Groundwater Monitoring & Corrective Action Report CCR Landfill - Hunter Power Plant Castle Dale, Utah

January 2021







Prepared For: Hunter Power Plant Highway 10, S of Castle Dale Castle Dale, UT 84513

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APPENDICES

Attachment	A:	Fiel	d	Summary	Report -	May	202	0 E	lve	nt	
	_				_	-					

- Attachment B: Field Summary Report October 2020 Event
- Attachment C: Remedy Selection Progress Reports



ACRONYMS

- bgs Below Ground Surface
- CCR Coal Combustion Residuals
- CFR U.S. Code of Federal Regulations
- EPA U.S. Environmental Protection Agency
- FGD Flue-Gas Desulfurization
- SAP Sampling and Analysis Plan
- SSL Statistically Significant Level
- UTL Upper Tolerance Limit



1.0 CURRENT STATUS - § 257.90(e)(6)

This Groundwater Monitoring and Corrective Action Report was prepared for PacifiCorp by Water and Environmental Technologies. It was prepared to comply with the requirements detailed in *Code of Federal Regulations* § 257.90(e) (*CCR Rule*).

The Hunter Power Plant is located in Emery County, approximately three miles south of Castle Dale, Utah. After dewatering and treatment, Flue Gas De-sulfurization (FGD) waste, fly ash and bottom ash are disposed of in the CCR Landfill. As a result, it is considered a CCR unit. The following provides the status of the groundwater monitoring and corrective action program at the end of 2020.

- (i) The CCR Landfill was undergoing assessment monitoring at the start of 2020.
- (ii) The CCR Landfill remained in assessment monitoring at the end of 2020.
- (iii) Following completion of initial detection monitoring prior to October 17, 2017, statistically significant levels (SSLs) above site-specific background concentrations were noted for the following Appendix III constituents and monitoring wells.
- (A) Boron in ELF-11, ELF-4, ELF-5, ELF-6, ELF-8, calcium in ELF-8, chloride in ELF-11, ELF-5, ELF-6, ELF-7, fluoride in ELF-4, ELF-5, ELF-6, ELF-7, ELF-8, pH in ELF-4, ELF-5, ELF-6, ELF-7, and sulfate and TDS in ELF-3.
- (B) The CCR Landfill program transitioned to assessment monitoring on January 15, 2018.
- (iv) SSLs above groundwater protection standards were noted for Appendix IV constituents in 2020 as follows.
- (A) Spring cobalt in ELF-3, ELF-8, and ELF-11 and molybdenum in ELF-8; Fall cobalt in ELF-8 and ELF-11 and molybdenum in ELF-8.
- (B) An assessment of corrective measures was initiated on January 14, 2019.
- (C) A public meeting was held July 23, 2019.
- (D) The assessment of corrective measures was completed on June 11, 2019.
- (v) A remedy was selected on November 12, 2020.
- (vi) Remedial activities were initiated and continued through the end of 2020.

1.1 Summary of Previous Work

Detection monitoring was initiated in September of 2015 to ensure a minimum of eight independent measurements were acquired, prior to the October 17, 2017 requirement in the CCR Rule. PacifiCorp met this requirement and provided the findings of initial detection monitoring in the first Groundwater Monitoring and Corrective Action Report for the CCR Landfill (WET 2018).

The results of detection monitoring revealed all Appendix III constituents exceeded site-specific background concentrations. Based on these findings, the CCR Landfill monitoring program transitioned to assessment monitoring in 2018. Two rounds of sampling were completed in 2018, groundwater protection standards were established for the CCR Landfill, and assessment monitoring results were compared to these standards. These comparisons revealed Appendix IV



constituents: lithium and molybdenum exhibited SSLs above their groundwater protection standards.

Once Appendix IV constituents exhibited SSLs, an investigation to characterize the nature and extent of the release was initiated. An assessment of corrective measures began January 14, 2019 and was completed on June 11, 2019. A public meeting was held in Huntington, Utah on July 23, 2019 to discuss the proposed alternatives and solicit public input. Based on the public input, additional sampling and investigation was conducted to more fully delineate the nature and extent of impacts, and to support the assessment of corrective measures.

An inspection of the current condition and operation of the horizontal well capture system was inspected on August 20, 2019, November 12, 2019 and November 2020. Additional groundwater collected in 2019 and 2020 was used to further evaluate the effectiveness of the current system and evaluate the need for any further actions.

The nature and extent report was updated with the additional data from the investigations and placed in the plant operating record. The corrective measures report was reviewed and based on the additional data a remedy was selected and placed on the BHE webpage on November 12, 2020. The corrective measures sampling and analysis plan (SAP) was completed in concert with the remedy selection report and was also placed in the Plant operating record October 12, 2020.

1.2 Report Purpose and Organization

The following sections provide a status update for activities initiated or completed at the Hunter Power Plant CCR Landfill, during the 2020 monitoring period. They also summarize any issues or problems encountered, and their resolutions. Each required element of the annual report is displayed below and is referenced to specific sections of the report where the required information can be found:

- Document the status of the Groundwater Monitoring and Corrective Action Program (Section 1.0);
- Summarize key actions completed (Section 5.0);
- Describe any problems encountered (Section 7.0);
- Discuss actions taken to resolve problems (Section 7.0); and
- Define key activities for the upcoming year (Section 8.0).

The Annual Groundwater Monitoring and Corrective Action Report also includes the following required elements:

- A map showing the CCR unit and all CCR Monitoring Program background (or upgradient) and downgradient monitoring wells, and their identification numbers (Figure 1).
- Identifies any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken (Section 2.1 and 2.2).



- A summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required for detection or assessment monitoring (Section 3.0).
- A narrative discussion of any transition between monitoring programs (i.e. transitioning from detection monitoring to assessment monitoring) in addition to identifying constituents detected at a statistically significant increase over background levels (Section 3.1).
- Other information required to be included as specified in § 257.90 through § 257.98 of the *CCR Rule* not listed above, is also included in the report.

2.0 GROUNDWATER MONITORING NETWORK

The monitoring network wells for the CCR Landfill were installed using appropriate spacing, location and depth as defined by the Code of Federal Regulations, 40 CFR, Part 257 and 261, *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; CCR Rule* § 257.91 (a) (1) and § 257.91 (b) and adequately monitor groundwater both hydraulically upgradient and downgradient of the site.

The monitoring wells for the CCR Landfill utilized to conduct detection and assessment monitoring between 2015 and 2019 include four background wells and seven downgradient wells. The background wells include four locations spanning the extent of the CCR Landfill east to west, and include: ELF-1D, ELF-2, ELF-9, and ELF-10. The background well spacing and distribution were developed to comply with the requirements of the CCR Rule. Monitoring results from these locations indicate they are not being influenced by groundwater passing waste in the CCR unit, providing results representative of background concentrations for the site.

Downgradient monitoring wells for the CCR Landfill include seven locations placed to capture groundwater as it passes the waste unit boundary. Using historical data and knowledge of the site from ongoing state mandated groundwater monitoring, downgradient wells were placed along the groundwater flow path which generally travels from west to east as it passes across the CCR Landfill. The downgradient monitoring wells include the following: ELF-3, ELF-4, ELF-5, ELF-6, ELF-7, ELF-8, and ELF-11.

To support an evaluation of the nature and extent of past releases at the CCR Landfill, three new wells were installed in November of 2018 east and downgradient of the CCR Landfill at the Plant boundary. The three wells included: ELF-12, ELF-13, and ELF-14 (Figure 1). These wells were incorporated into the groundwater monitoring program in 2019 and continue to undergo semi-annual monitoring in accordance with the CCR Rule throughout remedy selection and implementation.

2.1 Monitoring Well Decommissioning & Replacement in 2020

No wells were replaced or decommissioned for the Hunter Landfill monitoring network in 2020.



2.2 Additions to the Monitoring Network in 2020

No new wells were added to the Hunter Landfill monitoring network in 2020.

3.0 GROUNDWATER MONITORING

The CCR Landfill was transitioned to assessment monitoring in 2018. Two rounds of sampling and analysis were completed each year in 2018, 2019 and 2020 to comply with the CCR Rule, and statistical analyses were completed comparing downgradient well results with groundwater protection standards. All of the samples underwent analysis in accordance with the requirements defined in the CCR Rule. In addition, water level and field data were acquired each time the wells were sampled, in accordance with the SAP.

Table 1 provides assessment monitoring data collected for the CCR Landfill. Attachments A and B contain field summary reports for the May and October 2020 sampling events. They consist of groundwater contour maps, data validation, statistical analyses, field data sheets, and laboratory data packages for each event.

3.1 Continuation - Assessment Monitoring

In accordance with the CCR Rule, the CCR Landfill remains in assessment monitoring while PacifiCorp prepares to implement corrective measures. To support ongoing monitoring, site-specific background (UTL) concentrations were combined with *EPA National Primary Drinking Water Standards* to create groundwater protection standards for the CCR Landfill. After updating the statistics to incorporate the 2020 monitoring data for upgradient wells, the higher of these values was adopted as the groundwater protection standard. These comparisons for the two 2020 monitoring events are provided in Tables 2 and 3.

Table 2 indicates cobalt (ELF-3, ELF-8, and ELF-11) and molybdenum (ELF-8) exhibited SSLs above their groundwater protection standards for the May 2020 event. Table 3 indicates cobalt (ELF-8 and ELF-11) and molybdenum (ELF-8) exhibited SSLs above their groundwater protection standards for the October 2020 event.

4.0 SELECTION OF REMEDY

The potential remedies for the CCR Landfill at the Hunter Power Plant were assessed in the Corrective Measures Assessment completed in 2019 utilizing the criteria in § 257.96 *Assessment of Corrective Measures*. A public meeting was conducted July 23, 2019 to present the findings of the Nature and Extent investigation and Corrective Measures Assessment. Public comments were solicited during the meeting and over the ensuing 30 days. Additional site characterization was conducted in 2019 to address the public concerns and to provide supplemental information to aid in selecting a remedy. The remedy for the CCR Landfill at the Plant was selected based on the criteria and evaluation factors in 40 CFR § 257.97 - *Selection of Remedy* and was posted to the Plant operating record on October 12, 2020.



The primary elements of the selected remedy is the capture of groundwater through operation of horizontal wells installed beneath the landfill to collect leachate and impacted groundwater.

The groundwater capture system at the CCR Landfill has operated since 2015 and has proven effective in reducing groundwater impacts and will remain in place. Existing groundwater monitoring data indicates the capture system has contained groundwater impacts to an area immediately downgradient of the waste unit boundary.

5.0 REMEDY IMPLEMENTATION

The horizontal well collection system at the Hunter CCR Landfill has been in operation since 2015 and has continued collection of leachate and impacted groundwater through 2020.

6.0 **PROBLEMS & RESOLUTIONS**

Monitoring wells ELF-1D (fall), ELF-5 (spring and fall), or ELF-6 (spring and fall) produced insufficient water to support sampling. As a result, neither has been used in developing groundwater contour maps or statistical analyses for the site in 2020. No other problems were noted during the 2020 monitoring period.

7.0 UPCOMING YEAR

During 2021, it is anticipated PacifiCorp will complete the following activities at the CCR Landfill:

Semi-Annual Monitoring

- Conduct the first semi-annual assessment monitoring event;
- Perform statistical analysis of data;
- Conduct the second semi-annual assessment monitoring event;
- Perform statistical analysis of data; and
- Develop the Annual Groundwater Monitoring and Corrective Action Report.

Corrective Measures

- Continue operating existing horizontal wells;
- Design and install monitoring wells in the ash to monitor effectiveness of system;
- Evaluate data to determine if additional corrective measures are appropriate;
- Implement corrective action groundwater monitoring plan; and
- Evaluate need for additional remedial activities.



8.0 **REFERENCES**

- EPA 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA-540-R-201 7-001, January 2017.
- EPA 2010. Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater from Monitoring Wells, EPASOP-GW 001, January 2010.
- EPA 1989. Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A), EPA/540/1-89/002, December 1989.
- WET, 2019. Corrective Measures Assessment, Hunter Power Plant, Castle Dale, Utah. June 2019.
- WET, 2017. Sampling and Analysis Plan & Well Documentation, CCR Landfill Hunter Power Plant, Castle Dale, Utah, Revision 1, October 2017.



FIGURES









TABLES

	. Hunter	Power Plant	- ASH Lah		sessment		oring		Appendix II										Apper	ndix IV						
										1																
SAMPLE ID	WELL TYPE	COLLECTION DATE	TOC AMSL (ft)	DTW (ft)	GWE AMSL (ft)) В	Ca	CI	F	рН	SO4	TDS	Sb	As	Ва	Ве	Cd	Cr	Co	Pb	Li	Hg	Мо	Se	ті	Radium 226+228
) mg/L (s.u C) mg/L (Q mg/L (Q mg/L (Q mg/L (Q mg/L	Q mg/L	Q mg/L	Q mg/L	Q mg/L C	Q mg/L	Q mg/L Q) mg/L Q	mg/L (Q mg/L Q	mg/L C	Q pCi/L Q
		9/18/2015	5669.55	84.43	5585.12	NS - Not en	0																			
		11/10/2015		NM	NM	NS - Not en																				
		12/1/2015		84.41 84.25	5585.14	NS - Not en NS - Not en																				
		1/12/2016 2/2/2016		84.25	5585.30 5585.41	NS - Not en																				
		3/9/2016		NM	NM	NS - Not en																				
		4/6/2016		83.45	5586.10	NS - Not en	-																			
515.45		5/4/2016		83.60	5585.95	NS - Not en																				
ELF-1D	Background	5/9/2017		82.60	5586.95	NS - Not en	nough w	/ater																		
		8/2/2017		82.35	5587.20	NS - Not en	nough w	/ater																		
		2/15/2018		98.82	5570.73	NA							<0.00200	<0.00200	0.0103	<0.00200	<0.000500	<0.00200	0.00542	<0.00200	2.12	<0.000150	0.0165	<0.00200	<0.00200	2.63
		5/30/2018		99.87		NS - Not en	-								- -							- <u>-</u>	r		-	
		5/8/2019		81.81	5587.74	2.23	377		<0.100	7.02	7730	26800	<0.00400	<0.00200	0.0085	<0.00200	<0.000500	0.0023	<0.00400	<0.00200		+ <0.0000900	0.0207	<0.00200	<0.00200	1.23
		8/20/2019		83.22	5586.33	2.19		J+ 6430	<0.200	7.27	8640	27000	<0.00400	<0.00200	0.0084	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	2.19	<0.0000900 UJ	0.0161	<0.00200	<0.00200	1.09
		5/13/2020		83.89	5585.66	2.10	353		<0.100	7.30	8940	28700	< 0.00400	<0.00200	0.0103	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	1.96	<0.000900	0.0153	<0.00200	<0.00200	2.20
		10/29/2020	5642.02	85.48	5584.07	NS - Not en	-		0.500	7.20	0450	44400	0.001	0.001	10.05	.0.001		0.001	0.00000	0.001.00	4.50		0.0000		0.0005	
		9/18/2015 11/10/2015	5612.02	20.20 20.65	5591.82 5591.37	3.31 3.27	419 419		0.500	7.30	8150 7870	11400 11300	<0.001 <0.002	<0.001 <0.002	<0.05 0.0092	<0.001 <0.002	<0.001 <0.0005	<0.001 <0.002	0.00600 <0.004	0.00100 <0.002	1.50 4.93	<0.0001 <0.00015	0.0030	0.60800	<0.0005 <0.002	2.30 0.80
		12/1/2015		20.03	5591.00	3.24	392		<0.1	7.22	8320	11500	<0.002	<0.002	0.0092	<0.002	< 0.0005	<0.002	0.00559	<0.002	3.97	<0.00015	0.0034	0.53000	<0.002	8.10 J+
		1/12/2016		21.02	5590.73	3.38	420		0.277	7.21	8180	12300	<0.002	<0.002	0.0128	<0.002	< 0.0005	<0.002	0.01140	<0.002	4.08	<0.00015	0.0038	0.49900	<0.002	1.99
		2/2/2016		21.23	5590.59	3.50	410		0.100		7350	12000	<0.002	<0.002	0.0207	<0.002	<0.0005	<0.002	0.001140	<0.002	3.93	<0.00015	0.0043	0.45000	<0.002	1.25
		3/9/2016		21.56	5590.46	3.48	395		<0.1	7.21	7190	11400	<0.002	<0.002	0.0119	<0.002	< 0.0005	<0.002	0.00767	<0.002	2.14	<0.00015	0.0039	0.45100	<0.002	2.87
		4/7/2016		21.67	5590.35	3.33	404		<0.1	7.16	8370	12400	< 0.002	<0.002	0.0091	<0.002	< 0.0005	0.0110	< 0.004	<0.002	1.34	< 0.00015	0.0051	0.46300	<0.002	0.94
		5/4/2016		21.69	5590.33	3.15	364		0.103	7.76	8040	11700	<0.002	<0.002	0.0095	< 0.002	<0.0005	<0.002	< 0.004	<0.002	1.45	<0.00015	0.0030	0.39800	<0.002	0.85
ELF-2	Background	9/8/2016		22.12	5589.90	3.25	428	446	0.299	7.30	7950	12300	<0.002	< 0.002	0.0085	<0.002	< 0.0005	<0.002	< 0.004	<0.002	3.50	<0.00015	0.0029	0.36600	< 0.002	0.61
		5/9/2017		22.21	5589.81	NS - Not en	nough w	/ater					· · ·	•		· ·		· ·	•					· ·		
		8/2/2017		22.14	5589.88	3.11	383	363	<0.100	7.42	7950	11600	<0.00200	<0.00200	0.0120	<0.00200	<0.000500	<0.00200	0.00565	<0.00200	1.54	<0.000150	0.0032	0.19800	<0.00200	1.37
		2/15/2018		22.30	5589.72	NA					.		<0.00200	<0.00200	0.0113	<0.00200	<0.000500	<0.00200	0.00677	<0.00200	1.61	<0.000150	0.0031	0.08790	<0.00200	2.29
		5/30/2018		22.24	5589.78	3.58	369		0.192		6030	12000	<0.00100	<0.00200	0.0100	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	1.75 J-		0.0026	0.07660	<0.00200	0.99
		5/8/2019		22.53	5589.49	3.77	430		0.310	7.17	6950	12200	<0.00400	<0.00200	0.0099	<0.00200	<0.000500	0.0024	<0.00400	<0.00200	1.76 J+		0.0031	0.03190	<0.00200	0.82
		8/20/2019		22.72	5589.30	3.53	414		<0.100	7.43	6780	12600	< 0.00400	<0.00200	0.0084	<0.00200	< 0.000500	< 0.00200	< 0.00400	< 0.00200	1.52	<0.0000900 UJ	0.0026	0.03400	< 0.00200	1.49
		5/13/2020		23.22	5588.80	3.38	398		<0.100	7.27	6830	12000	< 0.00400	<0.00200	0.0104	<0.00200	< 0.000500	<0.00200	0.00600	<0.00200	1.59	<0.000900	0.0028	0.00566	< 0.00200	2.17
		10/29/2020	FCC1 00	24.69	5587.33	3.18	356		<0.100	7.51	7900	12200	<0.00400	<0.00200	0.0097	<0.00200	<0.000500	<0.00200	0.00438	<0.00200	1.42	<0.0000900	<0.00200	0.00423	<0.00200	2.08
		9/18/2015 11/10/2015	5661.00	NM NM	NM NM	NS - Not en NS - Not en	-																			
		12/1/2015		NM	NM	NS - Not en	•																			
		1/12/2016		51.14	5609.86	NS - Not en	0																			
		2/2/2016		36.85	5624.15				0.276	7.86	6470	9420	<0.002	0.00499	0.0794	<0.002	<0.0005	0.0157	<0.004	0.00435	2.48	<0.00015	0.0983	0.00424	<0.002	1.14
		3/9/2016		23.63	5637.37	1.61	84.2	1 1	0.260	8.05	8030	11900	<0.002	0.00674	0.0411	< 0.002	<0.0005	0.0056	< 0.004	< 0.002	1.05	< 0.00015	0.1580	<0.002	<0.002	1.15
		4/7/2016		23.49	5637.51	1.35	112		<0.100	7.86	7080	10400	<0.002	0.00679	0.0946	< 0.002	<0.0005	0.0183	0.00498	0.00549	0.724	<0.00015	0.1290	<0.002	<0.002	2.60
		5/4/2016		23.47	5637.53	1.30	64.6	282	1.29	7.75	6850	10100	<0.002	0.00546	0.0323	<0.002	< 0.0005	0.0036	< 0.004	<0.002	1.03	<0.00015	0.1220	<0.002	<0.002	0.64
		9/8/2016		23.40	5637.60	1.36	57.2	352	1.65	8.03	6750	10600	<0.002	0.00524	0.0189	<0.002	<0.0005	<0.002	< 0.004	<0.002	1.60	<0.00015	0.1230	<0.002	<0.002	0.66
ELF-9	Background	5/9/2017		23.39	5637.61	NS - Not en	nough w	/ater																		
		8/2/2017		31.38	5629.62	1.32	91.9	+ + +			6900	12000	<0.00200	0.01140	0.1020	<0.00200	0.00053	0.0201	0.00520	0.00768	0.748	<0.000150	0.1410	<0.00200	<0.00200	1.84
		8/29/2017		22.01	5638.99	1.50	53.9		1.16	7.94	5830	10500	<0.00200	0.00622	0.0165	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	0.801	<0.000150	0.1060	<0.00200	<0.00200	2.23
		9/15/2017		23.32	5637.68	1.39	60.3	359	1.84	8.06	5600	11900	< 0.00200	0.00762	0.0348	<0.00200	<0.000500	0.0053	< 0.00400	< 0.00200	0.783	< 0.000150	0.1170	< 0.00200	<0.00200	1.92
		2/15/2018		22.81		NA	50.5			17.00		44000	<0.00200	0.0117	0.0767	<0.00200	< 0.000500	0.0137	< 0.00400	0.00489	0.74	<0.000150	0.1270	<0.00200	<0.00200	1.38
		5/30/2018		23.25	5637.75	1.57		J- 416	1.19		5460	11200	<0.00100	0.00824	0.0137	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	1.10 J-	- <0.000150 J-	0.1090	<0.00200	<0.00200	0.70
		5/8/2019		23.24 23.25	5637.76 5637.75	1.87 1.91	58.7	527 J+ 371	1.43 <0.200		5750 5930	10300 10700	<0.00400 <0.00400	0.0096	0.0126	<0.00200 <0.00200	<0.000500 <0.000500	<0.00200 <0.00200	<0.00400	<0.00200 <0.00200	0.759 J+ 0.888	+ <0.0000900 <0.0000900 UJ	0.1130 0.0679	<0.00200	<0.00200 <0.00200	1.34 1.50
		8/20/2019 5/13/2020		23.25	5637.75 5637.91	1.91	57.1				7280	9900	<0.00400	0.00663	0.0134	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	1.06	<0.0000900 01	0.0679	<0.00200		1.50
		10/29/2020		23.09	5637.91	1.49	48.9				6530	10900	<0.00400	0.00725	0.0128	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	0.873	<0.0000900	0.0768	<0.00200	<0.00200	1.36
		10/23/2020		23.14	00.100	1.2/	40.9	442	0.700	0.05	0220	10900	\0.00400	0.00076	0.0120	\0.00200	\U.UUU3UU	\U.UU2UU	\U.UU4UU	\0.00200	0.075	~0.0000900	0.0057	\0.00200	~0.00200	1.30

