analytical results from the 2020 sampling event are similar to the previously collected data; no trends have been identified.

If you have any questions or comments regarding this submittal, please call me at (510) 642-4848.

Sincerely,



Greg Haet  
EH&S Associate Director  
Environmental Protection

Enclosures: Analytical Summary Tables  
Sample Location Figure  
Attachment 1: Enthalpy Analytical Results Job Number 317953

**POLYCHLORINATED BIPHENYLS (PCB) RESULTS  
 REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)**

Screening Criteria	PCBs <sup>(1)</sup>			
	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total Aroclors
<i>Commercial worker</i>	0.528	0.588	0.595	0.577
<i>Construction worker</i>	3.99	2.29	4.01	3.98
<i>Maintenance worker</i>	3.99	4.00	4.01	3.98
<i>Off-Site Receptor</i>	3.07	4.15	6.44	2.61
<i>Other</i>	1 <sup>(2)</sup>	1 <sup>(2)</sup>	1 <sup>(2)</sup>	1
<i>Category I Criteria</i>	1	1	1	1
<i>Category II Criteria</i>	1	1	1	1
<b>Sample Location</b>				
WSM 16 discrete sample mean <sup>(3)</sup> March 1, 2005	0.19 <sup>(4)</sup>	0.14 <sup>(5)</sup>	0.054	0.384
WSM 30 discrete sample mean <sup>(3)</sup> June 13, 2006	0.22 <sup>(6)</sup>	ND	0.016 <sup>(7)</sup>	0.236
WSM DU1-001 January 17, 2008	0.081	0.053	0.021 J	0.155
WSM DU1-002 February 4, 2009	0.18	0.10	0.05	0.33
WSM DU1-003 February 18, 2010	0.31	0.16	0.036 J	0.506
WSM DU1-004 February 22, 2011	0.048 U	0.048 U	0.048 U	ND (<0.048)
WSM DU1-005 February 3, 2012	0.034 U	0.096	0.068	0.164
WSM DU1-006 February 4, 2013	0.010 U	0.010 U	0.010 U	ND (<0.010)
WSM DU1-007 February 27, 2014	0.19	0.042 U	0.03 J	0.268
WSM DU1-008 January 27, 2015	0.094	0.097	0.036	0.227
WSM DU1-009 January 21, 2016	0.100	ND (<0.0097)	ND (<0.0097)	0.100
WSMPHA17 January 18, 2017	ND (<0.012)	0.033	0.018	0.051
WSM2018PHA January 26, 2018	ND (<0.160)	ND	0.410	0.410
WSM2019PHA January 25, 2019	ND (<0.066)	ND (<0.066)	ND (<0.066)	ND
WSM2020PHA January 31, 2020	ND (<0.033)	0.15	ND (<0.033)	0.15

Notes:

**Bold values** indicate that the result exceeded the Category I criterion.

Screening criteria based on the Final Soil Management Plan, Revision 2, Table C-1, December 31, 2019.

- (1) All other PCBs not detected
- (2) Other criteria for PCBs are based on Toxic Substances Control Act (TSCA) criteria for high occupancy areas with no cap
- (3) For detect-only data, the mean is the arithmetic mean. For chemicals with non-detect measurements, this value is the arithmetic mean with one-half the detection limit substituted for non-detect measurements.
- (4) Thirteen detections
- (5) Eleven detections
- (6) Nineteen detections
- (7) Twelve detections
- J Estimated Value
- NA Not available
- ND, U Not detected

**PESTICIDE RESULTS  
 REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)**

	Pesticides <sup>(1)</sup>													
	Aldrin	Alpha-bhc	Heptachlor	Heptachlor expoxide	Endosulfan I	Dieldrin	Endrin	Endosulfan sulfate	4,4'-DDD	4,4'-DDE	4,4'-DDT	Alpha- Chlordane	Gamma- Chlordane	Methoxychlor
<b>Screening Criteria</b>														
<i>Commercial worker</i>	0.184	0.235	0.626	0.330	6,030	0.093	159	3,180	6.18	9.28	7.06	6.10	6.10	--
<i>Construction worker</i>	1.41	1.58	5.14	2.59	1,990	0.623	43.1	855	4.3	70.5	49.9	43.60	43.6	--
<i>Maintenance worker</i>	1.415	1.58	5.14	2.59	49,600	0.623	1,080	21,400	41.5	70.5	49.9	43.60	43.6	--
<i>Off-Site Receptors</i>	0.984	2,120	1.03	0.910	10,300	830	--	34,000,000	55,300	60.7	39,400	42.0	42.90	--
<i>Category I Criteria</i>	0.184	0.235	0.626	0.330	1,990	0.0926	43.1	855	4.31	9.28	7.06	6.10	6.10	--
<i>Category II Criteria</i>	1.84	2.35	6.26	3.30	19,900	0.926	431	8,550	43.1	92.8	70.6	61.0	61.0	--
<b>Sample Location</b>														
WSM 16 discrete sample mean <sup>(2)</sup> March 1, 2005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WSM 30 discrete sample mean <sup>(2)</sup> June 13, 2006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WSM DU1-001 January 17, 2008	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.017 U	0.017 U	0.17 U
WSM DU1-002 February 4, 2009	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.060 U	0.060 U	0.60 U
WSM DU1-003 February 18, 2010	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.063 U	0.063 U	0.063 U	0.063 U	0.063 U	0.063 U	0.032 U	0.032 U	0.32 U
WSM DU1-004 February 22, 2011	0.017 CJ	0.034 U	0.034 U	0.033 CJ	0.0037 UJ	0.029 CJ	0.046 CJ	0.031 UJ	0.038 UJ	0.066 U	0.044 CJ	0.023 UJ	0.034 U	0.012 UJ
WSM DU1-005 February 3, 2012	0.0023 CJ	0.006 U	0.006 U	0.0031 J	0.006 U	0.012 U	0.012 U	0.012 U	0.0037 J	0.0036 CJ	0.0041 CJ	0.0015 CJ	0.0015 CJ	0.06 U
WSM DU1-006 February 4, 2013	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.017 U	0.017 U	0.17 U
WSM DU1-007 February 27, 2014	0.037 U	0.037 U	0.037 U	0.0095 CJ	0.037 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.072 U	0.037 U	0.037 U	0.37 U

	Aldrin	Alpha-bhc	Heptachlor	Heptachlor exposide	Endosulfan I	Dieldrin	Endrin	Endosulfan sulfate	4,4'-DDD	4,4'-DDE	4,4'-DDT	Alpha- Chlordane	Gamma- Chlordane	Methoxychlor
WSM DU1-008 January 27, 2015	0.0042 U	0.00048 C J	0.00069 C J	0.0042 U	0.0042 U	0.0042 U	0.016 C J	0.0081 U	0.0077 C J	0.0081 U	0.18 C	0.00042 U	0.00042 U	0.00042 U
WSM DU1-009 January 21, 2016	ND (< 0.034)	ND (< 0.034)	0.040	ND (< 0.034)	ND (< 0.034)	ND (< 0.034)	ND (< 0.067)	ND (< 0.067)	ND (< 0.067)	ND (< 0.067)	ND (< 0.067)	ND (< 0.034)	ND (< 0.034)	ND (< 0.34)
WSMPHA17 January 18, 2017	ND (<0.033)	ND (<0.033)	ND (<0.033)	ND (<0.033)	ND (<0.033)	ND (< 0.033)	ND (< 0.065)	ND (< 0.065)	ND (< 0.065)	ND (< 0.065)	ND (< 0.065)	ND (< 0.033)	ND (< 0.033)	ND (< 0.33)
WSM2018PHA January 26, 2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WSM2019PHA January 25, 2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WSM2020PHA January 31, 2020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Only chemicals that were detected or have screening criteria are listed.  
 Bold values indicate that the result exceeded the Category I criterion.

Screening criteria based on the Final Soil Management Plan, Revision 2, Table C-1, December 21, 2019.

- (1) All other pesticides were not detected.
- (2) For detect-only data, the mean is the arithmetic mean. For chemicals with non-detect measurements, this value is the arithmetic mean with one-half the detection limit substituted for non-detect measurements.
- C Relative percent difference between columns exceeds 40%
- J Estimated Value
- NA Not available – samples collected in 2005, 2006, 2018, 2019, and 2020 were not analyzed for pesticides.
- U Not detected (method blank contamination)

**METAL RESULTS  
REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)**

Screening Criteria	Metals																							
	Aluminum	Antimony	Arsenic (I)	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
<i>Commercial worker</i>	NA	467	0.253	217,000	232	778	NA	1.75E+6	347	46,700	818,000	320	NA	25,600	187	5,840	11,100	NA	5,840	5,840	NA	11.70	5,780	350,000
<i>Construction worker</i>	NA	142	0.85	2,120	21.4	36.6	NA	531,000	21.1	14,200	248,000	320	NA	213	39.6	1,770	60.4	NA	1,730	1,770	NA	3.54	351	106,000
<i>Maintenance worker</i>	NA	3,540	1.77	53,100	128	73	NA	13.3E+7	34.1	354,000	6.19E+6	320	NA	5,340	989	44,200	1,180	NA	44,200	44,200	NA	88.5	8,780	2.65E+6
<i>Off-Site Receptors</i>	NA	--	888	709,000	1,590	909	NA	--	424	--	--	--	NA	71	42,500	--	14,700	NA	28.4E+7	--	NA	--	142,000	--
<i>Other</i>	NA <sup>(2)</sup>		16 <sup>(1)</sup>						73 <sup>(2)</sup>					5,900 <sup>(2)</sup>			280 <sup>(2)</sup>							
<i>Category I Criteria</i>	NA	142	16	2,120	21.4	36.6	NA	100,000	73	14,200	100,000	320	NA	5,900	39.6	1,770	280	NA	1,730	1,770	NA	3.54	351	100,000
<i>Category II Criteria</i>	NA	1,420	16	21,200	214	366	NA	100,000	730	100,000	100,000	800	NA	5,900	396	17,700	604	NA	17,300	17,700	NA	35.4	3,510	100,000
<b>Sample Location</b>																								
WSM 16 discrete sample mean <sup>(3)</sup> March 1, 2005	NA	ND	<b>55.7</b>	ND	0.84	1.2 <sup>(3)</sup>	NA	86.44	ND	118	NA	51.56	NA	NA	2.59	ND	85.75	NA	1.15 <sup>(4)</sup>	ND	NA	ND	ND	276
WSM 30 discrete sample mean <sup>(3)</sup> June 13, 2006	NA	6.2 <sup>c</sup>	<b>55.3</b>	78.1	0.61	1.24 <sup>(5)</sup>	NA	89.4	14.8	136	NA	82.1	NA	NA	3.5	2.4 <sup>(6)</sup>	81.4	NA	1.03 <sup>(7)</sup>	0.29 <sup>(8)</sup>	NA	0.51 <sup>(9)</sup>	81.5	321
WSM DU1-001 January 17, 2008	28,000	2.4	15	53	0.53	0.38 J	2,700	74	13	67	46,000	32	15,000	470	1.6	0.50 U	69	3,300	1.0 U	0.50 U	8,200	1.0 U	67	140
WSM DU1-002 February 4, 2009	8,800	1.3	<b>22</b>	31	0.89 U	0.52 J	2,600	39	10	79	26,000	44	9,600	620	1.8	1.3	48	3,900	0.73 J	0.89 U	30,000	0.89 U	39	210
WSM DU1-003 February 18, 2010	24,000	3.9	<b>26</b>	61	0.60	0.68 J	3,900	81	12	100	38,000	52	13,000	330	2.6	0.89 J	73	4,900	1.2 J	0.96 U	21,000	1.9 U	71	260
WSM DU1-004 February 22, 2011	23,000	11	<b>35</b>	57	0.67	0.50 J	3,700	78	13	110	36,000	59	13,000	360	3.0	1.8	75	4,900	2.0 U	0.34 J	23,000	2.0 U	68	280
WSM DU1-005 February 3, 2012	20,000	0.45 J	<b>29</b>	51	0.76 J	0.49 J	3,500	72	12	90	38,000	52	12,000	590	2.3	1.6	68	4,700	1.1	0.47 J	22,000	0.11 J	54	230
WSM DU1-006 February 4, 2013	28,000	1.2 U	<b>28</b>	60	0.61	0.31 J	3,600	84	16	96	45,000	56	13,000	510	2.0	1.8	83	4,600	1.2 U	0.43 J	14,000	1.2 U	77	240