NS: Not Sampled

NM: Not Measured

GWE: Ground Water Elevation

DTW: Depth to Water

TOC: Top of Casing

AMSL: Above Mean Sea Level

Q: Data Validation Qualifier

J: Estimated

J+: Overestimated UJ: Estimated Non-Detect

									Appendix I	II									Apper	ndix IV						
SAMPLE ID		COLLECTION DATE	TOC AMSL (ft)	DTW (ft)	GWF AMSL (ft)	в	Ca	c	F	рH	SO₄	TDS	Sb	As	Ва	Ве	Cd	Cr	Co	Pb		Hg	Мо	Se	ті	Radium
5/1111 22 15		COLLECTION DATE	10074002 (10)	5100 (10)		5	- Cu			P	4			713	54		cu				-			50		226+228
								0							N	0	Q mg/L (0	0	N	0		Q mg/L			
		9/18/2015	5620.57	50.64	5569.93	NS - Not en			l mg/L	u s.u ju	l mg/L	ι mg/L C	l mg/L l	ι mg/L C	t mg/L	Q mg/L (L mg/L l	u mg/L	u mg/L lu	t mg/L	u mg/L u	mg/L 0	u mg/L	Q mg/L C	mg/L	
		11/10/2015	5620.57	43.09	5577.48	1.56	446	6790	<0.1	7.10	19900	37200	<0.002	0.00292	0.0501	<0.002	0.00056	0.0057	0.00788	0.00318	4.59	<0.00015	0.1150	0.41000	<0.002	0.70
		12/1/2015		44.21	5576.36	1.68	457	7530	3.98	7.21	20100	40300	<0.002	<0.00232	0.0329	<0.002	0.00051	<0.002	0.00550	< 0.002	3.49	<0.00015	0.1130	0.29000	<0.002	14.20 J+
		1/12/2016		46.50	5574.07	1.62	484				19800	40100	<0.002	< 0.002	0.0353	< 0.002	0.00058	<0.002	0.00493	< 0.002	3.60	< 0.00015	0.1240	0.15700	<0.002	1.14
		2/2/2016		46.09	5574.48	NS - Not en																1				
		3/9/2016		47.82	5572.75	NS - Not en	ough wa	ter																		
		4/7/2016		47.35	5573.22	1.54	479	7120	3.97		20700	38400	<0.002	0.00366	0.0519	<0.002	0.00060	0.0050	0.00444	0.00325	0.841	<0.00015	0.1180	0.14600	<0.002	2.66
		5/4/2016		48.73	5571.84	1.48	470	7530	3.87	8.37	19300	37800	<0.002	0.00929	0.0863	<0.002	0.00110	0.0164	0.00793	0.01200	1.12	<0.00015	0.1070	0.10500	<0.002	3.10
		9/8/2016		48.05	5572.52	NS - Not en	<u> </u>																			
ELF-10	Background	5/9/2017		45.41	5575.16	NS - Not en							1			-	-		_							
		8/2/2017		46.80	5573.77	1.64	509	7150	<0.100		17300	38600	<0.00200	<0.00200	0.0391	<0.00200	0.00056	0.0084	0.00411	0.00217	2.09	<0.000150	0.0871	0.00903		
		8/29/2017		48.10	5572.47	1.84	500	6960	<0.100	7.28	16800	38200	<0.00200	<0.00200	0.0205	<0.00200	<0.000500	0.0020	<0.00400	<0.00200	1.53	<0.000150	0.0855	0.00821	<0.00200	3.56
		9/15/2017		51.74	5568.83	1.6	445	5710	0.244	7.23	13100	39600	<0.00200	<0.00200	0.0601	<0.00200	< 0.000500	0.0065	< 0.00400	0.00311	2.20	<0.000150	0.0795	0.01050	< 0.00200	3.42
		2/15/2018		49.84	5570.73	NA					1 1 0 0 0 0		< 0.00200	<0.00200	0.0679	<0.00200	<0.000500	0.0052	0.00429	0.00252	1.88	<0.000150	0.0618	<0.00200	< 0.00200	2.30
		5/30/2018		50.89	5569.68	1.73		- 8790	<0.100			35300	<0.00100	<0.00200	0.0304	<0.00200	<0.000500	0.0024	< 0.00400	<0.00200	2.17 J-	< 0.000150	J- 0.0546	<0.00200	<0.00200	2.20
		5/8/2019 8/20/2019		48.77 51.64	5571.80 5568.93	2.12 NS - Not en	543		<0.100	6.88	10300	35200	<0.00400	<0.00200	0.0184	<0.00200	<0.000500	<0.00200	0.00558	<0.00200	1.76 J+	<0.000900	0.0516	<0.00200	<0.00200	2.47
		5/12/2020		49.21	5571.36	1.59	474		<0.100	6.85	9230	33600	<0.00400	<0.00200	0.0145	<0.00200	<0.000500	0.0030	0.00432	<0.00200	2.90	<0.0000900	0.0331	0.00234	<0.00200	2.41
		10/28/2020		50.42	5570.15	1.59	474	12100		7.79		32900	< 0.00400	<0.00200	0.0145	<0.00200	< 0.000500	0.0030	0.00432	<0.00200	2.90	<0.0000900	0.0331		<0.00200	
		9/18/2015	5604.78	34.37	5570.41	NS - Not en			<0.100	1.19	8010	32900	<0.00400	<0.00200	0.0155	<0.00200	<0.000300	0.0022	0.00421	<0.00200	2.10	<0.0000300	0.0341	<0.00200	<0.00200	1.10 0
		11/10/2015	5004.78	NM	NM	NS - Not en																				
		12/1/2015		34.40	5570.38	NS - Not en	<u> </u>																			
		1/12/2016		34.30	5570.48	NS - Not en	-																			
		2/2/2016		34.25	5570.53	NS - Not en	-																			
		3/9/2016		NM	NM	NS - Not en	ough wa	ter																		
		4/7/2016		34.30	5570.48	NS - Not en	ough wa	ter																		
		5/4/2016		NM	NM	NS - Not en	iough wa	ter																		
ELF-3	Downgradient	9/8/2016		34.02	5570.76	NS - Not en	iough wa	ter																		
		5/9/2017		33.43	5571.35	NS - Not en	<u> </u>																			
		8/2/2017		33.32	5571.46	1.01	492	609	<0.100	7.79	33000	47700	<0.00200	<0.00200	0.0150	<0.00200	<0.000500	<0.00200	0.00455	<0.00200	4.20	<0.000150	0.0320		<0.00200	
		2/15/2018		34.04	5570.74	NA							<0.00200	<0.00200	0.0118	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	2.67	<0.000150	0.0335	0.12500	<0.00200	2.22
		5/30/2018		34.80	5569.98	NS - Not en			T				1							T T					T	
		5/8/2019		31.75	5573.03	1.51	465	768	<0.100	7.52	27700	50700	< 0.00400	0.00205	0.0391	<0.00200	0.00078	0.0042	0.02140	0.00605		< 0.000900	0.0209	0.50200		3.61
		8/20/2019		30.30	5574.48	<5.00	431		<0.400	7.79	32000	50400	< 0.00400	<0.00200	0.0111	<0.00200	<0.000500	0.0025	< 0.00400	< 0.00200	2.81	<0.0000900 L	JJ 0.0187	0.61700	<0.00200	3.04
		5/13/2020		30.75	5574.03	1.08	455	840	<0.100	7.47	35100	49300	< 0.00400	<0.00200	0.0405	<0.00200	<0.000500	0.0022	0.01590	0.00491	3.16	<0.0000900	0.0172	0.52100	<0.00200	5.41
		10/28/2020	FF91 F0	30.89	5573.89	1.05	390	545	< 0.100	_	28800	48600	< 0.00400	<0.00200	0.0107	<0.00200	<0.000500	< 0.00200	<0.00400	<0.00200	3.61	<0.000900	0.0157	0.45000	<0.00200	1.32 U
		9/18/2015 11/10/2015	5581.50	15.03	5566.47 5566.53	4.66 4.93	526 486	2320 2040	0.300	7.20 6.94	5790 5350	10400 11200	<0.001 <0.002	<0.001 <0.002	<0.05 0.0116	<0.001 <0.002	<0.001 <0.0005	0.0020 J <0.002	+ 0.00800 0.00583	<0.001 <0.002	1.70 5.41	<0.0001 <0.00015	0.0010	0.00400 J- 0.00496	<pre><0.0005 <0.002</pre>	2.10
		11/10/2013					400	2040	4.40	0.94			<0.00Z	<0.00Z				-		<0.002	4.31	<0.00015	0.0026	0.00496	<0.002	11.59 J+
				14.97				2270	267	7 01	6240	11/00	<0.002	<0.002	0 0110	<0.002		<0.002	0 00501		4.51	<0.00013	0.0020	0.00480	1	1.39
		12/1/2015		15.12	5566.38	4.88	482	2370	3.67	7.01	6240 5900	11400	<0.002	<0.002	0.0118	<0.002	<0.0005	<0.002	0.00591	+ +			0.0030	0.00471	<0.002	1.55
		12/1/2015 1/12/2016		15.12 15.22	5566.38 5566.28	4.88 5.02	482 514	2500	3.93	7.52	5900	12400	<0.002	<0.002	0.0155	<0.002	<0.0005	<0.002	<0.004	<0.002	4.43	<0.00015	0.0030	0.00471	<0.002	3.60
		12/1/2015 1/12/2016 2/2/2016		15.12 15.22 15.25	5566.38 5566.28 5566.25	4.88 5.02 5.19	482 514 495	2500 2170	3.93 4.25	7.52 6.97	5900 5410	12400 11500	<0.002 <0.002	<0.002 <0.002	0.0155 0.0119	<0.002 <0.002	<0.0005 <0.0005	<0.002 <0.002	<0.004 0.00582	<0.002 <0.002	4.43 4.39	<0.00015 <0.00015	0.0025	0.00352	<0.002	3.60
		12/1/2015 1/12/2016 2/2/2016 3/9/2016		15.12 15.22 15.25 15.36	5566.38 5566.28 5566.25 5566.14	4.88 5.02 5.19 4.96	482 514 495 496	2500 2170 2240	3.93 4.25 4.06	7.52 6.97 7.03	5900 5410 5290	12400 11500 11200	<0.002 <0.002 <0.002	<0.002 <0.002 <0.002	0.0155 0.0119 0.0153	<0.002 <0.002 <0.002	<0.0005 <0.0005 <0.0005	<0.002 <0.002 <0.002	<0.004 0.00582 0.00729	<0.002 <0.002 <0.002	4.43 4.39 2.37	<0.00015 <0.00015 <0.00015	0.0025 0.0031	0.00352 0.00360	<0.002 <0.002	2.20
		12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016		15.12 15.22 15.25 15.36 15.38	5566.38 5566.28 5566.25 5566.14 5566.12	4.88 5.02 5.19 4.96 4.77	482 514 495 496 519	2500 2170 2240 2320	3.93 4.25 4.06 3.63	7.52 6.97 7.03 6.97	5900 5410 5290 6110	12400 11500 11200 11300	<0.002 <0.002 <0.002 <0.002	<0.002 <0.002 <0.002 <0.002	0.0155 0.0119 0.0153 0.0139	<0.002 <0.002 <0.002 <0.002	<0.0005 <0.0005 <0.0005 <0.0005	<0.002 <0.002 <0.002 <0.002	<0.004 0.00582 0.00729 0.00675	<0.002 <0.002 <0.002 <0.002	4.43 4.39 2.37 2.96	<0.00015 <0.00015 <0.00015 <0.00015	0.0025 0.0031 0.0026	0.00352 0.00360 0.00365	<0.002 <0.002 <0.002	2.20 0.62
ELF-4	Downgradient	12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016 5/4/2016		15.12 15.22 15.25 15.36	5566.38 5566.28 5566.25 5566.14	4.88 5.02 5.19 4.96	482 514 495 496 519 476	2500 2170 2240 2320 2280	3.93 4.25 4.06 3.63	7.52 6.97 7.03	5900 5410 5290	12400 11500 11200	<0.002 <0.002 <0.002	<0.002 <0.002 <0.002	0.0155 0.0119 0.0153	<0.002 <0.002 <0.002	<0.0005 <0.0005 <0.0005	<0.002 <0.002 <0.002	<0.004 0.00582 0.00729	<0.002 <0.002 <0.002	4.43 4.39 2.37	<0.00015 <0.00015 <0.00015	0.0025 0.0031	0.00352 0.00360	<0.002 <0.002	2.20
ELF-4	Downgradient	12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016 5/4/2016		15.12 15.22 15.25 15.36 15.38 14.41	5566.38 5566.28 5566.25 5566.14 5566.12 5567.09	4.88 5.02 5.19 4.96 4.77 4.42	482 514 495 496 519 476 ough wa	2500 2170 2240 2320 2280 ter	3.93 4.25 4.06 3.63	7.52 6.97 7.03 6.97	5900 5410 5290 6110	12400 11500 11200 11300	<0.002 <0.002 <0.002 <0.002	<0.002 <0.002 <0.002 <0.002	0.0155 0.0119 0.0153 0.0139	<0.002 <0.002 <0.002 <0.002	<0.0005 <0.0005 <0.0005 <0.0005	<0.002 <0.002 <0.002 <0.002	<0.004 0.00582 0.00729 0.00675	<0.002 <0.002 <0.002 <0.002	4.43 4.39 2.37 2.96	<0.00015 <0.00015 <0.00015 <0.00015	0.0025 0.0031 0.0026	0.00352 0.00360 0.00365	<0.002 <0.002 <0.002	2.20 0.62
ELF-4	Downgradient	12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016 5/4/2016 9/8/2016		15.12 15.22 15.25 15.36 15.38 14.41 NM	5566.38 5566.28 5566.25 5566.14 5566.12 5567.09 NM	4.88 5.02 5.19 4.96 4.77 4.42 NS - Not en	482 514 495 519 476 ough wa	2500 2170 2240 2320 2280 ter ter	3.93 4.25 4.06 3.63 <0.1	7.52 6.97 7.03 6.97 7.16	5900 5410 5290 6110	12400 11500 11200 11300 11600	<0.002 <0.002 <0.002 <0.002	<0.002 <0.002 <0.002 <0.002	0.0155 0.0119 0.0153 0.0139	<0.002 <0.002 <0.002 <0.002	<0.0005 <0.0005 <0.0005 <0.0005	<0.002 <0.002 <0.002 <0.002	<0.004 0.00582 0.00729 0.00675	<0.002 <0.002 <0.002 <0.002	4.43 4.39 2.37 2.96	<0.00015 <0.00015 <0.00015 <0.00015	0.0025 0.0031 0.0026	0.00352 0.00360 0.00365 0.00281	<0.002 <0.002 <0.002	2.20 0.62 1.98
ELF-4	Downgradient	12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016 5/4/2016 9/8/2016 5/9/2017		15.12 15.22 15.25 15.36 15.38 14.41 NM 16.05	5566.38 5566.28 5566.25 5566.14 5566.12 5567.09 NM 5565.45 5565.25	4.88 5.02 5.19 4.96 4.77 4.42 NS - Not en NS - Not en	482 514 495 519 476 ough wa	2500 2170 2240 2320 2280 ter ter	3.93 4.25 4.06 3.63 <0.1	7.52 6.97 7.03 6.97 7.16	5900 5410 5290 6110 6010	12400 11500 11200 11300 11600	<0.002 <0.002 <0.002 <0.002 <0.002	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002	0.0155 0.0119 0.0153 0.0139 0.0123	 <0.002 <0.002 <0.002 <0.002 <0.002 	<0.0005 <0.0005 <0.0005 <0.0005 <0.0005	<0.002 <0.002 <0.002 <0.002 <0.002	 <0.004 0.00582 0.00729 0.00675 0.00637 	<0.002 <0.002 <0.002 <0.002 <0.002	4.43 4.39 2.37 2.96 1.40	<0.00015 <0.00015 <0.00015 <0.00015 <0.00015	0.0025 0.0031 0.0026 0.0024	0.00352 0.00360 0.00365 0.00281	<0.002 <0.002 <0.002 <0.002	2.20 0.62 1.98 2.57
ELF-4	Downgradient	12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016 5/4/2016 9/8/2016 5/9/2017 8/2/2017		15.12 15.22 15.25 15.36 15.38 14.41 NM 16.05 16.25	5566.38 5566.28 5566.25 5566.14 5566.12 5567.09 NM 5565.45 5565.25	4.88 5.02 5.19 4.96 4.77 4.42 NS - Not en NS - Not en 4.35	482 514 495 519 519 476 ough wa 483 483	2500 2170 2240 2320 2280 ter ter 2240 J- 2200	3.93 4.25 4.06 3.63 <0.1	7.52 6.97 7.03 6.97 7.16	5900 5410 5290 6110 6010	12400 11500 11200 11300 11600	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002	0.0155 0.0119 0.0153 0.0139 0.0123 0.0123	 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 	<0.0005 <0.0005 <0.0005 <0.0005 <0.0005 <0.0005	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002	 <0.004 0.00582 0.00729 0.00675 0.00637 	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002	4.43 4.39 2.37 2.96 1.40 1.65	<0.00015 <0.00015 <0.00015 <0.00015 <0.00015 <0.000150 <0.000150	0.0025 0.0031 0.0026 0.0024	0.00352 0.00360 0.00365 0.00281 0.00255	<0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200	2.20 0.62 1.98 2.57 1.57
ELF-4	Downgradient	12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016 5/4/2016 9/8/2016 5/9/2017 8/2/2017 2/15/2018		15.12 15.22 15.25 15.36 15.38 14.41 NM 16.05 16.25 16.52	5566.38 5566.28 5566.25 5566.14 5566.12 5567.09 NM 5565.45 5565.25 5564.98	4.88 5.02 5.19 4.96 4.77 4.42 NS - Not en NS - Not en 4.35 NA	482 514 495 496 519 476 ough wa 483	2500 2170 2240 2320 2280 ter ter 2240 J- 2200	3.93 4.25 4.06 3.63 <0.1 	7.52 6.97 7.03 6.97 7.16 7.21	5900 5410 5290 6110 6010 5750	12400 11500 11200 11300 11600 11600	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200	0.0155 0.0119 0.0153 0.0139 0.0123 0.0123 0.0115 0.0115	 <0.002 <0.002 <0.002 <0.002 <0.002 <0.002 	<0.0005 <0.0005 <0.0005 <0.0005 <0.0005 <0.000500 <0.000500	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 0.0044	<0.004 0.00582 0.00729 0.00675 0.00637 	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200	4.43 4.39 2.37 2.96 1.40 	<0.00015 <0.00015 <0.00015 <0.00015 <0.00015 <0.000150 <0.000150	0.0025 0.0031 0.0026 0.0024 0.0027 0.0027 0.0026	0.00352 0.00360 0.00365 0.00281 0.00255 <0.00200	<0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200	2.20 0.62 1.98 2.57 1.57
ELF-4	Downgradient	12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016 5/4/2016 9/8/2016 5/9/2017 8/2/2017 2/15/2018 5/30/2018		15.12 15.22 15.25 15.36 15.38 14.41 NM 16.05 16.25 16.52 16.52	5566.38 5566.28 5566.25 5566.14 5566.12 5567.09 NM 5565.45 5565.25 5564.98 5564.97	4.88 5.02 5.19 4.96 4.77 4.42 NS - Not en 4.35 NA 4.88	482 514 495 519 519 476 ough wa 483 483	2500 2170 2240 2320 2280 ter 2280 ter J- 2200 1980	3.93 4.25 4.06 3.63 <0.1 <0.100	7.52 6.97 7.03 6.97 7.16 7.16 7.21 6.98 7.06 7.22	5900 5410 5290 6110 6010 5750 5290 4800 4890	12400 11500 11200 11300 11600 11600 11600 11700	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.0020 <0.00200 <0.00200	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200 <0.00200	0.0155 0.0119 0.0153 0.0139 0.0123 0.0123 0.0115 0.0141 0.0116	 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 	<0.0005 <0.0005 <0.0005 <0.0005 <0.0005 <0.000500 <0.000500 <0.000500 <0.000500	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 0.0044 <0.00200	<0.004 0.00582 0.00729 0.00675 0.00637 0.00637 0.00611 0.00833 0.00666	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.0020 <0.00200 <0.00200	4.43 4.39 2.37 2.96 1.40	<0.00015 <0.00015 <0.00015 <0.00015 <0.00015 <0.000150 <0.000150 <0.000150	0.0025 0.0031 0.0026 0.0024 0.0027 0.0027 0.0026 I- 0.0028	0.00352 0.00360 0.00365 0.00281 	<0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200 <0.00200	2.20 0.62 1.98 2.57 1.57 1.81 1.72 2.73
ELF-4	Downgradient	12/1/2015 1/12/2016 2/2/2016 3/9/2016 4/6/2016 5/4/2016 9/8/2016 5/9/2017 8/2/2017 2/15/2018 5/30/2018 5/8/2019		15.12 15.22 15.25 15.36 15.38 14.41 NM 16.05 16.25 16.52 16.53 16.49	5566.38 5566.28 5566.25 5566.14 5566.12 5567.09 NM 5565.45 5565.25 5564.98 5564.97 5565.01	4.88 5.02 5.19 4.96 4.77 4.42 NS - Not en 4.35 NA 4.88 5.00	482 514 495 519 476 ough wa ough wa 483 483 485 515	2500 2170 2240 2320 2280 ter 2280 ter J- 2200 1980	3.93 4.25 4.06 3.63 <0.1 <0.100 0.339 0.187 0.941 <0.100	7.52 6.97 7.03 6.97 7.16 7.16 7.21 6.98 7.06 7.22	5900 5410 5290 6110 6010 5750 5750 5290 4800 4890 6260	12400 11500 11200 11300 11600 11600 11600 11700 11800	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.0020 <0.00200 <0.00100 <0.00400	<0.002 <0.002 <0.002 <0.002 <0.002 <0.0020 <0.00200 <0.00200 <0.00200	0.0155 0.0119 0.0153 0.0139 0.0123 0.0115 0.0115 0.0141 0.0116 0.0118	 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200 <0.00200 <0.00200 <0.00200 <0.00200 	<0.0005 <0.0005 <0.0005 <0.0005 <0.0005 <0.000500 <0.000500 <0.000500	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 0.0044 <0.00200 <0.00200	 <0.004 0.00582 0.00729 0.00675 0.00637 	<0.002 <0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200 <0.00200 <0.00200	4.43 4.39 2.37 2.96 1.40 	<0.00015 <0.00015 <0.00015 <0.00015 <0.000150 <0.000150 <0.000150 <0.000150	0.0025 0.0031 0.0026 0.0024 0.0027 0.0027 0.0026 0-0.0028 0.0027	0.00352 0.00360 0.00365 0.00281 0.00255 <0.00200 <0.00200	<0.002 <0.002 <0.002 <0.002 <0.002 <0.00200 <0.00200 <0.00200 <0.00200 <0.00200 <0.00200	2.20 0.62 1.98 2.57 1.57 1.81 1.72 2.73 2.00

NS: Not Sampled

NM: Not Measured

GWE: Ground Water Elevation

DTW: Depth to Water

TOC: Top of Casing

AMSL: Above Mean Sea Level

Q: Data Validation Qualifier

J: Estimated

J+: Overestimated

UJ: Estimated Non-Detect

					Ι						Appendix IV															
SAMPLE ID	WELL TYPE	COLLECTION DATE	TOC AMSL (ft)	DTW (ft)	GWE AMSL (ft)	в	Ca	ci	F	pH	SO4	TDS	Sb	As	Ва	Ве	Cd	Cr	Co	Pb	Li	Hg	Мо	Se	т	Radium
			. ,	. ,							~															226+228
						mg/L Q	mg/l	Q mg/L	0 mg/l	0 511 0			mg/L C) mg/L	Q mg/L	Q mg/L	Q mg/L	Q mg/L (Q mg/L C	mg/L (Q mg/L Q	mg/L C	mg/L C) mg/L Q	mg/L	Q pCi/L Q
		9/18/2015	5577.79	16.61	5561.18	5.44	464	4250	0.40	7.20	11200	21000	<0.001	<0.001	<0.05	< 0.001	<0.001	0.0040	<0.005	<0.001	3.70	<0.0001	0.0020	0.05200 J+	< 0.0005	3.20
		11/10/2015		16.20	5561.59	5.89	499	4110	<0.1	6.98	11100	22600	< 0.002	< 0.002	0.0131	< 0.002	< 0.0005	<0.002	< 0.004	<0.002	13.7	< 0.00015	0.0045	0.04530	< 0.002	1.70
		12/2/2015		16.74	5561.05	5.53	480	4150	3.49	6.99	11200	21000	<0.002	< 0.002	0.0097	< 0.002	<0.0005	<0.002	<0.004	< 0.002	9.96	<0.00015	0.0044	0.03760	< 0.002	10.36 J+
		1/12/2016		16.85	5560.94	6.20	503	4210	4.85	7.26	11100	21300	<0.002	<0.002	0.0112	< 0.002	< 0.0005	<0.002	0.00402	<0.002	11.7	<0.00015	0.0045	0.03640	<0.002	1.56
		2/2/2016		16.52	5561.27	6.10	481	3750	3.96	7.04	9890	21000	<0.002	<0.002	0.0097	<0.002	<0.0005	<0.002	<0.004	<0.002	10.6	<0.00015	0.0046	0.03250	<0.002	1.61
		3/9/2016		16.47	5561.32	6.55	492	4170	4.62	7.05	10300	22300	<0.002	<0.002	0.0123	<0.002	<0.0005	<0.002	0.00413	<0.002	5.83	<0.00015	0.0050	0.02970	<0.002	2.89
		4/6/2016		16.31	5561.48	5.35	476	3700	3.53	7.10	11200	19200	<0.002	<0.002	0.0179	<0.002	<0.0005	0.0022	0.00457	<0.002	3.10	<0.00015	0.0045	0.03370	<0.002	3.70
		5/4/2016		15.35	5562.44	5.99	465	3900	<0.1	7.19	10700	21100	<0.002	< 0.002	0.0151	< 0.002	<0.0005	<0.002	0.00424	<0.002	5.68	<0.00015	0.0044	0.03060	< 0.002	1.75
ELF-5	Downgradient			17.30	5560.49	6.03	491	3980	<0.1	7.03	10300	20600	<0.002	<0.002	0.0170	<0.002	<0.0005	0.0023	0.00409	<0.002	8.64	<0.00015	0.0042	0.03970	<0.002	2.02
		5/9/2017 8/2/2017		17.13 NM	5560.66 NM	NS - Not er NS - Not er																				
		2/15/2018		18.00	5559.79	NA	nough wa	lei					<0.00200	<0.00200	0.0103	<0.00200	<0.000500	<0.00200	<0.00400	<0.00200	4.35	<0.000150	0.0046	0.01810	<0.00200	1.81
		5/30/2018		17.98	5559.81	7.61	459	J- 4420	0.104	7.04	11100	27800	<0.00100	<0.00200	0.0105	<0.00200		<0.00200	0.00430	<0.00200	6.85 J-		0.0050	0.02500	<0.00200	2.37
		5/8/2019		18.58	5559.21	6.06	489	3180	0.104	7.09	8640	21600	<0.00400	<0.00200	0.0138	<0.00200		<0.00200	0.01020	<0.00200		<0.0000900	0.0049	0.00913	<0.00200	2.85
		8/20/2019		18.69	5559.10	8.7		J+ 4440		7.23	12300	24000	< 0.00400	0.00212	0.0267	< 0.00200		0.0044	0.00618	0.00246	5.93	<0.0000900 U	J 0.0072	0.01270	< 0.00200	2.77
		5/13/2020		17.74	5560.05	NS - Not er								<u> </u>			- I					•	· ·			
		10/28/2020		18.75	5559.04	NS - Not er	nough wa	ter																		
		9/18/2015	5579.61	15.97	5563.64	14.3	531	5650	0.60	7.20	9470	22100	<0.001	<0.002	<0.05	<0.001	< 0.001	0.0010 J	+ 0.02700	<0.001	5.80	<0.0001	<0.001	0.28400	<0.0005	4.70
		11/10/2015 16.02 5563.59 12/1/2015 16.09 5563.52				16.0	518	4670	<0.10	6.78	9130	19500	<0.002	<0.002	0.0102	<0.002	<0.0005	<0.002	0.02260	<0.002	18.7	<0.00015	<0.002	0.07970	<0.002	1.40
						14.4	454	4850	4.03	7.03	10300	19500	<0.002	<0.002	0.0094	<0.002	<0.0005	<0.002	0.02080	<0.002	14.6	<0.00015	<0.002	0.08870	<0.002	33.62 J+
		1/12/2016		16.20	5563.41	14.6	505	NA	NA	NA	NA	NA	<0.002	<0.002	0.0105	<0.002	<0.0005	<0.002	0.02080	<0.002	15.1	<0.00015	<0.002	0.08920	<0.002	1.68
		2/2/2016		16.29	5563.32	13.6	493	4060	5.13	6.94	8800	20100	<0.002	< 0.002	0.0093	< 0.002	< 0.0005	< 0.002	0.01910	< 0.002	14.2	<0.00015	<0.002	0.08280	< 0.002	2.26
		3/9/2016 4/6/2016		16.26 16.30	5563.35 5563.31	15.7 13.3	500 491	1190 4890	5.07 4.87	6.90 7.04	930	20800 20200	<0.002 <0.002	<0.002 <0.002	0.0109	<0.002 <0.002	<0.0005 <0.0005	<0.002 <0.002	0.02060	<0.002 <0.002	7.20	<0.00015 <0.00015	<0.002 <0.002	0.09590	<0.002 <0.002	2.70
		5/4/2016		16.30	5563.49	13.3	491	4890	<0.1	7.40	9910 8400	19600	<0.002	<0.002	0.0089	< 0.002	< 0.0005	<0.002	0.01780	<0.002	7.92	<0.00015	<0.002	0.09510	<0.002	1.93
ELF-6	Downgradient			10.12 NM	NM	NS - Not er			\U.1	7.40	0400	13000	NU.002	NU.002	0.0115	NO.002	<0.0005	<0.002	0.01800	NU.002	7.52	<0.00015	N0.002	0.05170	NU.002	1.55
		5/9/2017		16.52	5563.09	NS - Not er																				
		8/2/2017		NM	NM	NS - Not er																				
		2/15/2018		16.30	5563.31	NA							<0.00200	< 0.00200	0.0099	< 0.00200	<0.000500	<0.00200	0.01470	< 0.00200	5.50	<0.000150	0.0024	0.09240	< 0.00200	1.76
		5/30/2018		17.87	5561.74	NS - Not er		ter																		
		5/8/2019		17.62	5561.99	12.4	539	3810	0.139	7.06	7840	23700	<0.00400	<0.00200	0.0159	<0.00200	<0.000500	<0.00200	0.03580	<0.00200	5.56 J+	<0.0000900	<0.00200	0.00795	<0.00200	5.23
		8/20/2019		18.25	5561.36	NS - Not er																				
		5/13/2020		NM	NM	NS - Not er																				
		10/28/2020	5570.04	NM 12.24	NM	NS - Not er	5		0.40	7 4 0	0720	15200	10.001	10.001	10.05	10.001	10.001	10,001	10.005	10.001	2.00	10.0001	10.001	0.455.00	10,0005	2.00
		9/18/2015 11/10/2015	5579.81	13.24 13.42	5566.57 5566.39	1.72 1.86	496 480	2800 2600	0.40	7.10 6.93	8720 8650	15300 19200	<0.001 <0.002	<0.001 <0.002	<0.05 0.0101	<0.001 <0.002	<0.001 <0.0005	<0.001 <0.002	<0.005 0.00529	<0.001 <0.002	2.00	<0.0001 <0.00015	<0.001 0.0024	0.45500	<0.0005 <0.002	3.00
		12/1/2015		13.42	5566.21	1.80	480	2000	3.12	6.99	9050	16800	<0.002	<0.002	0.0101	<0.002	< 0.0005	<0.002	0.00508	<0.002	5.41	<0.00015	0.0024	0.39200	<0.002	9.80 J+
		1/12/2016		13.68	5566.13	1.79	480	2910	4.36	7.11	9140	14900	<0.002	<0.002	0.0112	<0.002	<0.0005	<0.002	0.00604	<0.002	5.67	<0.00015	0.0026	0.40000	<0.002	1.27
		2/2/2016		13.67	5566.14	1.81	469	2660				17100	< 0.002	< 0.002	0.0100	< 0.002	< 0.0005	<0.002	0.00428	<0.002	5.35	<0.00015	1	0.37300	< 0.002	3.84
		3/9/2016		13.77	5566.04	1.79	443	2710	3.37			16800	<0.002	< 0.002	0.0120	<0.002	<0.0005	<0.002	0.00668	< 0.002	2.73	<0.00015	0.0030	0.38300	< 0.002	2.90
		4/6/2016		13.76	5566.05	1.70	485	2850	3.19			16500	<0.002	<0.002	0.0093	< 0.002	0.00050	<0.002	0.00447	<0.002	2.64	<0.00015	0.0023	0.42100	< 0.002	1.39
		5/4/2016		13.87	5565.94	1.58	445	2650			8680	16900	<0.002	<0.002	0.0098	<0.002	<0.0005	<0.002	0.00483	<0.002	0.639	<0.00015	0.0021	0.36000	<0.002	1.64
ELF-7	Downgradient			14.12	5565.69	1.84		2660	<0.1	7.07	8640	18100	<0.002	<0.002	0.0096	<0.002	<0.0005	<0.002	0.00498	<0.002	4.59	<0.00015	0.0024	0.36000	<0.002	2.34
		5/9/2017		16.27		NS - Not er				1	1	1		1				1		[1	1	
		8/2/2017		14.37	5565.44	1.72	476	2480	<0.100	7.13	8680	17800	<0.00200	<0.00200	0.0124	<0.00200		<0.00200		< 0.00200	2.12	<0.000150	0.0025	0.25300	<0.00200	
		2/15/2018		14.71		NA 1.8C	444	1 2500	0.220		0400	17200	<0.00200	<0.00200	0.0107	<0.00200		<0.00200	0.00613	<0.00200	2.13	<0.000150	0.0025	0.17500	<0.00200	
		5/30/2018		14.25 14.86	5565.56 5564.95	1.86	444	J- 2590 2710	0.329	6.99	8460 8260	17200 17200	<0.00100 <0.00400	<0.00200 <0.00200	0.0088	<0.00200 <0.00200		<0.00200 <0.00200	<0.00400 0.00530	<0.00200 <0.00200	2.49 J-	<0.000150 J- <0.0000900	0.0025	0.13600	<0.00200	1.63 2.26
		5/8/2019 8/20/2019		14.86	5564.95	1.86 2.24		J+ 2720	0.132 3.88	7.03		17200	<0.00400	<0.00200	0.0095	<0.00200		<0.00200	<0.00530	<0.00200	2.23 J+ 2.23	<0.0000900 U	0.0023 I 0.0027	0.06620	<0.00200 <0.00200	
		5/13/2020		15.80	5564.01	1.84	542	3160	< 0.100	6.73	10200	18700	< 0.00400	< 0.00200	0.0100	< 0.00200	< 0.000500	< 0.00200	< 0.00400	< 0.00200	2.73	< 0.0000900	0.0037	0.02050	< 0.00200	1.73