	Aluminum	Antimony	Arsenic (1)	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
WSM DU1-007 February 27, 2014	24,000	1.2	<b>48</b>	64	0.77 J	0.93 J	3,900	100	19	140	60,000	83	16,000	790	1.9	4.5	94	5,200	1.4	0.64 J	22,000	0.31 J	86	400
WSM DU1-008 January 27, 2015	23,000	0.50 J	<b>25</b>	52	0.66	0.41 J	3,900	76	15	59	37,000	41	12,000	780	1.5	1.3	76	4,200	1.1	0.29 J	17,000	0.15 J	72	190
WSM DU1-009 January 21, 2016	NA	0.88	<b>19</b>	47	0.65	2.0	NA	80	14	77	NA	38	NA	NA	2.2	2.2	73	NA	ND (<0.5)	0.25	NA	0.81	70	180
WSMPHA17 January 18, 2017	NA	ND (<2.0)	6.8	20	0.17	0.64	NA	30	4.6	29	NA	19	NA	NA	0.54	0.94	28	NA	ND (<2.0)	ND (<0.25)	NA	ND (<0.49)	29	110
WSM2018PHA January 26, 2018	NA	ND (<2.0)	13	21	0.21	0.27	NA	26	4.6	22	NA	17	NA	NA	0.46	0.63	24	NA	ND (<2.0)	ND (<0.25)	NA	ND (<0.51)	26	73
WSM2019PHA January 25, 2019	NA	ND (<2.0)	16	33	0.43	0.49	NA	53	9.3	52	NA	34	NA	NA	0.32	1.0	47	NA	ND (<2.0)	ND (<0.25)	NA	ND (<0.49)	49	140
WSM2020PHA January 31, 2020	NA	ND (<2.0)	<b>22</b>	50	0.50	0.34	NA	79	14	80	NA	42	NA	NA	0.61	1.6	71	NA	ND (<2.0)	0.33	NA	ND (<0.50)	64	180

Notes:

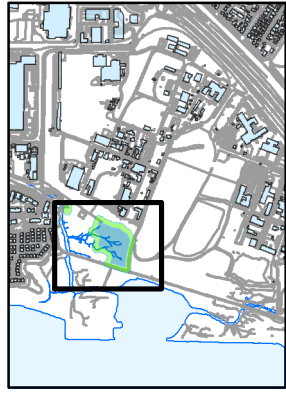
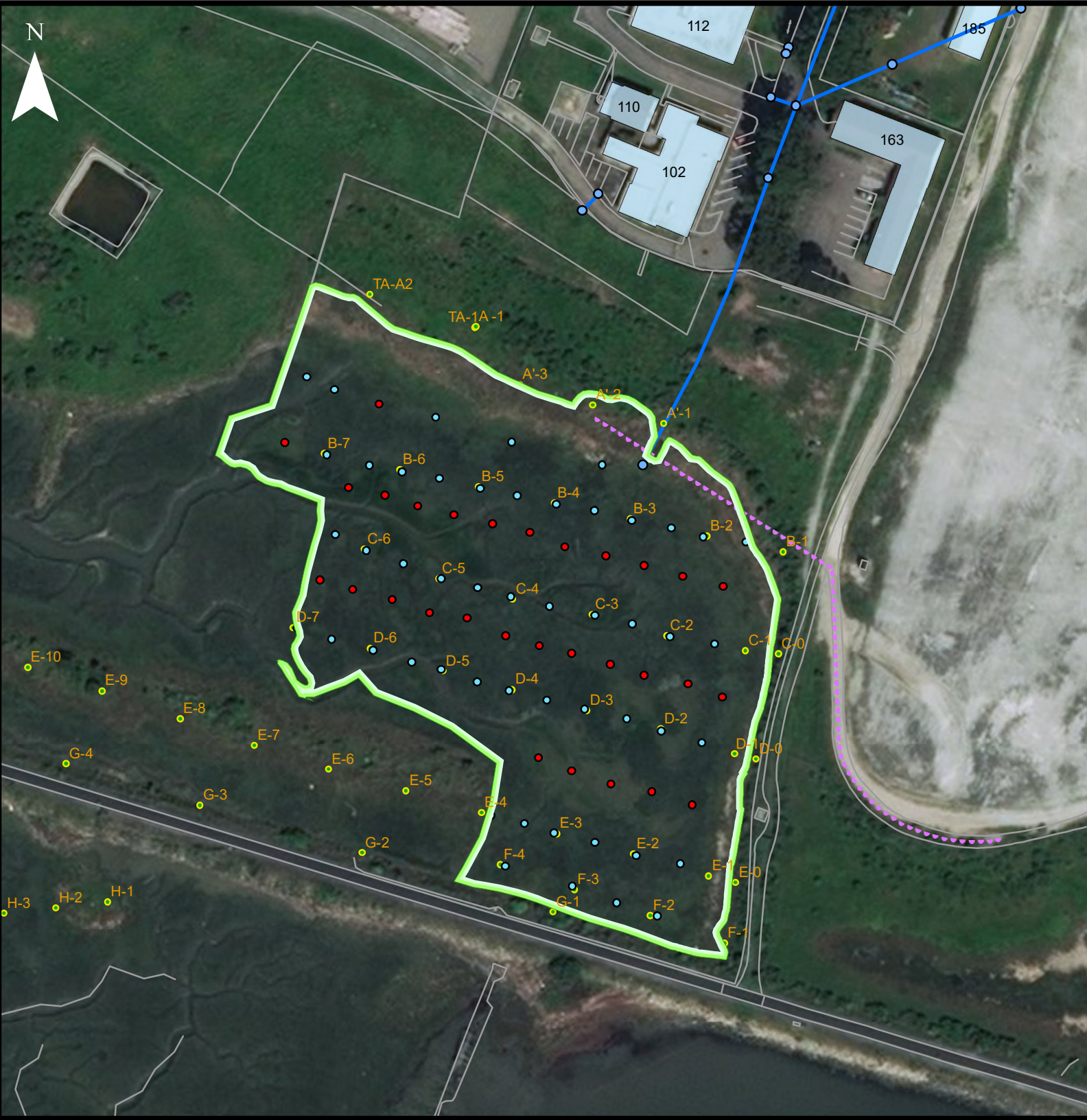
**Bold values** indicate that the result exceeded the Category I criterion.