NS: Not Sampled

NM: Not Measured

GWE: Ground Water Elevation

DTW: Depth to Water

TOC: Top of Casing

AMSL: Above Mean Sea Level

Q: Data Validation Qualifier

J: Estimated

J+: Overestimated

UJ: Estimated Non-Detect

		Power Plant							Appendix II	I									Apper	ndix IV						
SAMPLE ID	WELL TYPE	COLLECTION DATE	TOC AMSL (ft)	DTW (ft)	GWE AMSL (ft)	В	Ca	CI	F	рН	SO4	TDS	Sb	As	Ва	Ве	Cd	Cr	Co	Pb	Li	Hg	Мо	Se	ті	Radium 226+228
						mg/L Q	mg/L	Q mg/L C	2 mg/L (Q s.u	Q mg/L (Q mg/L	Q mg/L () mg/L C) mg/L (Q mg/L (Q mg/L	Q mg/L C	mg/L C	Q mg/L C	Q mg/L (Q mg/L Q	mg/L Q	mg/L (2 mg/L (Q pCi/L Q
		9/18/2015	5584.50	8.37	5576.13	26.6	628	2320	1.40	7.60	3120	7430	< 0.001	0.002	0.0700	< 0.001	0.01000	0.0130	0.19600	0.01200	3.50	<0.0001	0.4370	< 0.004	< 0.002	3.60
		11/10/2015		8.15	5576.35	30.4	577	2160	<0.1	7.30	3140	7690	<0.002	<0.002	0.0163	<0.002	0.00073	<0.002	0.14700		10.7	<0.00015	0.5220	<0.002	<0.002	2.20
	_	12/1/2015		8.29	5576.21	30.2	586	2370	0.874	7.52	3410	8070	<0.002	<0.002	0.0275	<0.002	0.00090	0.0035	0.15000		8.59	<0.00015	0.4880	<0.002	<0.002	18.90 J+
	_	1/12/2016		8.32	5576.18	29.7	623	2380 J-	+ 1.04	7.62	3130	8340	<0.002	<0.002	0.0218	<0.002	0.00099	0.0022	0.20000	0.00473	9.43	<0.00015	0.4590	<0.002	<0.002	1.80
	-	2/2/2016		8.14	5576.36	27.2	579	2180	<0.100	7.47	2970	7860	< 0.002	<0.002	0.0140	<0.002	<0.0005	<0.002	0.01430	<0.002	8.79	<0.00015	0.0173	0.00716	<0.002	1.98
	-	3/9/2016		8.26	5576.24	26.6	590	2240	0.837	7.48	2950	7580	< 0.002	0.00299	0.0533	< 0.002	0.00113	0.0089	0.20200		5.09	<0.00015	0.4330	< 0.002	< 0.002	3.70
	-	4/6/2016		8.40	5576.10	25.4	609	2300	<0.100	7.46	3390	7440	< 0.002	< 0.002	0.0244	< 0.002	0.00114	0.0029	0.16600	0.00545	<0.1	< 0.00015	0.4810	<0.002	< 0.002	2.60
FIF 0	Deumanadianat	5/4/2016		8.45	5576.05	25.4	588	2190	0.946	7.61	3170	7900	<0.002	0.00224	0.0507	< 0.002	0.00105	0.0097	0.17200	0.00657	4.40	< 0.00015	0.4310	<0.002	<0.002	2.40
ELF-8	Downgradient	9/8/2016		8.66 8.60	5575.84	27.4 NS - Not en	595	2350	1.33	7.53	3280	8010	<0.002	<0.002	0.0120	<0.002	0.00170	<0.002	0.14500	0.00628	7.77	<0.00015	0.4710	<0.002	<0.002	2.10
	-	5/9/2017 8/2/2017		8.79	5575.90 5575.71	31.6			1.69	7 5 4	2260	8420	<0.00200	<0.00200	0.0212	<0.00200	0.00294	0.0023	0.16100	0.01260	3.54	<0.000150	0.4780	<0.00200	<0.00200	1.07
	-	2/15/2018		8.56	5575.94	NA	025	2110	1.09	7.54	5200	6420	<0.00200	<0.00200	0.0212	<0.00200	0.00294	<0.0023	0.18100	0.01280	3.68	<0.000150	0.4780	<0.00200	<0.00200	1.24
	-	5/30/2018		8.81	5575.69	28.7	537	J- 1940	0.975	7.47	2820	7920	<0.00100	<0.00200	0.0130	<0.00200	0.00199	<0.00200	0.13700	0.00737	3.95 J	J- <0.000150 J-	0.4410	<0.00200	<0.00200	1.98
	-	5/8/2019		8.49	5576.01	29.8	606	2100	1.13	7.49	2980	9400	< 0.00100	<0.00200	0.0110	<0.00200	0.00195	<0.00200	0.20100	0.00643	4.03 J	+ <0.000900	0.3990	<0.00200	<0.00200	2.25
	-	8/20/2019		9.17	5575.33	30.2	566		<0.100	7.41		8240	< 0.00400	<0.00200	0.0124	<0.00200	0.00174	< 0.00200	0.19000		3.42	<0.0000900 UJ		<0.00200	<0.00200	2.15
		5/13/2020		8.94	5575.56	31.8	635	2250	0.885	7.51	3540	8340	< 0.00400	< 0.00200	0.0111	< 0.00200	0.00162	<0.00200	0.20700		3.85	<0.0000900	0.3900	< 0.00200	<0.00200	1.65
	-	10/28/2020		10.52	42254.48	27.6	527	1910	0.957		J 3220	8380	< 0.00400	< 0.00200	0.0115	< 0.00200	0.00159	<0.00200	0.19800	0.00786	3.20	< 0.0000900	0.4300	< 0.00200	<0.00200	2.11
		9/18/2015	5597.32	28.03	5569.29	14.4	432	1230	0.500	7.50	10200	14300	< 0.001	< 0.001	<0.05	< 0.001	< 0.001	< 0.001	0.01700	< 0.001	3.20	< 0.0001	0.0160	0.00700	< 0.0005	1.20
		11/10/2015		28.09	5569.23	16.3	419	1180	<0.1	7.40	9890	15200	<0.002	<0.002	0.0203	<0.002	< 0.0005	<0.002	0.01510	<0.002	10.2	<0.00015	0.0253	0.00644	< 0.002	1.20
		12/1/2015		28.45	5568.87	17.0	410	1290	<0.1	7.39	10900	17600	<0.002	<0.002	0.0189	<0.002	< 0.0005	<0.002	0.01530	<0.002	8.58	<0.00015	0.0210	0.00753	<0.002	31.52 J+
		1/12/2016		28.42	5568.90	NS - Not en	ough wa	iter																		
		2/2/2016		28.38	5568.94	16.3	414	952	<0.100	7.24		15600	<0.002		0.0139	<0.002	<0.0005	<0.002	0.01430		8.49	<0.00015		0.00739		2.12
	_	3/9/2016		28.46	5568.86	18.1	413	4290	<0.100	7.32	9020	15700	<0.002	<0.002	0.0224	<0.002	<0.0005	<0.002	0.01310	<0.002	4.33	<0.00015	0.0241	0.00545	<0.002	3.23
	-	4/6/2016		28.41	5568.91	15.2	412	1230	<0.100	7.28	11100	15800	< 0.002	<0.002	0.0191	<0.002	<0.0005	<0.002	0.01470	<0.002	3.29	<0.00015	0.0214	0.00700	<0.002	1.24
		5/4/2016		28.31	5569.01	14.9	399	1170	<0.100	8.01	10000	15700	< 0.002	< 0.002	0.0245	< 0.002	< 0.0005	<0.002	0.01400		4.31	<0.00015	0.0205	0.00666	< 0.002	2.78
ELF-11	Downgradient	9/8/2016		28.20	5569.12	17.3	434	1180	<0.100	7.24	10000	16200	<0.002	<0.002	0.0163	<0.002	<0.0005	<0.002	0.01260	<0.002	6.44	<0.00015	0.0201	0.00885	<0.002	0.95
	-	5/9/2017 8/2/2017		28.13 28.36	5569.19	NS - Not en																				
	-	2/15/2018		28.36	5568.96 5569.12	NS - Not en NA	ough wa	iter					<0.00200	<0.00200	0.0193	<0.00200	<0.000500	<0.00200	0.01540	<0.00200	3.43	<0.000150	0.0220	0.05560	<0.00200	2.03
	-	5/30/2018		28.19	5569.12	18.8	406	J- 993	0.136	7.23	8780	16700	<0.00200	<0.00200	0.0193	<0.00200	< 0.000500	<0.00200	0.01340	<0.00200	3.99 J		0.0220	0.03360	<0.00200	1.83
	-	5/8/2019		28.10	5569.22	17.8	436	1100	0.130	7.23	9980	16800	< 0.00100	<0.00200	0.0103	<0.00200	<0.000500	<0.00200	0.01460		3.49 J	+ <0.000900	0.0183	0.06490	<0.00200	1.88
	-	8/20/2019		28.31	5569.01	17.8	442		<0.100	8.02		17000	<0.00400	<0.00200	0.0142	<0.00200	<0.000500	<0.00200	0.01510		3.36	<0.0000900 UJ	0.0186	0.06270	<0.00200	2.48
	-	5/12/2020		28.11	5569.21	16.1	420	1000	<0.100	7.25		18500	< 0.00400	<0.00200	0.0131	<0.00200	<0.000500	<0.00200	0.01980		3.44	<0.0000900	0.0200	0.06630	<0.00200	2.67
		10/28/2020		30.28	5567.04	15.6	384	1040	<0.100		J 10800	17800	<0.00400	< 0.00200	0.0108	< 0.00200	<0.000500	<0.00200	0.01970		3.15	<0.000900	0.0183	0.06690	<0.00200	2.75 U
		11/2/2018	5569.99	19.35	5550.64	1.36 J+	225	J- 732	0.262	7.65	11400	21700	< 0.00400	<0.00200	0.0207	< 0.00200	< 0.000500	<0.00200	< 0.00400	< 0.00200	0.820	<0.000150	<0.00200	<0.00200	<0.00200	4.80
		5/8/2019		19.59	5550.40	1.68	182	500	0.341	7.55	12200	20100	< 0.00400	<0.00200	0.0192	< 0.00200	< 0.000500	<0.00200	< 0.00400	< 0.00200	0.839 J	+ <0.0000900	< 0.00200	<0.00200	<0.00200	2.25
ELF-12	Downgradient	8/20/2019		NM	NM	1.68	169	J+ 428	<0.100	7.73	11400	19900	<0.00400	<0.00200	0.0165	< 0.00200	< 0.000500	<0.00200	< 0.00400	<0.00200	0.792	<0.0000900 UJ	<0.00200	<0.00200	<0.00200	2.83
		5/12/2020		20.15	5549.84	1.32	151	414	0.896	7.53	11200	19200	<0.00400	<0.00200	0.0099	< 0.00200	< 0.000500	< 0.00200	< 0.00400	< 0.00200	0.937	<0.0000900	<0.00200	<0.00200	<0.00200	3.12
		10/28/2020		20.48	5549.51	1.31	139	392	<0.100		J 11900	18600	<0.00400	<0.00200	0.0101	< 0.00200	<0.000500	<0.00200	<0.00400	<0.00200	0.738	<0.0000900	<0.00200	<0.00200	<0.00200	2.42 U
		11/2/2018	5559.43	3.82	5555.61	0.664 J+	471		<0.100	7.24		17900	<0.00400	<0.00200	0.0573	<0.00200	<0.000500	<0.00200	0.00471	<0.00200	1.72	<0.000150	<0.00200	<0.00200	<0.00200	2.26
		5/8/2019		3.10	5556.33	0.703	481	2730	<0.100	7.03		16700	<0.00400	<0.00200	0.0111	<0.00200	<0.000500	<0.00200	<0.00400	1	2.06 J	+ <0.0000900	<0.00200	<0.00200	<0.00200	1.58
ELF-13	Downgradient	8/20/2019		NM	NM	0.732	461		0.798		7370	17300	< 0.00400	<0.00200	0.0110	<0.00200	<0.000500		0.00407		1.86		< 0.00200	<0.00200	<0.00200	2.07
	-	5/12/2020		3.52	5555.91	0.536	449	2770	<0.100			17000		<0.00200	0.0097	<0.00200	<0.000500		< 0.00400	1	1.82	<0.0000900	<0.00200	<0.00200	<0.00200	2.49
		10/28/2020	FF (0.01	4.63	5554.80	0.609	411	2720	<0.100		J 8870	16800	< 0.00400	< 0.00200	0.0100	<0.00200	<0.000500	<0.00200	0.00421		1.74	<0.0000900	<0.00200	<0.00200	<0.00200	2.32
	-	11/2/2018	5560.91	6.30	5554.61	3.0 J+	532		0.173		7450	20500	<0.00400	<0.00200	0.0464	<0.00200	<0.000500		0.01310		4.01	<0.000150	<0.00520	0.00401	<0.00200	1.60
	Downgradiaut	5/8/2019		6.07	5554.84	2.4	534	5070	<0.100		7280	19700	<0.00400	<0.00200	0.0327	<0.00200	<0.000500	0.0089	0.00976			+ <0.0000900	0.0039	0.00512	<0.00200	2.58
ELF-14	Downgradient	8/20/2019		NM	NM	3.09	496		0.589		7280 8220	19800	<0.00400	<0.00200	0.0137	<0.00200	<0.000500	<0.00200	0.00912	<0.00200	4.58	<0.0000900 UJ	0.0043	0.00664	<0.00200	2.69
	-	5/12/2020		6.48	5554.43	2.32	486	4160	<0.100 <0.100		8220 J 8730	19400 18800	<0.00400 <0.00400	<0.00200 <0.00200	0.0102 0.0129	<0.00200 <0.00200	<0.000500		0.00728		4.12 4.15	<0.0000900 <0.0000900	0.0039 0.0040	0.00296	<0.00200	2.22
		10/28/2020		6.00	5554.91	2.79	443	3880	<0.100	1.67	1 8/3U	18800	<0.00400	<0.00200	0.0129	<0.00200	< 0.000500	<0.00200	0.00841	<0.00200	4.15	<0.000900	0.0040	0.00573	<0.00200	2.12

NS: Not Sampled

NM: Not Measured GWE: Ground Water Elevation

DTW: Depth to Water

TOC: Top of Casing

AMSL: Above Mean Sea Level

Q: Data Validation Qualifier

J: Estimated

J+: Overestimated

UJ: Estimated Non-Detect



Analyte	Upper Tolerance Limit (mg/L)	Groundwater Protection Standard (mg/L)	Downgradient Wells that Exceed Groundwater Protection Standards
Antimony	0.004	0.006	None Exceed
Arsenic	0.0117	0.0117	None Exceed
Barium	0.102	2.0	None Exceed
Beryllium	0.002	0.004	None Exceed
Cadmium	0.0011	0.005	None Exceed
Chromium	0.0201	0.1	None Exceed
Cobalt	0.0114	0.0114	ELF-11, ELF-3, ELF-8
Fluoride Appendix IV	4.36	4.36	None Exceed
Lead	0.012	0.015	None Exceed
Lithium	4.79	4.79	None Exceed
Mercury	0.00009	0.002	None Exceed
Molybdenum	0.158	0.158	ELF-8
Radium	6.645	6.645	None Exceed
Selenium	0.608	0.608	None Exceed
Thallium	0.002	0.002	None Exceed

Table 2. Summary of Groundwater Quality Comparisons - May 2020 Event



Analyte	Upper Tolerance Limit (mg/L)	Groundwa Protection Sta (mg/L)		Exc	ngradient Wells that ceed Groundwater otection Standards				
Antimony	0.004	0.006	0.	006	None Exceed				
Arsenic	0.0117	0.01	0.0	117	None Exceed				
Barium	0.102	2.00	2	.00	None Exceed				
Beryllium	0.002	0.004	0.	004	None Exceed				
Cadmium	0.0011	0.005	0.	005	None Exceed				
Chromium	0.0201	0.1000	0.1	000	None Exceed				
Cobalt	0.0114	0.006	0.0)114	ELF-8, ELF-11				
Fluoride Appx IV	4.36	4.00	4	.36	None Exceed				
Lead	0.012	0.015	0.	015	None Exceed				
Lithium	4.65	0.040	4	.65	None Exceed				
Mercury	0.00009	0.002	0.	002	None Exceed				
Molybdenum	0.158	0.100	0.	158	ELF-8				
Radium	6.28	5.0	6.	.28	None Exceed				
Selenium	0.608	0.1	0.	608	None Exceed				
Thallium	0.002	0.002	0.0	002	None Exceed				

Table 3. Summary of Groundwater Quality Comparisons – October 2020 Event



ATTACHMENT A:

Field Summary Report – June 2020 Event



Facility Name:	Hunter Power Plant – CCR Landfill
Event Description:	Assessment Monitoring
Event Dates:	May 12-13, 2020
Field Personnel:	Mike Shirley (WET), Dennis Vanderbeek (PacifiCorp),
	Bradley Giles (PacifiCorp)

ACTIVITY SUMMARY. WET and PacifiCorp personnel arrived onsite May 12, 2020 and performed groundwater sampling at Hunter CCR Landfill. Prior to collecting samples, field instruments were calibrated, followed by the collection of water levels in the CCR monitoring wells. After recording water levels, the wells were purged in accordance with the EPA low-flow method. Field parameters were monitored during well purging in accordance with the site-specific sampling and analysis plan (SAP). Once field parameters met the SAP stabilization requirements, groundwater samples were collected for Appendix III and Appendix IV constituents. All calibration data and field measurements were recorded on the WET electronic field form. The wells that underwent sampling during this sampling event included:

- ELF-1D
- ELF-2
- ELF-9
- ELF-11
- ELF-12
- ELF-13
- ELF-14

- ELF-3
- ELF-4
- ELF-5
- ELF-6
- ELF-7
- ELF-8
- ELF-10

The following details dates for conducting field work and post-field work data processing:

- Date fieldwork completed: 5/13/2020
- Dates unvalidated lab data received: 6/17/2020
- Data validation completion date: 7/8/2020

After collection, the samples were preserved in accordance with the SAP, placed on ice, chain of custody forms were completed, and the samples were transported to American West Analytical Laboratories (AWAL) in Salt Lake City, Utah for analysis. Samples arrived at AWAL on 5/15/2020. AWAL subcontracted Radium analyses to ALS Global in Fort Collins, Colorado. Samples arrived at ALS on 5/21/2020. The following information is attached to this summary as a supplement:

- Attachment A: Groundwater Contour Map
- Attachment B: Data Validation Summary
- Attachment C: Statistical Analysis
- Attachment D: Field Data Sheets
- Attachment E: Laboratory Analytical Reports

SAP DEVIATIONS. Wells ELF-10 and ELF-5 did not produce enough water to take full sample sets. Well ELF-6 did not produce any water and was not able to be sampled.



Attachment A:

Groundwater Contour Map





Groundwater Elevation Contour (Contour Interval = 5 Ft.)