Screening criteria based on the Final Soil Management Plan, Revision 2, Table C-1, December 31, 2019.

- NA Not available
- ND Not detected
- J Estimated Value
- U Not detected

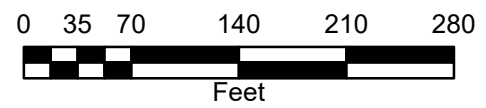
- (1) Arsenic screening value based on DTSC-approved ambient concentration developed for the adjacent Campus Bay site.
- (2) Screening levels for cobalt, manganese, and nickel were updated, and aluminum was eliminated as a chemical of concern in the Final SMP, Revision 1.
- (3) For detect-only data, the mean is the arithmetic mean. For chemicals with non-detect measurements, this value is the arithmetic mean with one-half the detection limit substituted for non-detect measurements
- (4) Fifteen detections
- (5) Eight detections
- (6) Eleven detections
- (7) Twenty-two detections
- (8) Twenty-six detections
- (9) Only thirteen detections
- (10) Two detections





**2020 PHA Sampling Locations**

- Decision Unit 1 boundary
- Increments added in 2018
- Increment location (approximate)
- Vegetation Quadrats
- Biologically Active Permeable Barrier



**Berkeley EH&S**  
UNIVERSITY OF CALIFORNIA

**Richmond Field Station Site**  
University of California, Berkeley

**WESTERN STEGE MARSH**  
**NEAR SURFACE SAMPLING**  
**JANUARY 31, 2020**



**ENTHALPY**  
ANALYTICAL

Enthalpy Analytical  
2323 Fifth Street  
Berkeley, CA 94710  
(510) 486-0900

enthalpy.com

Lab Job Number: 317953  
Report Level: II  
Report Date: 02/19/2020

**Analytical Report** *prepared for:*

Alicia Bihler  
UC Berkeley Environ. Health & Safety  
317 University Hall #1150  
Berkeley, CA 94720-1150

Location: RFS-WSM-PAH

*Authorized for release by:*

Jess Silberman, Project Manager  
(510) 204-2223  
[Jessica.Silberman@enthalpy.com](mailto:Jessica.Silberman@enthalpy.com)

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the above signature which applies to this PDF file as well as any associated electronic data deliverable files. The results contained in this report meet all requirements of NELAP and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

CA ELAP# 2896, NELAP# 4044-001

## Sample Summary

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Alicia Bihler  
UC Berkeley Environ. Health & Safety  
317 University Hall #1150  
Berkeley, CA 94720-1150

Lab Job #: 317953  
Location: RFS-WSM-PAH  
Date Received: 01/31/20

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<b>Sample ID</b>	<b>Lab ID</b>	<b>Collected</b>	<b>Matrix</b>
WSM-2020-PAH	317953-001	01/31/20 11:20	Soil

## Case Narrative

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UC Berkeley Environ. Health & Safety  
317 University Hall #1150  
Berkeley, CA 94720-1150  
Alicia Bihler

Lab Job Number: 317953  
Location: RFS-WSM-PAH  
Date Received: 01/31/20

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This data package contains sample and QC results for one soil sample, requested for the above referenced project on 01/31/20. The sample was received intact.

### **PCBs (EPA 8082):**

All samples underwent sulfuric acid cleanup using EPA Method 3665A. All samples underwent sulfur cleanup using the copper option in EPA Method 3660B. High recoveries were observed for Aroclor-1016 and Aroclor-1260 in the MS/MSD for batch 278614; the parent sample was not a project sample, the LCS was within limits, the associated RPDs were within limits, and these analytes were not detected at or above the RL in the associated sample. WSM-2020-PAH (lab # 317953-001) was diluted due to the color of the sample extract. No other analytical problems were encountered.

### **Metals (EPA 6010B and EPA 7471A):**

Low recoveries were observed for antimony in the MS/MSD of WSM-2020-PAH (lab # 317953-001); the BS/BSD were within limits, and the associated RPD was within limits. High recovery was observed for barium in the MS of WSM-2020-PAH (lab # 317953-001); the BS/BSD were within limits, and the associated RPD was within limits. No other analytical problems were encountered.

## Detection Summary for 317953

**Client:** UC Berkeley Environ. Health & Safety

**Location** RFS-WSM-PAH

Sample ID: WSM-2020-PAH

Lab ID: 317953-001

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Aroclor-1254	150		33	ug/Kg	As Recd	10.00	EPA 8082	EPA 3540C
Arsenic	22		1.5	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Barium	50		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Beryllium	0.50		0.10	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Cadmium	0.34		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Chromium	79		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Cobalt	14		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Copper	80		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Lead	42		1.0	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Mercury	0.61		0.016	mg/Kg	As Recd	1.000	EPA 7471A	METHOD
Molybdenum	1.6		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Nickel	71		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Silver	0.33		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Vanadium	64		0.25	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Zinc	180		1.0	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B



**SAMPLE RECEIPT CHECKLIST**

Section 1: Login # 317953  
 Date Received: 1/31/20

Client: UC Berkeley EHS  
 Project: RFS - WSM - PAH



**Section 2: Shipping info (if applicable)**

Are custody seals present?  No, or  Yes. If yes, where?  on cooler,  on samples,  on package  
 Date: \_\_\_\_\_ How many \_\_\_\_\_  Signature,  Initials,  None

Were custody seals intact upon arrival?  Yes  No  N/A

Samples received in a cooler?  Yes, how many? \_\_\_\_\_  No (skip Section 3 below)

If no cooler Sample Temp (°C): 18.3 using IR Gun #  B, or  C

Samples received on ice directly from the field. Cooling process had begun

If in cooler: Date Opened 1/31/20 By (print) ZH (sign) [Signature]

**Section 3: Important: Notify PM if temperature exceeds 6°C or arrive frozen.**

Packing in cooler: (if other, describe) \_\_\_\_\_

Bubble Wrap,  Foam blocks,  Bags,  None,  Cloth material,  Cardboard,  Styrofoam,  Paper towels

Samples received on ice directly from the field. Cooling process had begun

Type of ice used:  Wet,  Blue/Gel,  None Temperature blank(s) included?  Yes,  No

Temperature measured using  Thermometer ID: \_\_\_\_\_, or IR Gun #  B  C

Cooler Temp (°C): #1: \_\_\_\_\_, #2: \_\_\_\_\_, #3: \_\_\_\_\_, #4: \_\_\_\_\_, #5: \_\_\_\_\_, #6: \_\_\_\_\_, #7: \_\_\_\_\_

Section 4:	YES	NO	N/A
Were custody papers dry, filled out properly, and the project identifiable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were Method 5035 sampling containers present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If YES, what time were they transferred to freezer? _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did all bottles arrive unbroken/unopened?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are there any missing / extra samples?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are samples in the appropriate containers for indicated tests?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are sample labels present, in good condition and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the container count match the COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do the sample labels agree with custody papers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was sufficient amount of sample sent for tests requested?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you change the hold time in LIMS for unpreserved VOAs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Did you change the hold time in LIMS for preserved terracores?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are bubbles > 6mm present in VOA samples?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Was the client contacted concerning this sample delivery?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If YES, who was called? _____ By _____ Date: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Section 5:**

Are the samples appropriately preserved? (if N/A, skip the rest of section 5)

Did you check preservatives for all bottles for each sample?

Did you document your preservative check?

pH strip lot# \_\_\_\_\_, pH strip lot# \_\_\_\_\_, pH strip lot# \_\_\_\_\_

Preservative added:

H2SO4 lot# \_\_\_\_\_ added to samples \_\_\_\_\_ on/at \_\_\_\_\_

HCL lot# \_\_\_\_\_ added to samples \_\_\_\_\_ on/at \_\_\_\_\_

HNO3 lot# \_\_\_\_\_ added to samples \_\_\_\_\_ on/at \_\_\_\_\_

NaOH lot# \_\_\_\_\_ added to samples \_\_\_\_\_ on/at \_\_\_\_\_

**Section 6:**

Explanations/Comments: \_\_\_\_\_

Date Logged in 1/31/20 By (print) ZH (sign) [Signature]  
 Date Labeled 1/31 By (print) Bri (sign) [Signature]

## Polychlorinated Biphenyls (PCBs)

**Lab #:** 317953

**Project#:** STANDARD

**Client:** UC Berkeley Environ. Health & Safety

**Location:** RFS-WSM-PAH

**Field ID:** WSM-2020-PAH

**DiIn Fac:** 10.00

**Analyzed:** 02/17/20

**Type:** SAMPLE

**Batch#:** 278614

**Prep:** EPA 3540C

**Lab ID:** 317953-001

**Sampled:** 01/31/20

**Analysis:** EPA 8082

**Matrix:** Soil

**Received:** 01/31/20

**Basis:** air dried

**Prepared:** 02/14/20

**Type:** BLANK                      **DiIn Fac:** 1.000                      **Analyzed:** 02/17/20  
**Lab ID:** QC1009481                      **Batch#:** 278614                      **Prep:** EPA 3540C  
**Matrix:** Soil                      **Prepared:** 02/14/20                      **Analysis:** EPA 8082

**Type:** BLANK                      **DiIn Fac:** 1.000                      **Analyzed:** 02/17/20  
**Lab ID:** QC1009482                      **Batch#:** 278614                      **Prep:** EPA 3540C  
**Matrix:** Miscell.                      **Prepared:** 02/14/20                      **Analysis:** EPA 8082



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**Polychlorinated Biphenyls (PCBs)**