Groundwater Elevation Map CCR Landfill

Attachment A

Job#: PERCM052

Date: 9/28/2020

Path: M:\PERC_CCR\2020_CCR_Sampling\Hunter\2020_CCR_Final\2020_CCR_Final.aprx, Author: jhulla



Attachment B:

Data Validation Summary

DATA VALIDATION SUMMARY CCR COMPLIANCE SAMPLING

Facility Name:	Hunter Power	Plant
Validator:	Janelle Garza (6/11/2020)
Reviewer:	(R1) Stefanie V	Vandaele (6/29/2020); (R2) Marcus Holland (7/8/2020)
Laboratory:	American Wes	t Analytical Laboratories; Salt Lake City, UT ries; Fort Collins, CO (third party lab for Ra analyses)
Laboratory Work Order#:	2005382	
Sample Media:	Aqueous	
Review Element:	Complete / Criteria Met? (Yes/No)	If no, describe: No time was recorded for Group B – DUP on the COC
Chain of Custody:	No	or sample receipt form for samples upon arrival at ALS laboratories.
Field Documentation:	Yes	
Holding Times & Sample Preservation:	No	 The laboratory flagged all pH results for technical holding time exceedance (>24 hours). pH is measured in the field, and it is not feasible to laboratory analyze pH within 24 hours from time of collection. Therefore, these flags are disregarded, and no qualification is necessary. TDS in sample ELF-9 was analyzed 22 days after collection, past the holding time of 7 days. This data point was qualified as estimated low (J-) due to a detected result. However, this data point was also qualified as estimated high (J+) from field blank contamination, resulting in a combined J (estimated detect) qualifier. Samples ELF-10 and ELF-1D had limited volume upon receipt at ALS. No action required. Samples ELF-11, ELF-12, and ELF-3 were received at ALS with a pH>2. Preservative was added to bring pH to an acceptable range. No action required.
Calibrations:	Yes	
Blanks:	No	 TDS were detected in the field blank (FB) at 80 mg/L, above the RL of 10 mg/L. Samples ELF-1D and ELF-9 were qualified as estimated high (J+) and reported at the FB value (4000 mg/L) due to results >RL but <10x FB value. However, ELF-9 was also qualified as estimated low (J-) due to holding time exceedance, resulting in a combined J (estimated detect) qualifier. All remaining samples did not require qualification due to results ≥10x MB value.
Laboratory Control Sample:	Yes	
Duplicates:	Yes	

DATA VALIDATION SUMMARY CCR COMPLIANCE SAMPLING

Matrix Spike:	No	Calcium in Lab Sample ID 2005382-013BMS and 2005382-013BMSD had very poor recoveries at -204% and -70.6% (limits 70-130%). This Lab Sample ID was associated with Client Sample ID Group B - DUP. The analyte concentration was too high for accurate MS recovery and/or RPD. These results are being disregarded for evaluation.
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Overall Assessment:

Out of 322 total data points, 320 data points (99.4%) remain unqualified and are considered quantitative and usable data. Two data points (0.6%) were qualified as estimated (J and J+) due to holding time exceedance and field blank contamination and are considered qualitative data. No data points were rejected; thus, this sample delivery group is 100% complete and usable.



Attachment C:

Statistical Analysis

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1.0 INTRODUCTION

This appendix contains a statistical analysis of the data collected from the groundwater monitoring wells associated with the CCR Landfill at the Hunter Power Plant in Castle Dale, Utah. Methods used to compare upgradient with downgradient wells vary depending on the characteristics of the upgradient well data. Upgradient well data were analyzed for outliers, normality, non-detects, and other characteristics that affect the comparison measures. A comprehensive statistical analysis is presented along with a discussion of the methods used to compare upgradient with downgradient water quality.

2.0 PRELIMINARY DATA ANALYSIS

The primary purpose of this statistical analysis was to establish background values from the upgradient well data, and compare these to the downgradient well data to determine if the downgradient water quality has been impacted by the CCR Landfill. Familiarity with numerical and distributional characteristics of the upgradient wells aids in computing appropriate limits and in correctly interpreting those limits. This section contains a statistical summary of the upgradient well data. It is essential to understand the statistical characteristics of the data, prior to making the upgradient / downgradient well comparison. This understanding helps to ensure the appropriate calculations have been done and comparisons are completed using the proper statistical measures. The mean, standard deviation, quartiles, and other statistical quantities and corresponding graphs are presented in the following sections.

2.1 Data Analysis Techniques

The following sections summarize the statistical tools and techniques, used to evaluate upgradient well data from the CCR Landfill.

2.1.1 Mean

One measure of primary interest is the center of the data. The average (\bar{x}), or the mean, is the most commonly used measure of the central tendency of the data. However, it can be heavily influenced by outliers and by asymmetric data. The mean is calculated using Equation (1):

$$\overline{x} = \frac{\sum_{i=1}^{n} x_{i}}{n}$$
(1)

Where:

 \overline{x} = mean n = number of observations x_i = i^{th} observation.

2.1.2 Standard Deviation

Another quantity of interest is the spread of the data. The standard deviation (s) is the most commonly used measure of spread, as it is easy to interpret and is used in many other statistical methods. Because it is calculated using the average, it is also sensitive to outliers and affected by data that are not symmetric. The standard deviation is calculated using Equation (2):

$$s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}$$
(2)

Where:

s =standard deviation

n = number of observations

 $x_i = i^{th}$ observation

 \overline{x} = mean of the observations.

2.1.3 Coefficient of Variance

The coefficient of variance (CV) is a relative measure of variation in the sample data which expresses the standard deviation relative to the mean. The CV is expressed as a percentage and provides a direct comparison to the standard deviations of two different data sets. It is important to note the mean of the data may be very close to or very far away from zero and the spread may be independent of the distance from the mean to zero. Therefore, no firm guidelines have been established for interpreting the CV. The CV was calculated for each detected analyte in each data grouping using Equation (3):

$$CV = \frac{s}{\overline{X}} \times 100\% \tag{3}$$

Where:

s = standard deviation

 \overline{X} = mean of the observations

2.1.4 Quartiles and the Five Number Summary

The five-number summary is a set of five numbers that are used to assess the spread of the data. It consists of the minimum value, first quartile, median, third quartile, and maximum of the data value. The first quartile is the 25th percentile of the data, the median is the 50th percentile of the data, and the third quartile is the 75th percentile of the data. The 25th percentile of the data is the

number such that 25% of the data are less than that number and 75% of the data are above the 25th percentile. The median and third quartiles are found in a similar manner.

2.2 Visual Tools

It is difficult to review numerical summary statistics and identify the degree of symmetry or normality of data without the aid of visual tools. In completing the statistical analysis for the CCR Landfill, histograms and dot plots were developed for each of the analytes with at least one detectable observation. All graphs were developed using the R Statistical Package (R Core Team 2020).

2.2.1 Histograms

Histograms display the distribution and symmetry of the data. The data are displayed in such a way, that deviations from a normal (i.e., bell shaped) distribution can easily be observed. Outliers are also often identifiable in a histogram. Histograms for the upgradient wells were generated using both non-detects and detected results. The method detection limits (MDL) are plotted on the histogram with a blue line to show which observations are non-detects. If an analyte has more than one MDL there will be more than one blue line on the histogram. Figure C.1 below is a histogram of fluoride data for the upgradient wells for the CCR Landfill. It is provided here to illustrate data distribution using a histogram. All of the histograms used to examine the analytes from the CCR Landfill upgradient well data, are provided at the end of this appendix in Figure C.3.



Figure C.1. Histogram of fluoride data from the CCR Landfill upgradient wells.

2.2.2 Dot Plots

A dot plot is a graphical tool used to determine the spread of the data and to look for outliers. Each measured concentration is plotted on the graph so that non-detects and outliers are clearly visible. The MDL for non-detects are shown as green points on the plot. Figure C.2 uses the same fluoride data points used to develop the Figure C.1. Several of the points are non-detects and the concentrations in well ELF-10 are larger than those in the other wells. All of the dot plots used to examine the CCR Landfill upgradient well data are provided at the end of this appendix in Figure C.3.



Figure C.2. Dot plot of fluoride data the CCR Landfill upgradient wells

2.2.3 Outliers

Outliers are data points that are notably larger or smaller than the rest of the data set and may indicate a problem with the data point or the data set as a whole. Examples which may be indicative of outliers include: 1) a misreported or erroneous concentration, 2) analytical error(s), or 3) natural variations in groundwater concentrations. Outliers are generally not omitted from project data simply because they are outliers. Rather, the result is examined individually or by project, to ensure the outlier does not represent an erroneous result or another concern warranting either additional sampling or omission of the outlier. For example, if outliers which represent exceedingly low concentrations are used to compute background concentrations, they may result in background levels which are too conservative. Conversely, use of excessively high outlier concentrations to compute background values, may result in an overestimation of background concentrations resulting in false-negative comparisons for downgradient groundwater quality.

Outliers were detected in the cadmium, cobalt, lead, pH, and radium data CCR Landfill data. However, none of the outliers are extreme enough to warrant removal from the dataset. The MDLs for the non-detects in the boron upgradient data were 5 mg/L and the largest detected value was less than 4 mg/L. This is an unusually large MDL and its inclusion would have resulted in a Groundwater Protection Standard (GWPS) that was larger than any concentration detected in the upgradient wells. Thus, the non-detects were removed from the upgradient boron data and are not included in any tables or graphs in this appendix.

2.2.4 Treatment of Non-Detects

Non-detect values are common in environmental data. When present in data sets, non-detects produce difficulties in computing statistical metrics because reliable values cannot be assigned. Substituting a value such as the MDL or one-half of the MDL for non-detects are common practices. However, use of the detection limit, or one-half of the detection limit, can produce unstable or unreliable results (EPA 2009). Statistical methods, such as Kaplan-Meier (Helsel 2004), can be used to appropriately evaluate data sets containing significant quantities of non-detects, by producing estimates of the survival probability function for non-detects. These estimates can then be used to compute summary statistics on the data set. However, Kaplan-Meier does not perform well if more than 50% of the results are non-detects or if fewer than eight detections are available for evaluation.

The arsenic, cadmium, chromium, cobalt, and lead data have more than 50% non-detects. Antimony, beryllium, mercury, and thallium were not detected in any of the samples. Thus, statistical analysis cannot be done for those analytes. The fluoride, and selenium data have more than 15% non-detects, but more than half of the data are detected. As a result, Kaplan-Meier was used to compute means, standard deviations, and statistical limits used to compare the upgradient to downgradient water quality for barium, fluoride, and selenium.

2.3 Summary Results

Table C.1 provides summary statistics for the CCR Landfill upgradient well data. Although the data from the upgradient wells were combined when compared to the downgradient wells, the summary statistics presented in this section are separated by well and are presented as pooled data. The data are presented in this way, due to observed differences between the different wells for many of the analytes. These tables in conjunction with the histograms and normal-quantile plots, provide information about differences between wells and the data properties of the combined data. Analytes that were not detected in any upgradient well samples are not listed in Table C.1.

Analyte	Well	Number of Samples	Samples Detected	Median (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
Arsenic	ELF-1D	4	0	< 0.002	NA	NA	NA
Arsenic	ELF-2	15	0	< 0.002	NA	NA	NA
Arsenic	ELF-9	13	13	0.0068	0.0075	0.0022	29
Arsenic	ELF-10	12	3	< 0.002	NA	NA	NA

Analyte	Well	Number of Samples	Samples Detected	Median (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
Arsenic	Pooled	44	16	< 0.002	NA	NA	NA
Barium	ELF-1D	4	4	0.0094	NA	NA	NA
Barium	ELF-2	15	14	0.0104	0.0138	0.0105	76
Barium	ELF-9	13	13	0.0323	0.0422	0.0337	80
Barium	ELF-10	12	12	0.0372	0.0423	0.0217	51
Barium	Pooled	44	43	0.0155	0.0296	0.0263	89
Boron	ELF-1D	3	3	2.19	NA	NA	NA
Boron	ELF-2	14	14	3.36	3.38	0.18	5
Boron	ELF-9	11	11	1.49	1.52	0.21	14
Boron	ELF-10	11	11	1.62	1.67	0.18	11
Boron	Pooled	39	39	1.87	2.28	0.87	38
Cadmium	ELF-1D	4	0	< 0.0005	NA	NA	NA
Cadmium	ELF-2	15	0	< 0.0005	NA	NA	NA
Cadmium	ELF-9	13	1	< 0.0005	NA	NA	NA
Cadmium	ELF-10	12	6	0.0005	NA	NA	NA
Cadmium	Pooled	44	7	< 0.0005	NA	NA	NA
Calcium	ELF-1D	3	3	366	NA	NA	NA
Calcium	ELF-2	14	14	407	403	20.8	5
Calcium	ELF-9	12	12	59.5	76	33.7	44
Calcium	ELF-10	11	11	474	480	29.0	6
Calcium	Pooled	40	40	397	323	170	52
Chloride	ELF-1D	3	3	6640	NA	NA	NA
Chloride	ELF-2	14	14	442	381	109	29
Chloride	ELF-9	12	12	381	401	95.6	24
Chloride	ELF-10	11	11	7530	7905	1686	21
Chloride	Pooled	40	40	465	2926	3617	124
Chromium	ELF-1D	4	1	< 0.002	NA	NA	NA
Chromium	ELF-2	15	2	< 0.002	NA	NA	NA
Chromium	ELF-9	13	7	0.0036	NA	NA	NA
Chromium	ELF-10	12	9	0.004	0.0051	0.0042	82
Chromium	Pooled	44	19	< 0.002	NA	NA	NA
Cobalt	ELF-1D	4	1	< 0.004	NA	NA	NA
Cobalt	ELF-2	15	8	0.005	0.0055	0.0020	37
Cobalt	ELF-9	13	2	< 0.004	NA	NA	NA
Cobalt	ELF-10	12	9	0.0044	0.0051	0.0014	28

Analyte	Well	Number of Samples	Samples Detected	Median (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
Cobalt	Pooled	44	20	< 0.004	NA	NA	NA
Fluoride	ELF-1D	3	0	< 0.1	NA	NA	NA
Fluoride	ELF-2	14	7	0.1	NA	NA	NA
Fluoride	ELF-9	12	10	1.2	0.96	0.61	64
Fluoride	ELF-10	11	5	< 0.1	NA	NA	NA
Fluoride	Pooled	40	22	0.20	0.78	1.21	154
Lead	ELF-1D	4	0	< 0.002	NA	NA	NA
Lead	ELF-2	15	1	< 0.002	NA	NA	NA
Lead	ELF-9	13	4	< 0.002	NA	NA	NA
Lead	ELF-10	12	6	0.0021	NA	NA	NA
Lead	Pooled	44	11	< 0.002	NA	NA	NA
Lithium	ELF-1D	4	4	2.16	NA	NA	NA
Lithium	ELF-2	15	15	1.75	2.44	1.25	51
Lithium	ELF-9	13	13	0.888	1.06	0.491	46
Lithium	ELF-10	12	12	2.13	2.35	1.10	47
Lithium	Pooled	44	44	1.68	1.98	1.12	57
Molybdenum	ELF-1D	4	4	0.0163	NA	NA	NA
Molybdenum	ELF-2	15	15	0.0031	0.0033	0.0007	21
Molybdenum	ELF-9	13	13	0.1170	0.1145	0.0242	21
Molybdenum	ELF-10	12	12	0.0863	0.0868	0.0313	36
Molybdenum	Pooled	44	44	0.0582	0.0602	0.0530	88
рН	ELF-1D	3	3	7.27	NA	NA	NA
pН	ELF-2	14	14	7.23	7.28	0.17	2
рН	ELF-9	12	12	7.92	7.89	0.15	2
рН	ELF-10	11	11	7.15	7.22	0.42	6
рН	Pooled	40	40	7.29	7.44	0.39	5
Radium	ELF-1D	4	4	1.72	NA	NA	NA
Radium	ELF-2	15	15	1.37	1.92	1.84	96
Radium	ELF-9	13	13	1.38	1.44	0.60	42
Radium	ELF-10	12	12	2.44	3.22	3.60	112
Radium	Pooled	44	44	1.53	2.12	2.25	106
Selenium	ELF-1D	4	0	< 0.002	NA	NA	NA
Selenium	ELF-2	15	15	0.398	0.317	0.219	69
Selenium	ELF-9	13	1	< 0.002	NA	NA	NA
Selenium	ELF-10	12	9	0.0098	0.0953	0.135	142

Analyte	Well	Number of Samples	Samples Detected	Median (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
Selenium	Pooled	44	25	0.0069	0.135	0.198	147
Sulfate	ELF-1D	3	3	8640	NA	NA	NA
Sulfate	ELF-2	14	14	7910	7569	714	9
Sulfate	ELF-9	12	12	6610	6494	790	12
Sulfate	ELF-10	11	11	17300	16048	4522	28
Sulfate	Pooled	40	40	7950	9643	4678	49
TDS	ELF-1D	3	3	27000	NA	NA	NA
TDS	ELF-2	14	14	12000	11907	423	4
TDS	ELF-9	12	12	10550	10743	839	8
TDS	ELF-10	11	11	38200	37664	2162	6
TDS	Pooled	40	40	12000	19811	11987	61

Table C.2 provides the five-number summaries for the CCR Landfill upgradient wells. As with the summary statistics, a five-number summary was computed for each well as well as for the pooled data. If a minimum or a quartile falls within the range of non-detects it is denoted using a less-than (<) symbol. Analytes that were not detected in any of the upgradient well samples are not listed in Table C.2.

Analyte	Well	Minimum (mg/L)	First Quartile (mg/L)	Median (mg/L)	Third Quartile (mg/L)	Maximum (mg/L)
Arsenic	ELF-1D	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Arsenic	ELF-2	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002
Arsenic	ELF-9	0.005	0.006	0.0068	0.0086	0.0117
Arsenic	ELF-10	< 0.002	< 0.002	< 0.002	0.0025	0.0093
Arsenic	Pooled	< 0.001	< 0.002	< 0.002	0.0056	0.0117
Barium	ELF-1D	0.0084	0.0084	0.0085	0.0094	0.0103
Barium	ELF-2	< 0.0084	0.0092	0.0106	0.0126	0.05
Barium	ELF-9	0.0126	0.0158	0.0335	0.0774	0.102
Barium	ELF-10	0.0184	0.0316	0.0391	0.056	0.0863
Barium	Pooled	< 0.0084	0.0111	0.0186	0.0433	0.102
Boron	ELF-1D	2.19	2.20	2.21	2.22	2.23
Boron	ELF-2	3.11	3.25	3.33	3.50	3.77
Boron	ELF-9	1.30	1.35	1.45	1.60	1.91
Boron	ELF-10	1.48	1.57	1.63	1.72	2.12

Table C.2. Five-number summary for the CCR Landfill upgradient wells.