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**Lab #:** 317953**Project#:** STANDARD**Client:** UC Berkeley Environ. Health & Safety**Location:** RFS-WSM-PAH

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Legend

**DO:** Diluted Out**ND:** Not Detected**RL:** Reporting Limit

## Polychlorinated Biphenyls (PCBs): Batch QC

<b>Lab #:</b> 317953			<b>Project#:</b> STANDARD		
<b>Client:</b> UC Berkeley Environ. Health & Safety			<b>Location:</b> RFS-WSM-PAH		
<b>Type:</b> LCS	<b>Diln Fac:</b> 1.000	<b>Analyzed:</b> 02/17/20			
<b>Lab ID:</b> QC1009483	<b>Batch#:</b> 278614	<b>Prep:</b> EPA 3540C			
<b>Matrix:</b> Soil	<b>Prepared:</b> 02/14/20	<b>Analysis:</b> EPA 8082			
Analyte	Spiked	Result	%REC	Limits	Units
Aroclor-1016	83.33	72.94	88	64-146	ug/Kg
Aroclor-1260	83.33	69.68	84	60-156	ug/Kg
Surrogate			%REC	Limits	
Decachlorobiphenyl			115	44-148	

## Polychlorinated Biphenyls (PCBs): Batch QC

**Lab #:** 317953

**Project#:** STANDARD

**Client:** UC Berkeley Environ. Health & Safety

**Location:** RFS-WSM-PAH

<b>Field ID:</b> ZZZZZZZZZZ	<b>Basis:</b> as received	<b>Prepared:</b> 02/14/20
<b>Type:</b> MS	<b>Diln Fac:</b> 10.00	<b>Analyzed:</b> 02/17/20
<b>MSS Lab ID:</b> 318114-001	<b>Batch#:</b> 278614	<b>Prep:</b> EPA 3540C
<b>Lab ID:</b> QC1009484	<b>Sampled:</b> 02/06/20	<b>Analysis:</b> EPA 8082
<b>Matrix:</b> Soil	<b>Received:</b> 02/06/20	

Analyte	MSS Result	Spiked	Result	%REC	Limits	Units
Aroclor-1016	<11.84	83.42	452.4	542 *	59-158	ug/Kg
Aroclor-1260	<7.744	83.42	607.3	728 *	50-171	ug/Kg

Surrogate	%REC	Limits
Decachlorobiphenyl	DO	44-148

<b>Field ID:</b> ZZZZZZZZZZ	<b>Basis:</b> as received	<b>Prepared:</b> 02/14/20
<b>Type:</b> MSD	<b>Diln Fac:</b> 10.00	<b>Analyzed:</b> 02/17/20
<b>MSS Lab ID:</b> 318114-001	<b>Batch#:</b> 278614	<b>Prep:</b> EPA 3540C
<b>Lab ID:</b> QC1009485	<b>Sampled:</b> 02/06/20	<b>Analysis:</b> EPA 8082
<b>Matrix:</b> Soil	<b>Received:</b> 02/06/20	

Analyte	Spiked	Result	%REC	Limits	Units	RPD	Lim
Aroclor-1016	83.33	417.1	500 *	59-158	ug/Kg	8	43
Aroclor-1260	83.33	597.2	717 *	50-171	ug/Kg	2	49

Surrogate	%REC	Limits
Decachlorobiphenyl	DO	44-148

Legend

\*: Value is outside QC limits

DO: Diluted Out

RPD: Relative Percent Difference

## California Title 22 Metals

**Lab #:** 317953

**Project#:** STANDARD

**Client:** UC Berkeley Environ. Health & Safety

**Location:** RFS-WSM-PAH

**Field ID:** WSM-2020-PAH

**Basis:** as received

**Received:** 01/31/20

**Lab ID:** 317953-001

**Diln Fac:** 1.000

**Matrix:** Soil

**Sampled:** 01/31/20

Analyte	Result	RL	Units	Batch#	Prepared	Analyzed	Prep	Analysis
Antimony	ND	2.0	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Arsenic</b>	<b>22</b>	1.5	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Barium</b>	<b>50</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Beryllium</b>	<b>0.50</b>	0.10	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Cadmium</b>	<b>0.34</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Chromium</b>	<b>79</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Cobalt</b>	<b>14</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Copper</b>	<b>80</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Lead</b>	<b>42</b>	1.0	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Mercury</b>	<b>0.61</b>	0.016	mg/Kg	278328	02/05/20	02/05/20	METHOD	EPA 7471A
<b>Molybdenum</b>	<b>1.6</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Nickel</b>	<b>71</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
Selenium	ND	2.0	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Silver</b>	<b>0.33</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
Thallium	ND	0.50	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Vanadium</b>	<b>64</b>	0.25	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B
<b>Zinc</b>	<b>180</b>	1.0	mg/Kg	278446	02/10/20	02/10/20	EPA 3050B	EPA 6010B

## Legend

**ND:** Not Detected

**RL:** Reporting Limit

### California Title 22 Metals: Batch QC

<b>Lab #:</b> 317953		<b>Project#:</b> STANDARD
<b>Client:</b> UC Berkeley Environ. Health & Safety		<b>Location:</b> RFS-WSM-PAH
<b>Type:</b> BLANK	<b>Diln Fac:</b> 1.000	<b>Analyzed:</b> 02/05/20
<b>Lab ID:</b> QC1008260	<b>Batch#:</b> 278328	<b>Prep:</b> METHOD
<b>Matrix:</b> Soil	<b>Prepared:</b> 02/05/20	<b>Analysis:</b> EPA 7471A

Analyte	Result	RL	Units
Mercury	ND	0.016	mg/Kg

Legend  
**ND:** Not Detected  
**RL:** Reporting Limit

### California Title 22 Metals: Batch QC

**Lab #:** 317953

**Project#:** STANDARD

**Client:** UC Berkeley Environ. Health & Safety

**Location:** RFS-WSM-PAH

**Type:** BS

**Diln Fac:** 1.000

**Analyzed:** 02/05/20

**Lab ID:** QC1008261

**Batch#:** 278328

**Prep:** METHOD

**Matrix:** Soil

**Prepared:** 02/05/20

**Analysis:** EPA 7471A

Analyte	Spiked	Result	%REC	Limits	Units
Mercury	0.1754	0.1779	101	80-120	mg/Kg

**Type:** BSD

**Diln Fac:** 1.000

**Analyzed:** 02/05/20

**Lab ID:** QC1008262

**Batch#:** 278328

**Prep:** METHOD

**Matrix:** Soil

**Prepared:** 02/05/20

**Analysis:** EPA 7471A

Analyte	Spiked	Result	%REC	Limits	Units	RPD	Lim
Mercury	0.1818	0.1919	106	80-120	mg/Kg	4	20

Legend

**RPD:** Relative Percent Difference

### California Title 22 Metals: Batch QC

**Lab #:** 317953

**Project#:** STANDARD

**Client:** UC Berkeley Environ. Health & Safety

**Location:** RFS-WSM-PAH

<b>Field ID:</b> ZZZZZZZZZZ	<b>Basis:</b> as received	<b>Prepared:</b> 02/05/20
<b>Type:</b> MS	<b>Diln Fac:</b> 1.000	<b>Analyzed:</b> 02/05/20
<b>MSS Lab ID:</b> 317917-004	<b>Batch#:</b> 278328	<b>Prep:</b> METHOD
<b>Lab ID:</b> QC1008263	<b>Sampled:</b> 01/29/20	<b>Analysis:</b> EPA 7471A
<b>Matrix:</b> Soil	<b>Received:</b> 01/30/20	

Analyte	MSS Result	Spiked	Result	%REC	Limits	Units
Mercury	0.01766	0.1538	0.1703	99	80-120	mg/Kg

<b>Field ID:</b> ZZZZZZZZZZ	<b>Basis:</b> as received	<b>Prepared:</b> 02/05/20
<b>Type:</b> MSD	<b>Diln Fac:</b> 1.000	<b>Analyzed:</b> 02/05/20
<b>MSS Lab ID:</b> 317917-004	<b>Batch#:</b> 278328	<b>Prep:</b> METHOD
<b>Lab ID:</b> QC1008264	<b>Sampled:</b> 01/29/20	<b>Analysis:</b> EPA 7471A
<b>Matrix:</b> Soil	<b>Received:</b> 01/30/20	

Analyte	Spiked	Result	%REC	Limits	Units	RPD	Lim
Mercury	0.1639	0.1803	99	80-120	mg/Kg	0	20

Legend

**RPD:** Relative Percent Difference

### California Title 22 Metals: Batch QC

**Lab #:** 317953

**Project#:** STANDARD

**Client:** UC Berkeley Environ. Health & Safety

**Location:** RFS-WSM-PAH

**Type:** BLANK

**Diln Fac:** 1.000

**Analyzed:** 02/10/20

**Lab ID:** QC1008766

**Batch#:** 278446

**Prep:** EPA 3050B

**Matrix:** Soil

**Prepared:** 02/10/20

**Analysis:** EPA 6010B

Analyte	Result	RL	Units
Antimony	ND	2.0	mg/Kg
Arsenic	ND	1.5	mg/Kg
Barium	ND	0.25	mg/Kg
Beryllium	ND	0.10	mg/Kg
Cadmium	ND	0.25	mg/Kg
Chromium	ND	0.25	mg/Kg
Cobalt	ND	0.25	mg/Kg
Copper	ND	0.25	mg/Kg
Lead	ND	1.0	mg/Kg
Molybdenum	ND	0.25	mg/Kg
Nickel	ND	0.25	mg/Kg
Selenium	ND	2.0	mg/Kg
Silver	ND	0.25	mg/Kg
Thallium	ND	0.50	mg/Kg
Vanadium	ND	0.25	mg/Kg
Zinc	ND	1.0	mg/Kg

## Legend

**ND:** Not Detected

**RL:** Reporting Limit



### California Title 22 Metals: Batch QC

**Lab #:** 317953

**Project#:** STANDARD

**Client:** UC Berkeley Environ. Health & Safety

**Location:** RFS-WSM-PAH

**Type:** BS

**DiIn Fac:** 1.000

**Analyzed:** 02/10/20

**Lab ID:** QC1008767

**Batch#:** 278446

**Prep:** EPA 3050B

**Matrix:** Soil

**Prepared:** 02/10/20

**Analysis:** EPA 6010B

Analyte	Spiked	Result	%REC	Limits	Units
Antimony	49.85	47.26	95	80-120	mg/Kg
Arsenic	49.85	48.22	97	80-120	mg/Kg
Barium	49.85	48.03	96	80-120	mg/Kg
Beryllium	24.93	24.02	96	80-120	mg/Kg
Cadmium	49.85	46.41	93	80-120	mg/Kg
Chromium	49.85	48.09	96	80-120	mg/Kg
Cobalt	49.85	47.45	95	80-120	mg/Kg
Copper	49.85	46.81	94	80-120	mg/Kg
Lead	49.85	48.00	96	80-120	mg/Kg
Molybdenum	49.85	46.94	94	80-120	mg/Kg
Nickel	49.85	47.62	96	80-120	mg/Kg
Selenium	49.85	46.40	93	80-120	mg/Kg
Silver	4.985	4.823	97	80-120	mg/Kg
Thallium	49.85	47.74	96	80-120	mg/Kg
Vanadium	49.85	47.74	96	80-120	mg/Kg
Zinc	49.85	46.29	93	80-120	mg/Kg