Analyte	Well	Minimum (mg/L)	First Quartile (mg/L)	Median (mg/L)	Third Quartile (mg/L)	Maximum (mg/L)
Boron	Pooled	1.30	1.57	1.87	3.26	3.77
Cadmium	ELF-1D	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cadmium	ELF-2	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.001
Cadmium	ELF-9	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0005
Cadmium	ELF-10	< 0.0005	< 0.0005	0.0005	0.0006	0.0011
Cadmium	Pooled	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0011
Calcium	ELF-1D	366	369	372	374	377
Calcium	ELF-2	364	392	410	419	430
Calcium	ELF-9	52.7	57.5	60.3	88.1	166
Calcium	ELF-10	445	460	475	496	543
Calcium	Pooled	52.7	107	400	445	543
Chloride	ELF-1D	6430	6543	6655	6768	6880
Chloride	ELF-2	218	363	444	461	473
Chloride	ELF-9	282	334	371	431	527
Chloride	ELF-10	5710	7000	7340	7635	9900
Chloride	Pooled	218	369	459	6813	9900
Chromium	ELF-1D	< 0.002	< 0.002	< 0.002	0.0022	0.0023
Chromium	ELF-2	< 0.001	< 0.002	< 0.002	< 0.002	0.011
Chromium	ELF-9	< 0.002	< 0.002	0.0044	0.0142	0.0201
Chromium	ELF-10	< 0.002	< 0.002	0.005	0.0061	0.0164
Chromium	Pooled	< 0.001	< 0.002	< 0.002	0.0054	0.0201
Cobalt	ELF-1D	< 0.004	< 0.004	< 0.004	0.0047	0.0054
Cobalt	ELF-2	< 0.004	< 0.004	0.0045	0.0059	0.0114
Cobalt	ELF-9	< 0.004	< 0.004	< 0.004	< 0.004	0.0052
Cobalt	ELF-10	< 0.004	< 0.0041	0.0044	0.0055	0.0079
Cobalt	Pooled	< 0.004	< 0.004	< 0.004	0.0054	0.0114
Fluoride	ELF-1D	< 0.1	< 0.13	< 0.15	< 0.18	<0.2
Fluoride	ELF-2	< 0.1	<0.1	0.1	0.277	0.5
Fluoride	ELF-9	< 0.1	0.268	1.19	1.36	1.84
Fluoride	ELF-10	< 0.1	< 0.1	0.172	3.95	4.36
Fluoride	Pooled	< 0.1	< 0.1	0.222	1.21	4.36
Lead	ELF-1D	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Lead	ELF-2	< 0.001	< 0.002	< 0.002	< 0.002	0.002
Lead	ELF-9	< 0.002	< 0.002	< 0.002	0.0045	0.0077
Lead	ELF-10	< 0.002	< 0.002	0.0022	0.0031	0.012
Lead	Pooled	< 0.001	< 0.002	< 0.002	0.002	0.012
Analyte	Well	Minimum (mg/L)	First Quartile (mg/L)	Median (mg/L)	Third Quartile (mg/L)	Maximum (mg/L)
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Lithium	ELF-1D	2.12	2.16	2.19	2.20	2.2
Lithium	ELF-2	1.34	1.53	1.76	3.82	4.93
Lithium	ELF-9	0.724	0.756	0.845	1.06	2.48
Lithium	ELF-10	0.841	1.65	2.09	2.85	4.59
Lithium	Pooled	0.724	1.09	1.68	2.20	4.93
Molybdenum	ELF-1D	0.0161	0.0163	0.0165	0.0186	0.0207
Molybdenum	ELF-2	0.0026	0.003	0.0031	0.0037	0.005
Molybdenum	ELF-9	0.0679	0.1082	0.1195	0.1275	0.158
Molybdenum	ELF-10	0.0516	0.0706	0.0871	0.1165	0.124
Molybdenum	Pooled	0.0026	0.0037	0.0648	0.1155	0.158
pН	ELF-1D	7.02	7.08	7.15	7.21	7.27
pН	ELF-2	7.12	7.17	7.22	7.30	7.76
рН	ELF-9	7.51	7.86	7.94	7.99	8.06
pН	ELF-10	6.88	7.03	7.18	7.27	8.37
pН	Pooled	6.88	7.17	7.29	7.86	8.37
Radium	ELF-1D	1.09	1.16	1.23	1.93	2.63
Radium	ELF-2	0.61	0.873	1.31	2.22	8.10
Radium	ELF-9	0.64	1.03	1.36	1.86	2.60
Radium	ELF-10	0.46	1.67	2.47	3.26	14.2
Radium	Pooled	0.46	0.978	1.44	2.34	14.2
Selenium	ELF-1D	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Selenium	ELF-2	0.0319	0.115	0.424	0.490	0.608
Selenium	ELF-9	< 0.002	< 0.002	< 0.002	< 0.002	0.0042
Selenium	ELF-10	< 0.002	< 0.0051	0.0105	0.152	0.410
Selenium	Pooled	< 0.002	< 0.002	0.0098	0.309	0.608
Sulfate	ELF-1D	7730	7958	8185	8413	8640
Sulfate	ELF-2	6030	7190	7950	8150	8370
Sulfate	ELF-9	5460	5790	6470	6875	8030
Sulfate	ELF-10	10000	14025	18300	19875	20700
Sulfate	Pooled	5460	6833	7950	10075	20700
TDS	ELF-1D	26800	26850	26900	26950	27000
TDS	ELF-2	11300	11500	12000	12300	12600
TDS	ELF-9	9420	10350	10600	11550	12000
TDS	ELF-10	35200	37350	38300	39350	40300
TDS	Pooled	9420	11375	12000	35225	40300

3.0 UPGRADIENT AND DOWNGRADIENT WELL COMPARISON

Groundwater quality was assessed using upper tolerance limits (UTLs) and the Maximum Contaminant Levels (MCL) for each of the Appendix III and IV analytes. The data measured from the upgradient/background wells, was used to compute a UTL, which serves as the background value. The larger of the UTL and MCL was used as the Groundwater Protection Standard (GWPS). Data obtained from the downgradient wells were compared point-by-point to the GWPSs to determine if the site complies with the *Final Rule*. The software package Sanitas© v.2016, was used to compute the UTLs. As part of this evaluation, groundwater data were examined for characteristics that impact how the UTL was computed. These characteristics include the:

- Number of non-detect results
- Data distribution
- Site-wide false-positive rate (SWFPR)
- Spatial and seasonal variability.

Summary statistics and other statistical characteristics of the data are discussed in the previous section. These characteristics were used to compute the appropriate UTL for each analyte.

3.1 Groundwater Protection Standards

The shape or distribution of the data was assessed to ensure that the most appropriate UTL was used for comparison purposes. The most efficient UTL is a parametric UTL that assumes the data follow a normal distribution. If the data do not follow a normal distribution, a non-parametric UTL is typically used. Thus, the data for each analyte are assessed to determine if a parametric UTL can be computed from the data. The parametric UTL is computed using the formula below:

$$UTL = \bar{X} + \kappa \times S$$

Where:

 \overline{X} = the average of the background data

 κ = multiplier from EPA Unified Guidance, March 2009

S = standard deviation of the background data

3.1.1 Normal Distribution

Histograms and dot plots were used to visually inspect the data for deviations from normality and to determine if outliers are present. This examination reveals the outliers are present in the cadmium, cobalt, lead, pH, and radium data. The Shapiro-Wilk test was used to assess normality in conjunction with the normal quantile plots. If the p-value associated with the test was greater than or equal to 0.05, the data are considered normally distributed and a parametric UTL was computed using the upgradient measurements. If the p-value is less than 0.05, then the maximum detected value was used as the UTL.

Note: The 0.05 p-value is not a hard and fast rule. Parametric UTLs were computed for analytes whose p-values were sufficiently close to 0.05 as determined by the Sanitas software (Sanitas 2016).

If the data for an analyte were not normally distributed, the ladder of powers method was used to determine if a reasonable transformation existed that would produce normal data. The ladder of powers tests different monotonic transformations of the data, such as the natural logarithm or square, to see if the transformed data have a normal distribution. If a transformation within the ladder of powers can be found that produces normal data, a parametric UTL was computed using the transformed data. If a transformation was identified, it was applied to both upgradient / background and downgradient groundwater data prior to comparison.

A non-parametric UTL was computed for data that are not normally distributed and cannot be transformed. The non-parametric UTL is the largest value measured in the upgradient / background wells. Table C.3 summarizes the results of the Shapiro-Wilk test for each of the Appendix III and IV analytes where at least 50% of the measurements were detects. An appropriate transformation was found for lithium and radium. Non-parametric UTLs were computed for all of the analytes except for lithium and radium.

Analyte	Well	W-Statistic	P-Value	Normal
Barium	Pooled	0.7781	< 0.0001	No
Boron	Pooled	0.8202	< 0.0001	No
Calcium	Pooled	0.7927	< 0.0001	No
Chloride	Pooled	0.7051	< 0.0001	No
Fluoride	Pooled	0.6155	< 0.0001	No
Lithium	Pooled	0.8751	< 0.0001	No
Cube Root of Lithium	Pooled	0.9536	0.0032	Yes
Molybdenum	Pooled	0.8438	< 0.0001	No
pН	Pooled	0.9084	< 0.0001	No
Radium	Pooled	0.5363	< 0.0001	No
LN of Radium	Pooled	0.9439	0.0008	Yes
Selenium	Pooled	0.6970	< 0.0001	No
Sulfate	Pooled	0.7185	< 0.0001	No
TDS	Pooled	0.7109	< 0.0001	No

Table C.3. Shapiro-Wilk Test for the CCR Landfill upgradient wells.

3.1.2 Upper Tolerance Limits and Groundwater Protection Standard

This section contains the GWPS computed for each analyte. Table C.4 lists the UTL, MCL, and GWPS for each of the analytes detected in the upgradient wells. The following criteria were used for determining each GWPS:

• If more than 50% of the data were detected and have a normal distribution, a parametric UTL was computed.

- If the data were not normally distributed or more than 50% of the data were nondetects, the greater of the largest MDL and maximum detected value was used as the UTL.
- If all of the upgradient samples were non-detects, the largest MDL was used as the UTL.
- The larger of the MCL and the UTL was used as the GWPS.
- Fluoride is compared to both the MCL and the UTL if the MCL exceeds the UTL, to meet the criteria for Appendix III constituents.

Figure C.4 shows graphs that were constructed for each of the analytes that had at least one detectable measurement in the downgradient wells. The graphs illustrate the GWPS as a horizontal line with the measurements from each of the downgradient wells plotted on the same graph. Non-detects are represented by hollow gray circles on the graphs. These graphs clearly depict how the downgradient measurements compare to the GWPS. Results above the GWPS line represent values exceeding the GWPS. As the graphs illustrate, boron, calcium, cobalt, molybdenum, pH, sulfate, and total dissolved solids exceed the GWPS. Table C.4 list the GWPSs and the wells that exceed the GWPS for each analyte (Figure C.4). GWPS plots are not provided for analytes that were not detected in any downgradient samples.

Analyte	Upper Tolerance Limit (mg/L)	Maximum Contaminant Level (mg/L)	Groundwater Protection Standard (mg/L)	Downgradient Wells that Exceed Background or Groundwater Protection Standards
Boron	3.77	NA	3.77	ELF-11, ELF-4, ELF-8
Calcium	543	NA	543	ELF-8
Chloride	11800	NA	11800	Within Limit
Fluoride Appendix III	4.36	NA	4.36	Within Limit
pH Acidic Range	6.85	NA	6.85	ELF-7
pH Basic Range	8.37	NA	8.37	Within Limit
Sulfate	20700	NA	20700	ELF-3
TDS	40300	NA	40300	ELF-3
Antimony	0.004	0.006	0.006	Within Limit
Arsenic	0.0117	0.01	0.0117	Within Limit
Barium	0.102	2.00	2.0	Within Limit
Beryllium	0.002	0.004	0.004	Within Limit
Cadmium	0.0011	0.005	0.005	Within Limit
Chromium	0.0201	0.1	0.1	Within Limit
Cobalt	0.0114	0.006	0.0114	ELF-11, ELF-3, ELF-8
Fluoride Appendix IV	4.36	4.0	4.36	Within Limit

Table C.4. Comparison of downgradient wells to the Groundwater Protection Standard

Analyte	Upper Tolerance Limit (mg/L)	Maximum Contaminant Level (mg/L)	Groundwater Protection Standard (mg/L)	Downgradient Wells that Exceed Background or Groundwater Protection Standards
Lead	0.012	0.015	0.015	Within Limit
Lithium	4.79	0.04	4.79	Within Limit
Mercury	0.00009	0.002	0.002	Within Limit
Molybdenum	0.158	0.1	0.158	ELF-8
Radium	6.645	5.0	6.645	Within Limit
Selenium	0.608	0.1	0.608	Within Limit
Thallium	0.002	0.002	0.002	Within Limit

4.0 CONCLUSIONS

Groundwater data was collected from the CCR Landfill monitoring network at the Hunter Power Plant. A comprehensive data analysis was completed on the upgradient wells to ensure that comparisons between upgradient and downgradient wells were done correctly. Statistically significant increases above groundwater protection standards were noted for Appendix IV constituents cobalt and molybdenum in the downgradient wells for the CCR Landfill.

5.0 **REFERENCES**

- EPA, 2009, "Statistical Analysis Of Groundwater Monitoring Data At RCRA Facilities Unified Guidance," EPA 530/R-09-007, U.S. Environmental Protection Agency, March 2009.
- Helsel, Dennis, 2004, Nondetects and Data Analysis: Statistic for Censored Environmental Data, New York: Wiley Interscience.
- R Core Team, 2020, *R: A Language and Environment for Statistical Computing*, <u>https://www.R-project.org</u>, R Foundation for Statistical Computing, Vienna, Austria.

Sanitas Technologies, 2016, Sanitas, www.sanitastech.com, Shawnee, Kansas.



Figure C.3. Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.4. Groundwater Protection Standard plots for the CCR Landfill.



Figure C.4 (cont.). Groundwater Protection Standard plots for the CCR Landfill.



Figure C.4 (cont.). Groundwater Protection Standard plots for the CCR Landfill.



Attachment D:

Field Data Sheets



Project Name:	HUNTER						
Sampler Initials:	Bg	Project Number:	PERCM052				
Sample ID:	ELF-1D	Project Location:					
Water Disposal:	Ground	Sample Date:	5/13/2020				
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment				
Field Conditions:	Breezy, warm	·	·				
Depth to Water (ft):	83.89						

FIELD PARAMETERS								
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)		
0	19.80	36,561	3.02	6.73	222.00	9.36		
5	19.10	36,650	2.89	6.65	213.40	10.50		
10	19.40	36,416	2.90	6.67	215.80	44.30		
20	19.00	36,527	2.87	6.63	210.80	127.00		

SAMPLE COLLECTION							
Appendix:	3_4		Sample Time:	11:30			
Containers		Preservatives		Analytes/Comments			
(1) 1/2 gal poly		HNO3		Radium 226 + 228			
(1) 250 mL poly		HNO3		Total metals, Total mercury			
(1) 250 mL poly		H2SO4		Nitrate + Nitrite			
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity			

Final depth to water was below top of pump. Not all bottles filled, well would no longer produce water.



Project Name:	HUNTER					
Sampler Initials:	Bg	Project Number:	PERCM052			
Sample ID:	ELF-2	Project Location:				
Water Disposal:	Ground	Sample Date:	5/13/2020			
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment			
Field Conditions:	Breezy, warm					
Depth to Water (ft):	23.22					

FIELD PARAMETERS								
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)		
0	14.00	14,265	1.34	6.55	209.40	1.39		
5	13.90	14,223	0.71	6.58	204.20	6.54		
10	13.50	14,264	0.44	6.57	198.90	3.14		
10	14.00	14,239	0.25	6.60	193.70	2.43		
15	14.30	14,266	0.18	6.58	195.00	2.67		

SAMPLE COLLECTION							
Appendix:	3_4		Sample Time:	10:45			
Containers		Preservatives		Analytes/Comments			
(1) 1/2 gal poly		HNO3		Radium 226 + 228			
(1) 250 mL poly		HNO3		Total metals, Total mercury			
(1) 250 mL poly		H2SO4		Nitrate + Nitrite			
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity			

Final dtw, 0.0, top of pump.



Project Name:	HUNTER					
Sampler Initials:	Bg	Project Number:	PERCM052			
Sample ID:	ELF-3	Project Location:				
Water Disposal:	Ground	Sample Date:	5/13/2020			
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment			
Field Conditions:	Warm	-	-			
Depth to Water (ft):	30.75					

FIELD PARAMETERS								
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)		
0	15.00	48,126	4.37	7.04	148.30	126.00		
5	14.10	47,878	1.93	6.87	148.50	114.00		
10	13.70	47,664	6.81	6.80	148.60	113.00		
15	13.40	47,665	1.96	6.86	149.10	115.00		

SAMPLE COLLECTION							
Appendix: 3_4 Samp		Sample Time:	ample Time: 13:30				
Containers		Preservatives		Analytes/Comments			
(1) 1/2 gal poly		HNO3		Radium 226 + 228			
(1) 250 mL poly		HNO3		Total metals, Total mercury			
(1) 250 mL poly		H2SO4		Nitrate + Nitrite			
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity			

Top of pump, final depth to water.



Project Name:	HUNTER		
Sampler Initials:	DV	Project Number:	PERCM052
Sample ID:	ELF-4	Project Location:	
Water Disposal:	Ground	Sample Date:	5/13/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	partly cloudy, 65°F, windy		
Depth to Water (ft):	17.34		

FIELD PARAMETERS								
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)		
0	15.08	15,300	188.00	7.01	208.00	0.00		
5	14.69	15,400	1.30	7.01	209.00	0.00		
10	14.62	15,400	1.28	7.00	209.00	0.00		
15	14.59	15,400	1.26	7.00	209.00	0.00		

SAMPLE COLLECTION							
ppendix: 3_4 Sample Time:		11:15					
Containers		Preservatives		Analytes/Comments			
(1) 1/2 gal poly		HNO3		Radium 226 + 228			
(1) 250 mL poly		HNO3		Total metals, Total mercury			
(1) 250 mL poly		H2SO4		Nitrate + Nitrite			
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity	7		

Not a lot of water but a good producer. Clearwater.



Project Name:	HUNTER		
Sampler Initials:	DV	Project Number:	PERCM052
Sample ID:	ELF-5	Project Location:	
Water Disposal:	Ground	Sample Date:	5/13/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	partly cloudy, 65°, windy		
Depth to Water (ft):	17.74		

FIELD PARAMETERS								
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)		

Appendix:	ppendix: 3_4 S		Sample Time:	10:40		
Containers		Preservatives		Analytes/Comments		
(1) 1/2 gal poly		HNO3		Radium 226 + 228		
(1) 250 mL poly		HNO3		Total metals, Total mercury		
(1) 250 mL poly		H2SO4		Nitrate + Nitrite		
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity	7	

No sample. Well went dry. Only able to bring trickle to surface then dry.



Project Name:	HUNTER		
Sampler Initials:	DV	Project Number:	PERCM052
Sample ID:	ELF-6	Project Location:	
Water Disposal:	Ground	Sample Date:	5/13/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	Partly cloudy, windy		
Depth to Water (ft):	0.00		

FIELD PARAMETERS								
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)		

SAMPLE COLLECTION							
Appendix: 3_4 S		Sample Time: 10:16					
Containers		Preservatives		Analytes/Comments			
(1) 1/2 gal poly		HNO3		Radium 226 + 228			
(1) 250 mL poly		HNO3		Total metals, Total mercury			
(1) 250 mL poly		H2SO4		Nitrate + Nitrite			
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity			

No water in well. Not able to sample. Pulled pump to check.



Project Name:	HUNTER					
Sampler Initials:	DV	Project Number:	PERCM052			
Sample ID:	ELF-7	Project Location:				
Water Disposal:	Ground	Sample Date:	5/13/2020			
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment			
Field Conditions:	Mostly cloudy, 65°F, windy					
Depth to Water (ft):	15.80					

FIELD PARAMETERS								
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)		
0	16.66	23,200	1.76	6.96	215.00	51.90		
5	14.30	23,300	5.43	6.95	215.00	21.90		
10	14.21	23,300	5.33	6.94	215.00	21.70		
15	14.26	23,300	5.40	6.93	215.00	22.60		

SAMPLE COLLECTION						
Appendix: 3_4 Sample Time:				12:05		
Containers		Preservatives		Analytes/Comments]	
(1) 1/2 gal poly HNO3			Radium 226 + 228]		
(1) 250 mL poly	(1) 250 mL poly HNO3			Total metals, Total mercury]	
(1) 250 mL poly		H2SO4		Nitrate + Nitrite]	
(1) 1-L poly None			TDS, pH, anions, fluoride, alkalinity]		

Had to remove pump to get a water level. Not able to get water level during stabilization process. Slow producer. yellow water



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Project Name:	HUNTER		
Sampler Initials:	DV	Project Number:	PERCM052
Sample ID:	ELF-8	Project Location:	
Water Disposal:	Ground	Sample Date:	5/13/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	Overcast, 63 F, light wind	·	·
Depth to Water (ft):	8.94		

FIELD PARAMETERS						
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)
0	13.60	11,600	1.77	7.46	255.00	11.60
5	12.87	11,600	1.24	7.49	248.00	1.80
10	12.90	11,600	1.17	7.51	240.00	0.00
15	12.91	11,600	1.15	7.51	243.00	0.00

SAMPLE COLLECTION						
ppendix: 3_4 Sample Tin				e: 09:45		
Containers		Preservatives		Analytes/Comments]	
(1) 1/2 gal poly HNO3			Radium 226 + 228			
(1) 250 mL poly	L) 250 mL poly HNO3			Total metals, Total mercury		
(1) 250 mL poly		H2SO4		Nitrate + Nitrite		
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity	7	

Comments/Observations:

Good producer, clear



Project Name:	HUNTER		
Sampler Initials:	DV	Project Number:	PERCM052
Sample ID:	ELF-9	Project Location:	
Water Disposal:	Ground	Sample Date:	5/13/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	Mostly cloudy, 64°F, light wind	-	
Depth to Water (ft):	23.09		

FIELD PARAMETERS						
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)
0	14.01	16,100	1.61	7.75	48.00	4.50
5	13.92	15,500	1.12	7.75	23.00	0.00
10	13.95	15,400	1.11	7.75	20.00	0.00
15	13.91	15,300	1.14	7.77	18.00	0.00

SAMPLE COLLECTION						
Appendix: 3_4 Sample			Sample Time:	Time: 13:00		
Containers	-	Preservatives		Analytes/Comments		
(1) 1/2 gal poly HNG		HNO3		Radium 226 + 228		
(1) 250 mL poly HNO3			Total metals, Total mercury			
(1) 250 mL poly		H2SO4		Nitrate + Nitrite		
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity	7	

Deeper well plenty of water. Good producer.


Project Name:	HUNTER		
Sampler Initials:	Bg	Project Number:	PERCM052
Sample ID:	ELF-10	Project Location:	
Water Disposal:	Ground	Sample Date:	5/12/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	Breezy	-	-
Depth to Water (ft):	49.21		

FIELD PARAMETERS						
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)
0	15.39	47,700	1.57	6.79	163.00	156.00
5	15.20	47,700	1.25	6.79	160.00	136.00
10	15.10	47,600	1.10	6.78	158.00	47.70

SAMPLE COLLECTION							
Appendix:	pendix: 3_4 Sample Time:			20:20			
Containers		Preservatives		Analytes/Comments			
(1) 1/2 gal poly		HNO3		Radium 226 + 228			
(1) 250 mL poly		HNO3		Total metals, Total mercury			
(1) 250 mL poly		H2SO4		Nitrate + Nitrite			
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity			

Did not stabilize, poor producer, DO dropped with time. Final depth to water top of pump.



Project Name:	HUNTER		
Sampler Initials:	Bg	Project Number:	PERCM052
Sample ID:	ELF-11	Project Location:	
Water Disposal:	Ground	Sample Date:	5/12/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	Sunny,	-	
Depth to Water (ft):	28.11		

FIELD PARAMETERS						
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)
0	16.39	19,300	2.58	7.20	170.00	180.00
5	16.82	19,000	1.60	7.18	170.00	206.00
10	17.07	18,900	1.46	7.17	168.00	156.00
15	17.09	19,000	1.58	7.16	167.00	117.00

SAMPLE COLLECTION							
Appendix:	ndix: 3_4 Sample Time:			17:30			
Containers		Preservatives		Analytes/Comments			
(1) 1/2 gal poly		HNO3		Radium 226 + 228			
(1) 250 mL poly		HNO3		Total metals, Total mercury			
(1) 250 mL poly		H2SO4		Nitrate + Nitrite			
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity			



Project Name:	HUNTER		
Sampler Initials:	Bg	Project Number:	PERCM052
Sample ID:	ELF-12	Project Location:	
Water Disposal:	Ground	Sample Date:	5/12/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	Breezy		
Depth to Water (ft):	20.15		

FIELD PARAMETERS						
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)
0	14.75	22,300	1.02	7.42	34.00	116.00
5	14.65	22,400	0.88	7.42	27.00	77.00
10	14.71	22,400	0.82	7.42	20.00	49.30
15	14.75	22,400	0.78	7.43	12.00	47.00
20	14.44	22,400	0.78	7.43	12.00	30.00

ppendix:	3_4 Sample Time		Sample Time:	: 19:20		
Containers		Preservatives		Analytes/Comments		
(1) 1/2 gal poly		HNO3		Radium 226 + 228		
(1) 250 mL poly		HNO3		Total metals, Total mercury		
(1) 250 mL poly		H2SO4		Nitrate + Nitrite		
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity		



Project Name:	HUNTER		
Sampler Initials:	MLS	Project Number:	PERCM052
Sample ID:	ELF-13	Project Location:	
Water Disposal:	Ground	Sample Date:	5/12/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	OVERCAST, WINDY	-	
Depth to Water (ft):	3.52		

FIELD PARAMETERS						
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)
0	13.46	20,200	2.19	6.96	189.00	15.60
2	12.48	20,500	1.33	6.95	192.00	6.20
10	12.50	20,700	1.15	6.96	194.00	0.00
15	12.47	20,800	1.20	6.96	195.00	0.00
20	12.53	20,800	1.15	6.96	196.00	0.00

Appendix:	opendix: 3_4 Sample		Sample Time:	18:45		
Containers		Preservatives		Analytes/Comments]	
(1) 1/2 gal poly		HNO3		Radium 226 + 228		
(1) 250 mL poly		HNO3		Total metals, Total mercury		
(1) 250 mL poly		H2SO4		Nitrate + Nitrite		
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity		



Project Name:	HUNTER		
Sampler Initials:	Bg	Project Number:	PERCM052
Sample ID:	ELF-14	Project Location:	
Water Disposal:	Ground	Sample Date:	5/12/2020
Sample Method:	Low Flow Bladder Pump	Decon Method:	Dedicated Equipment
Field Conditions:	Breezy	·	·
Depth to Water (ft):	6.48		

FIELD PARAMETERS									
TIME (min)	TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	Turb. (NTU)			
0	13.45	24	1.65	7.17	89.00	203.00			
5	13.09	24	1.12	7.17	94.00	112.00			
10	13.05	24	0.99	7.16	99.00	65.00			
15	13.07	24	0.91	7.16	103.00	67.50			
20	12.98	24	0.87	7.14	107.00	68.00			

Appendix:	3_4		Sample Time:	18:00	
Containers		Preservatives		Analytes/Comments	
(1) 1/2 gal poly		HNO3		Radium 226 + 228	
(1) 250 mL poly	/	HNO3		Total metals, Total mercury	
(1) 250 mL poly	/	H2SO4		Nitrate + Nitrite	
(1) 1-L poly		None		TDS, pH, anions, fluoride, alkalinity	7

Group B - Dup taken here



Attachment E:

Laboratory Analytical Reports



Jeff Tucker PacifiCorp 1407 West North Temple, #280 Salt Lake City, UT 84116 TEL: (801) 220-2989

RE: Hunter CCR Groundwater Sampling / PERCM052 Dear Jeff Tucker: Lab Set ID: 2005382 3440 South 700 West Salt Lake City, UT 84119 American West Analytical Laboratories received sample(s) on 5/15/2020 for the analyses presented in the following report. American West Analytical Laboratories (AWAL) is accredited by The National Phone: (801) 263-8686 Environmental Laboratory Accreditation Program (NELAP) in Utah and Texas; and is Toll Free: (888) 263-8686 state accredited in Colorado, Idaho, New Mexico, Wyoming, and Missouri. Fax: (801) 263-8687 All analyses were performed in accordance to the NELAP protocols unless noted e-mail: awal@awal-labs.com otherwise. Accreditation scope documents are available upon request. If you have any questions or concerns regarding this report please feel free to call. web: www.awal-labs.com The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction, and/or Kyle F. Gross purging efficiency. The "Reporting Limit" found on the report is equivalent to the Laboratory Director practical quantitation limit (PQL). This is the minimum concentration that can be reported by the method referenced and the sample matrix. The reporting limit must not be confused with any regulatory limit. Analytical results are reported to three significant Jose Rocha figures for quality control and calculation purposes. **OA** Officer

Thank You,		
	Jose G	Digitally signed by Jose G.
	Rocha	Rocha Date: 2020.06.10 16:56:28 -06'00'
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Laboratory Director or designee

Sample(s) were subcontracted for the following analyses:

Radiological Testing



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-001Client Sample ID:ELF-10Collection Date:5/12/2020Sceived Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00200	0.0145	
Dhomey(901) 262 9696	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/2/2020 1218h	E200.7	0.500	1.59	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1234h	E200.7	10.0	474	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00200	0.00303	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00400	0.00432	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/2/2020 1218h	E200.7	0.100	2.90	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1735h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00200	0.0331	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00200	0.00234	
-	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1257h	E200.8	0.00200	< 0.00200	
Jose Rocha								

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QA Officer

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Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-002Client Sample ID:ELF-11Collection Date:5/12/20201730hReceived Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00200	0.0138	
$Dh_{array}(901) 262 9696$	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/1/2020 1237h	E200.7	5.00	16.1	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1237h	E200.7	10.0	420	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00400	0.0198	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/1/2020 1237h	E200.7	1.00	3.44	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1742h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00200	0.0200	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00200	0.0663	
	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1300h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer

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Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-003Client Sample ID:ELF-12Collection Date:5/12/20205/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00200	0.00994	
$Dh_{array}(901) 262 9696$	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/2/2020 1221h	E200.7	0.500	1.32	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1240h	E200.7	10.0	151	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/2/2020 1221h	E200.7	0.100	0.937	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1752h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00200	< 0.00200	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00200	< 0.00200	
•	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1304h	E200.8	0.00200	< 0.00200	
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Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-004Client Sample ID:ELF-13Collection Date:5/12/20201850hReceived Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00200	0.00968	
$\mathbf{D}_{\mathbf{b}}$ and (901) 262 9696	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/2/2020 1223h	E200.7	0.500	0.536	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1242h	E200.7	10.0	449	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/1/2020 1242h	E200.7	1.00	1.82	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1754h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00200	< 0.00200	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00200	< 0.00200	
	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1307h	E200.8	0.00200	< 0.00200	
Jose Rocha								

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Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-005Client Sample ID:ELF-14Collection Date:5/12/2020Sceived Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00200	0.0102	
Phone: (801) 263-8686	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	5/29/2020 1625h	6/2/2020 1226h	E200.7	0.500	2.32	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1245h	E200.7	10.0	486	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00400	0.00728	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/1/2020 1245h	E200.7	1.00	4.12	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1756h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00200	0.00389	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00200	0.00296	
	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1311h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer

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Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-006Client Sample ID:ELF-1DCollection Date:5/13/20205/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00200	0.0103	
Dhamay (201) 262 2626	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/2/2020 1229h	E200.7	0.500	2.10	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1255h	E200.7	10.0	353	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/1/2020 1255h	E200.7	1.00	1.96	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1758h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00200	0.0153	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00200	< 0.00200	
·	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1314h	E200.8	0.00200	< 0.00200	
Jose Rocha								

Jose Rocha

QA Officer

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Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-007Client Sample ID:ELF-2Collection Date:5/13/20201045hReceived Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00200	0.0104	
Dhama (901) 262 9696	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/2/2020 1232h	E200.7	0.500	3.38	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1258h	E200.7	10.0	398	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00400	0.00600	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/1/2020 1258h	E200.7	1.00	1.59	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1800h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00200	0.00279	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00200	0.00566	
-	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1318h	E200.8	0.00200	< 0.00200	
Jose Rocha								

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QA Officer

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Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-008Client Sample ID:ELF-3Collection Date:5/13/20205/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00200	0.0405	
Phone: (801) 263-8686	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	5/29/2020 1625h	6/2/2020 1243h	E200.7	0.500	1.08	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1301h	E200.7	10.0	455	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00200	0.00220	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00400	0.0159	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00200	0.00491	
	Lithium	mg/L	5/29/2020 1625h	6/1/2020 1301h	E200.7	1.00	3.16	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1806h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00200	0.0172	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00200	0.521	
	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1321h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer

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Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-009Client Sample ID:ELF-4Collection Date:5/13/20201115hReceived Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00200	0.0104	
Phone: (801) 263-8686	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	5/29/2020 1625h	6/2/2020 1246h	E200.7	0.500	4.60	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1303h	E200.7	10.0	489	
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00400	0.00553	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/1/2020 1303h	E200.7	1.00	1.69	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1808h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00200	0.00456	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00200	< 0.00200	
	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1352h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer

Report Date: 6/10/2020 Page 10 of 43



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-010Client Sample ID:ELF-7Collection Date:5/13/20201205hReceived Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00200	0.00995	
Dhomey(901) 262 9696	Beryllium	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/3/2020 1415h	E200.7	0.500	1.84	
Toll Free: (888) 263-8686	Cadmium	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/3/2020 1519h	E200.7	20.0	542	
e-mail: awal@awal-labs.com	Chromium	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/3/2020 1415h	E200.7	0.100	2.73	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1810h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00200	0.00371	
Laboratory Director	Selenium	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00200	0.0205	
-	Thallium	mg/L	6/1/2020 1025h	6/1/2020 1545h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer

Report Date: 6/10/2020 Page 11 of 43



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-011Client Sample ID:ELF-8Collection Date:5/13/2020945hReceived Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00200	0.0111	
Dhomey(901) 262 9696	Beryllium	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/3/2020 1418h	E200.7	5.00	31.8	
Toll Free: (888) 263-8686	Cadmium	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.000500	0.00162	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/3/2020 1517h	E200.7	20.0	635	
e-mail: awal@awal-labs.com	Chromium	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00400	0.207	
web: www.awal-labs.com	Lead	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00200	0.00724	
	Lithium	mg/L	5/29/2020 1625h	6/3/2020 1418h	E200.7	1.00	3.85	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1812h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00200	0.390	
Laboratory Director	Selenium	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00200	< 0.00200	
-	Thallium	mg/L	6/1/2020 1025h	6/1/2020 1520h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer

Report Date: 6/10/2020 Page 12 of 43



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-012Client Sample ID:ELF-9Collection Date:5/13/20205/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00200	0.00725	
	Barium	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00200	0.0128	
Dhomey(901) 262 9696	Beryllium	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/3/2020 1354h	E200.7	0.500	1.49	
Toll Free: (888) 263-8686	Cadmium	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/3/2020 1354h	E200.7	1.00	57.1	
e-mail: awal@awal-labs.com	Chromium	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/3/2020 1354h	E200.7	0.100	1.06	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1814h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00200	0.0768	
Laboratory Director	Selenium	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00200	< 0.00200	
·	Thallium	mg/L	6/1/2020 1025h	6/1/2020 1537h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer

Report Date: 6/10/2020 Page 13 of 43

American West

INORGANIC ANALYTICAL REPORTClient:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-013Client Sample ID:Group B - DUPCollection Date:5/12/2020Received Date:5/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00200	0.0101	
Phone: (801) 263-8686	Beryllium	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	5/29/2020 1625h	6/2/2020 1257h	E200.7	0.500	2.42	
Toll Free: (888) 263-8686	Cadmium	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/1/2020 1306h	E200.7	10.0	487	2
e-mail: awal@awal-labs.com	Chromium	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00400	0.00700	
web: www.awal-labs.com	Lead	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/1/2020 1306h	E200.7	1.00	4.08	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1816h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00200	0.00377	
Laboratory Director	Selenium	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00200	0.00297	
	Thallium	mg/L	5/29/2020 1625h	6/1/2020 1335h	E200.8	0.00200	< 0.00200	
I D 1								

Jose Rocha

² - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

QA Officer

Report Date: 6/10/2020 Page 14 of 43



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-014Client Sample ID:Group B - BlankCollection Date:5/13/20205/15/20201426h

Analytical Results

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00200	< 0.00200	
D_{1} = (0.1) 2(2.9(9)	Beryllium	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	5/29/2020 1625h	6/3/2020 1420h	E200.7	0.500	< 0.500	
Toll Free: (888) 263-8686	Cadmium	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	5/29/2020 1625h	6/3/2020 1420h	E200.7	1.00	< 1.00	
e-mail: awal@awal-labs.com	Chromium	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	5/29/2020 1625h	6/3/2020 1420h	E200.7	0.100	< 0.100	
	Mercury	mg/L	5/18/2020 1242h	5/29/2020 1818h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00200	< 0.00200	
Laboratory Director	Selenium	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00200	< 0.00200	
•	Thallium	mg/L	6/1/2020 1025h	6/1/2020 1541h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-001Client Sample ID:ELF-10Collection Date:5/12/20202020hReceived Date:5/15/20201426h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Date Method Reporting Date Analytical Compound Units Prepared Analyzed Used Limit Result Oual Chloride mg/L 5/22/2020 1338h E300.0 200 11,800 Fluoride 0.100 < 0.100mg/L 5/22/2020 1946h E300.0 pH @ 25° C SM4500-H+B 1.00 6.85 pH Units 5/15/2020 1616h Η Sulfate mg/L 5/22/2020 1338h E300.0 1,500 9,230 Total Dissolved Solids mg/L 5/18/2020 1200h SM2540C 100 33,600

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer

Report Date: 6/10/2020 Page 16 of 43



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-002Client Sample ID:ELF-11Collection Date:5/12/20205/15/20201426h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Date Method Reporting Date Analytical Compound Units Prepared Analyzed Used Limit Result Oual Chloride mg/L 5/22/2020 1355h E300.0 100 1,140 Fluoride 0.100 < 0.100mg/L 5/22/2020 2003h E300.0 pH @ 25° C SM4500-H+B 1.00 7.25 Н pH Units 5/15/2020 1616h Sulfate mg/L 5/22/2020 1355h E300.0 750 10,700 Total Dissolved Solids mg/L 5/18/2020 1200h SM2540C 100 18,500

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-003Client Sample ID:ELF-12Collection Date:5/12/20205/15/20201426h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1412h	E300.0	200	414	
Fluoride	mg/L		5/29/2020 1325h	SM4500-F-C	0.100	0.896	
рН @ 25° С	pH Units		5/15/2020 1616h	SM4500-H+B	1.00	7.53	Н
Sulfate	mg/L		5/22/2020 1412h	E300.0	1,500	11,200	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	100	19,200	

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-004Client Sample ID:ELF-13Collection Date:5/12/20201850hReceived Date:5/15/20201426h

Analytical Results

3440 South 700 Wes Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1428h	E300.0	100	2,770	
Fluoride	mg/L		5/22/2020 2037h	E300.0	0.100	< 0.100	
рН @ 25° С	pH Units		5/15/2020 1616h	SM4500-H+B	1.00	7.05	Н
Sulfate	mg/L		5/22/2020 1428h	E300.0	750	8,300	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	100	17,000	

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-005Client Sample ID:ELF-14Collection Date:5/12/20201800hReceived Date:5/15/20201426h