**Type:** BSD

**DiIn Fac:** 1.000

**Analyzed:** 02/10/20

**Lab ID:** QC1008768

**Batch#:** 278446

**Prep:** EPA 3050B

**Matrix:** Soil

**Prepared:** 02/10/20

**Analysis:** EPA 6010B

Analyte	Spiked	Result	%REC	Limits	Units	RPD	Lim
Antimony	50.05	48.74	97	80-120	mg/Kg	3	20
Arsenic	50.05	49.61	99	80-120	mg/Kg	2	20
Barium	50.05	50.17	100	80-120	mg/Kg	4	20
Beryllium	25.03	25.06	100	80-120	mg/Kg	4	20
Cadmium	50.05	48.09	96	80-120	mg/Kg	3	20
Chromium	50.05	50.33	101	80-120	mg/Kg	4	20
Cobalt	50.05	49.38	99	80-120	mg/Kg	4	20
Copper	50.05	48.65	97	80-120	mg/Kg	3	20
Lead	50.05	49.68	99	80-120	mg/Kg	3	20
Molybdenum	50.05	49.22	98	80-120	mg/Kg	4	20
Nickel	50.05	49.60	99	80-120	mg/Kg	4	20
Selenium	50.05	47.16	94	80-120	mg/Kg	1	20
Silver	5.005	4.939	99	80-120	mg/Kg	2	20
Thallium	50.05	49.17	98	80-120	mg/Kg	3	20
Vanadium	50.05	49.35	99	80-120	mg/Kg	3	20
Zinc	50.05	47.90	96	80-120	mg/Kg	3	20

Legend

**RPD:** Relative Percent Difference

## California Title 22 Metals: Batch QC

**Lab #:** 317953

**Project#:** STANDARD

**Client:** UC Berkeley Environ. Health & Safety

**Location:** RFS-WSM-PAH

**Field ID:** WSM-2020-PAH

**Basis:** as received

**Prepared:** 02/10/20

**Type:** MS

**Diln Fac:** 1.000

**Analyzed:** 02/10/20

**MSS Lab ID:** 317953-001

**Batch#:** 278446

**Prep:** EPA 3050B

**Lab ID:** QC1008769

**Sampled:** 01/31/20

**Analysis:** EPA 6010B

**Matrix:** Soil

**Received:** 01/31/20

Analyte	MSS Result	Spiked	Result	%REC	Limits	Units
Antimony	0.3358	48.92	5.878	11 *	75-120	mg/Kg
Arsenic	21.68	48.92	72.40	104	80-120	mg/Kg
Barium	50.42	48.92	115.6	133 *	75-125	mg/Kg
Beryllium	0.4963	24.46	23.96	96	80-120	mg/Kg
Cadmium	0.3421	48.92	50.31	102	80-120	mg/Kg
Chromium	79.32	48.92	133.7	111	75-125	mg/Kg
Cobalt	13.54	48.92	58.11	91	75-120	mg/Kg
Copper	79.90	48.92	134.6	112	75-125	mg/Kg
Lead	41.57	48.92	84.48	88	75-120	mg/Kg
Molybdenum	1.619	48.92	39.92	78	75-120	mg/Kg
Nickel	71.39	48.92	118.1	96	75-120	mg/Kg
Selenium	1.293	48.92	48.93	97	75-120	mg/Kg
Silver	0.3285	4.892	5.634	108	80-120	mg/Kg
Thallium	<0.09064	48.92	40.21	82	75-120	mg/Kg
Vanadium	64.44	48.92	119.8	113	76-125	mg/Kg
Zinc	178.0	48.92	220.1	86	75-125	mg/Kg

**Field ID:** WSM-2020-PAH

**Basis:** as received

**Prepared:** 02/10/20

**Type:** MSD

**Diln Fac:** 1.000

**Analyzed:** 02/10/20

**MSS Lab ID:** 317953-001

**Batch#:** 278446

**Prep:** EPA 3050B

**Lab ID:** QC1008770

**Sampled:** 01/31/20

**Analysis:** EPA 6010B

**Matrix:** Soil

**Received:** 01/31/20

Analyte	Spiked	Result	%REC	Limits	Units	RPD	Lim
Antimony	50.15	6.689	13 *	75-120	mg/Kg	10	32
Arsenic	50.15	76.24	109	80-120	mg/Kg	3	20
Barium	50.15	105.2	109	75-125	mg/Kg	11	35
Beryllium	25.08	24.95	98	80-120	mg/Kg	2	20
Cadmium	50.15	52.52	104	80-120	mg/Kg	2	20
Chromium	50.15	137.1	115	75-125	mg/Kg	2	27
Cobalt	50.15	59.42	91	75-120	mg/Kg	0	21
Copper	50.15	138.8	117	75-125	mg/Kg	2	30
Lead	50.15	87.43	91	75-120	mg/Kg	2	43
Molybdenum	50.15	42.03	81	75-120	mg/Kg	3	20
Nickel	50.15	120.3	98	75-120	mg/Kg	1	29
Selenium	50.15	51.42	100	75-120	mg/Kg	3	20
Silver	5.015	5.957	112	80-120	mg/Kg	3	20
Thallium	50.15	41.96	84	75-120	mg/Kg	2	20
Vanadium	50.15	122.6	116	76-125	mg/Kg	1	25
Zinc	50.15	225.8	95	75-125	mg/Kg	2	25

**California Title 22 Metals: Batch QC**

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**Lab #:** 317953**Project#:** STANDARD**Client:** UC Berkeley Environ. Health & Safety**Location:** RFS-WSM-PAH

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Legend

\*: Value is outside QC limits

RPD: Relative Percent Difference