Analytical Results

3440 South 700 Wes Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1519h	E300.0	100	4,160	
Fluoride	mg/L		5/22/2020 2053h	E300.0	0.100	< 0.100	
рН @ 25° С	pH Units		5/15/2020 1647h	SM4500-H+B	1.00	7.32	Н
Sulfate	mg/L		5/22/2020 1519h	E300.0	750	8,220	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	100	19,400	

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-006Client Sample ID:ELF-1DCollection Date:5/13/20205/15/20201426h

Analytical Results

3440 South 700 Wes Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1609h	E300.0	100	6,640	
Fluoride	mg/L		5/22/2020 2110h	E300.0	0.100	< 0.100	
рН @ 25° С	pH Units		5/15/2020 1647h	SM4500-H+B	1.00	7.30	Н
Sulfate	mg/L		5/22/2020 1609h	E300.0	750	8,940	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	500	28,700	

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-007Client Sample ID:ELF-2Collection Date:5/13/20201045hReceived Date:5/15/20201426h

Analytical Results

3440 South 700 Wes Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1659h	E300.0	100	197	
Fluoride	mg/L		5/22/2020 2127h	E300.0	0.100	< 0.100	
рН @ 25° С	pH Units		5/15/2020 1647h	SM4500-H+B	1.00	7.27	Н
Sulfate	mg/L		5/22/2020 1659h	E300.0	750	6,830	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	100	12,000	

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-008Client Sample ID:ELF-3Collection Date:5/13/20205/13/20201330hReceived Date:5/15/20201426h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Date Method Reporting Date Analytical Compound Units Prepared Analyzed Used Limit Result Oual Chloride mg/L 5/22/2020 1716h E300.0 500 840 Fluoride 0.100 < 0.100mg/L 5/22/2020 2144h E300.0 pH @ 25° C SM4500-H+B 1.00 7.47 pH Units 5/15/2020 1647h Η Sulfate mg/L 5/22/2020 1716h E300.0 3,750 35,100 Total Dissolved Solids mg/L 5/18/2020 1200h SM2540C 500 49,300

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-009Client Sample ID:ELF-4Collection Date:5/13/20205/13/20201115hReceived Date:5/15/20201426h

Analytical Results

3440 South 700 Wes Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1732h	E300.0	50.0	2,470	
Fluoride	mg/L		5/22/2020 2200h	E300.0	0.100	< 0.100	
pH @ 25° C	pH Units		5/15/2020 1647h	SM4500-H+B	1.00	6.89	Н
Sulfate	mg/L		5/22/2020 1732h	E300.0	375	6,260	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	100	12,100	

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-010Client Sample ID:ELF-7Collection Date:5/13/20201205hReceived Date:5/15/20201426h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Date Method Reporting Date Analytical Compound Units Prepared Analyzed Used Limit Result Oual Chloride mg/L 5/22/2020 1749h E300.0 100 3,160 Fluoride 0.100 < 0.100mg/L 5/22/2020 2217h E300.0 pH @ 25° C SM4500-H+B 1.00 6.73 pH Units 5/15/2020 1647h Η Sulfate mg/L 5/22/2020 1749h E300.0 750 10,200 Total Dissolved Solids mg/L 5/18/2020 1200h SM2540C 100 18,700

Phone: (801) 263-8686 Toll Free: (888) 263-8686 Fax: (801) 263-8687 e-mail: awal@awal-labs.com

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-011Client Sample ID:ELF-8Collection Date:5/13/2020945hReceived Date:5/15/20201426h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1806h	E300.0	50.0	2,250	
Fluoride	mg/L		5/27/2020 1107h	E300.0	0.200	0.885	
pH @ 25° C	pH Units		5/15/2020 1647h	SM4500-H+B	1.00	7.51	Н
Sulfate	mg/L		5/22/2020 1806h	E300.0	375	3,540	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	100	8,340	

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H - Sample was received outside of the holding time.

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Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker **Client:** PacifiCorp **Project:** Hunter CCR Groundwater Sampling / PERCM052 Lab Sample ID: 2005382-012 **Client Sample ID: ELF-9 Collection Date:** 5/13/2020 1300h **Received Date:** 5/15/2020 1426h

Analytical Results

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Chloride	mg/L		5/22/2020 1823h	E300.0	100	595	
	Fluoride	mg/L		5/27/2020 1158h	E300.0	0.200	0.799	
	рН @ 25° С	pH Units		5/15/2020 1647h	SM4500-H+B	1.00	7.82	Н
Dhama, (901) 262, 9696	Sulfate	mg/L		5/22/2020 1823h	E300.0	750	7,280	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		6/4/2020 1120h	SM2540C	500	9,900	H*
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H - Sample was received outside of the holding time.

H* - The original analysis performed within the holding time yielded an anomalous result; thus, the sample was reanalyzed outside the holding time.

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Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-013Client Sample ID:Group B - DUPCollection Date:5/12/2020Received Date:5/15/20201426h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1839h	E300.0	200	4,370	
Fluoride	mg/L		5/22/2020 2342h	E300.0	0.100	< 0.100	
рН @ 25° С	pH Units		5/15/2020 1647h	SM4500-H+B	1.00	7.20	Н
Sulfate	mg/L		5/22/2020 1839h	E300.0	1,500	8,710	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	100	19,400	

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H - Sample was received outside of the holding time.

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Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client:PacifiCorpContact:Jeff TuckerProject:Hunter CCR Groundwater Sampling / PERCM052Lab Sample ID:2005382-014Client Sample ID:Group B - BlankCollection Date:5/13/20205/15/20201426h

Analytical Results

3440 South 700 Wes Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		5/22/2020 1856h	E300.0	0.100	< 0.100	
Fluoride	mg/L		5/22/2020 1856h	E300.0	0.100	< 0.100	
рН @ 25° С	pH Units		5/18/2020 1252h	SM4500-H+B	1.00	5.64	Н
Sulfate	mg/L		5/22/2020 1856h	E300.0	0.750	< 0.750	
Total Dissolved Solids	mg/L		5/18/2020 1200h	SM2540C	10.0	80.0	

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H - Sample was received outside of the holding time.

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QC SUMMARY REPORT

I ah Sam	nle ID: ICS-70137	Date Analyzed	ł· 06/01/202	0 1231h										
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Project	Hunter CCR Groundwate	er Sampling / H	PERCM052				QC Type:	LCS						
Lab Set	ID: 2005382						Dept:	ME						
Client:	PacifiCorp						Contact:	Jeff Tuck	er					

Lab Sample ID:	LCS-70137	Date Analyzed:	06/01/202	0 1231h								
Test Code:	200.7-W	Date Prepared:	05/29/202	0 1625h								
Boron		1.09	mg/L	E200.7	0.0449	0.500	1.000	0	109	85 - 115		
Calcium		9.63	mg/L	E200.7	0.211	1.00	10.00	0	96.3	85 - 115		
Lithium		1.03	mg/L	E200.7	0.0207	0.100	1.000	0	103	80 - 120		
Lab Sample ID:	LCS-70111	Date Analyzed:	06/01/202	0 1253h								
Test Code:	200.8-W	Date Prepared:	05/29/202	0 1625h								
Antimony		0.182	mg/L	E200.8	0.000734	0.00400	0.2000	0	91.1	85 - 115		
Arsenic		0.195	mg/L	E200.8	0.000298	0.00200	0.2000	0	97.4	85 - 115		
Barium		0.188	mg/L	E200.8	0.000544	0.00200	0.2000	0	93.9	85 - 115		
Beryllium		0.195	mg/L	E200.8	0.000198	0.00200	0.2000	0	97.7	85 - 115		
Cadmium		0.193	mg/L	E200.8	0.0000742	0.000500	0.2000	0	96.5	85 - 115		
Chromium		0.189	mg/L	E200.8	0.00191	0.00200	0.2000	0	94.6	85 - 115		
Cobalt		0.197	mg/L	E200.8	0.000300	0.00400	0.2000	0	98.3	85 - 115		
Lead		0.195	mg/L	E200.8	0.000448	0.00200	0.2000	0	97.3	85 - 115		
Molybdenum		0.199	mg/L	E200.8	0.000652	0.00200	0.2000	0	99.5	85 - 115		
Selenium		0.191	mg/L	E200.8	0.000508	0.00200	0.2000	0	95.3	85 - 115		
Thallium		0.189	mg/L	E200.8	0.000390	0.00200	0.2000	0	94.7	85 - 115		
Lab Sample ID:	LCS-70161	Date Analyzed:	06/01/202	0 1517h								
Test Code:	200.8-W	Date Prepared:	06/01/202	0 1025h								
Antimony		0.184	mg/L	E200.8	0.000734	0.00400	0.2000	0	92.1	85 - 115		
Arsenic		0.197	mg/L	E200.8	0.000298	0.00200	0.2000	0	98.6	85 - 115		
Barium		0.185	mg/L	E200.8	0.000544	0.00200	0.2000	0	92.7	85 - 115		
Beryllium		0.197	mg/L	E200.8	0.000198	0.00200	0.2000	0	98.6	85 - 115		
Cadmium		0.192	mg/L	E200.8	0.0000742	0.000500	0.2000	0	96.0	85 - 115		
Chromium		0.195	mg/L	E200.8	0.00191	0.00200	0.2000	0	97.4	85 - 115		
Cobalt		0.202	mg/L	E200.8	0.000300	0.00400	0.2000	0	101	85 - 115		
Lead		0.199	mg/L	E200.8	0.000448	0.00200	0.2000	0	99.5	85 - 115		
Molybdenum		0.198	mg/L	E200.8	0.000652	0.00200	0.2000	0	99.1	85 - 115		
Selenium		0.191	mg/L	E200.8	0.000508	0.00200	0.2000	0	95.7	85 - 115		
Selenium		0.191	mg/L	E200.8	0.000508	0.00200	0.2000	0	95.7	85 - 115	D D	

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Salt Lake City, UT 84119

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QC SUMMARY REPORT

Analyta	Deputé	Unita	Mathad	MDI	Reporting	Amount Spiked	Spike Ref.	% DEC	Limita	RPD Ref.	0/ DDD	RPD	Qual
Project:	Hunter CCR Groundwater Sampling / PEI	RCM052				QC Type:	MBLK						
Lab Set ID:	2005382					Dept:	ME						
Client:	PacifiCorp					Contact:	Jeff Tucke	r					
Anne i i one en	Denni enize												

Analyte		Result	Units	Method	MDL	Limit	Amount Spiked	Amount	%REC	Limits	Amt	% RPD	KFD Limit	Qual
Lab Sample ID:	MB-70137	Date Analyzed:	06/01/202	20 1229h										
Test Code:	200.7-W	Date Prepared:	05/29/202	20 1625h										
Boron		< 0.500	mg/L	E200.7	0.0449	0.500								
Calcium		< 1.00	mg/L	E200.7	0.211	1.00								
Lithium		< 0.100	mg/L	E200.7	0.0207	0.100								
Lab Sample ID:	MB-70111	Date Analyzed:	06/01/202	20 1250h										
Test Code:	200.8-W	Date Prepared:	05/29/202	20 1625h										
Antimony		< 0.00400	mg/L	E200.8	0.000734	0.00400								
Arsenic		< 0.00200	mg/L	E200.8	0.000298	0.00200								
Barium		< 0.00200	mg/L	E200.8	0.000544	0.00200								
Beryllium		< 0.00200	mg/L	E200.8	0.000198	0.00200								
Cadmium		< 0.000500	mg/L	E200.8	0.0000742	0.000500								
Chromium		< 0.00200	mg/L	E200.8	0.00191	0.00200								
Cobalt		< 0.00400	mg/L	E200.8	0.000300	0.00400								
Lead		< 0.00200	mg/L	E200.8	0.000448	0.00200								
Molybdenum		< 0.00200	mg/L	E200.8	0.000652	0.00200								
Selenium		< 0.00200	mg/L	E200.8	0.000508	0.00200								
Thallium		< 0.00200	mg/L	E200.8	0.000390	0.00200								
Lab Sample ID:	MB-70161	Date Analyzed:	06/01/202	20 1513h										
Test Code:	200.8-W	Date Prepared:	06/01/202	20 1025h										
Antimony		< 0.00400	mg/L	E200.8	0.000734	0.00400								
Arsenic		< 0.00200	mg/L	E200.8	0.000298	0.00200								
Barium		< 0.00200	mg/L	E200.8	0.000544	0.00200								
Beryllium		< 0.00200	mg/L	E200.8	0.000198	0.00200								
Cadmium		< 0.000500	mg/L	E200.8	0.0000742	0.000500								
Chromium		< 0.00200	mg/L	E200.8	0.00191	0.00200								
Cobalt		< 0.00400	mg/L	E200.8	0.000300	0.00400								
Lead		< 0.00200	mg/L	E200.8	0.000448	0.00200								
Molybdenum		< 0.00200	mg/L	E200.8	0.000652	0.00200								
Selenium		< 0.00200	mg/L	E200.8	0.000508	0.00200								

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QC SUMMARY REPORT

Client:	PacifiCorp						Contact:	Jeff Tucke	er					
Lab Set ID:	2005382						Dept:	ME						
Project:	Hunter CCR Groundwa	ater Sampling / PE	ERCM052				QC Type:	MBLK						
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample I	D: MB-70161	Date Analyzed:	06/01/202	0 1513h										
Test Code:	200.8-W	Date Prepared:	06/01/202	0 1025h										
TT 11		< 0.00200	/T	E200.8	0.000200	0.00000								

Lab Sample ID: MB-70109 Date Analyzed: 05/29/2020 1731h	Thallium		< 0.00200	mg/L	E200.8	0.000390	0.00200
	Lab Sample ID:	MB-70109	Date Analyzed:	05/29/2020 1	731h		
Test Code: HG-DW-245.1 Date Prepared: 05/18/2020 1242h	Test Code:	HG-DW-245.1	Date Prepared:	05/18/2020 1	242h		
Mercury < 0.0000900 mg/L E245.1 0.0000396 0.0000900	Mercury		< 0.0000900	mg/L	E245.1	0.0000396	0.000900

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QC SUMMARY REPORT

				Reporting	Amount Spiked			
Project: H	Hunter CCR Groundwater Sampling /	PERCM052			QC Type:	MS		
Lab Set ID: 2	2005382				Dept:	ME		
Client: H	PacifiCorp				Contact:	Jeff Tuck	er	

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	2005382-013BMS	Date Analyzed:	06/01/202	20 1314h										
Test Code:	200.7-W	Date Prepared:	05/29/202	20 1625h										
Calcium		466	mg/L	E200.7	2.11	10.0	10.00	487	-204	70 - 130				2
Lithium		5.05	mg/L	E200.7	0.207	1.00	1.000	4.08	96.9	75 - 125				
Lab Sample ID:	2005382-013BMS	Date Analyzed:	06/03/202	20 1318h										
Test Code:	200.7-W	Date Prepared:	05/29/202	20 1625h										
Boron		3.50	mg/L	E200.7	0.0449	0.500	1.000	2.42	108	70 - 130				
Lab Sample ID:	2005382-014BMS	Date Analyzed:	06/03/202	20 1423h										
Test Code:	200.7-W	Date Prepared:	05/29/202	20 1625h										
Boron		1.16	mg/L	E200.7	0.0449	0.500	1.000	0	116	70 - 130				
Calcium		10.4	mg/L	E200.7	0.211	1.00	10.00	0	104	70 - 130				
Lithium		1.07	mg/L	E200.7	0.0207	0.100	1.000	0	107	75 - 125				
Lab Sample ID:	2005382-013BMS	Date Analyzed:	06/01/202	20 1346h										
Test Code:	200.8-W	Date Prepared:	05/29/202	20 1625h										
Antimony		0.212	mg/L	E200.8	0.000734	0.00400	0.2000	0	106	75 - 125				
Arsenic		0.221	mg/L	E200.8	0.000298	0.00200	0.2000	0.000546	110	75 - 125				
Barium		0.198	mg/L	E200.8	0.000544	0.00200	0.2000	0.0101	94.0	75 - 125				
Beryllium		0.185	mg/L	E200.8	0.000198	0.00200	0.2000	0	92.4	75 - 125				
Cadmium		0.192	mg/L	E200.8	0.0000742	0.000500	0.2000	0.000136	96.0	75 - 125				
Chromium		0.182	mg/L	E200.8	0.00191	0.00200	0.2000	0	91.1	75 - 125				
Cobalt		0.189	mg/L	E200.8	0.000300	0.00400	0.2000	0.007	91.2	75 - 125				
Lead		0.181	mg/L	E200.8	0.000448	0.00200	0.2000	0	90.3	75 - 125				
Molybdenum		0.226	mg/L	E200.8	0.000652	0.00200	0.2000	0.00377	111	75 - 125				
Selenium		0.210	mg/L	E200.8	0.000508	0.00200	0.2000	0.00297	104	75 - 125				
Thallium		0.176	mg/L	E200.8	0.000390	0.00200	0.2000	0	88.0	75 - 125				
Lab Sample ID:	2005382-011BMS	Date Analyzed:	06/01/202	20 1531h										
Test Code:	200.8-W	Date Prepared:	06/01/202	20 1025h										
Antimony		0.426	mg/L	E200.8	0.00147	0.00800	0.4000	0.00245	106	75 - 125				

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QC SUMMARY REPORT

Client:	PacifiCorp	Contact:	Jeff Tucker
Lab Set ID:	2005382	Dept:	ME
Project:	Hunter CCR Groundwater Sampling / PERCM052	QC Type:	MS

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: Test Code:	2005382-011BMS 200.8-W	Date Analyzed: Date Prepared:	06/01/202 06/01/202											
Arsenic		0.434	mg/L	E200.8	0.000596	0.00400	0.4000	0.000473	108	75 - 125				
Barium		0.387	mg/L	E200.8	0.00109	0.00400	0.4000	0.0111	93.9	75 - 125				
Beryllium		0.372	mg/L	E200.8	0.000396	0.00400	0.4000	0	93.1	75 - 125				
Cadmium		0.393	mg/L	E200.8	0.000148	0.00100	0.4000	0.00162	98.0	75 - 125				
Chromium		0.373	mg/L	E200.8	0.00382	0.00400	0.4000	0	93.2	75 - 125				
Cobalt		0.595	mg/L	E200.8	0.000600	0.00800	0.4000	0.207	96.8	75 - 125				
Lead		0.383	mg/L	E200.8	0.000896	0.00400	0.4000	0.00724	94.0	75 - 125				
Molybdenum		0.817	mg/L	E200.8	0.00130	0.00400	0.4000	0.39	107	75 - 125				
Selenium		0.392	mg/L	E200.8	0.00102	0.00400	0.4000	0.0012	97.7	75 - 125				
Thallium		0.368	mg/L	E200.8	0.000780	0.00400	0.4000	0.000547	91.8	75 - 125				
Lab Sample ID: Test Code:	2005382-002BMS HG-DW-245.1	Date Analyzed: Date Prepared:	05/29/202 05/18/202											
Mercury		0.00281	mg/L	E245.1	0.0000396	0.0000900	0.003330	0	84.4	80 - 120				

² - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

2005382-011BMS: Insufficient sample amount was provided to allow for a full amount analysis of the MS/MSD. Reduced sample volume for the MS/MSD was used as a result.

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Antimony

0.420

mg/L

E200.8

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RPD

20

20

20

20

20

Limit Qual

2

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Jose Rocha QA Officer

% RPD

2.83

0.284

0.640

0.0155

0.504

QC SUMMARY REPORT

Client:	PacifiCorp						Contact:	Jeff Tucke	r		
Lab Set ID:	2005382						Dept:	ME			
Project:	Hunter CCR Groundwa	ater Sampling / PI	ERCM052	2			QC Type:	MSD			
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt
Lab Sample II	D: 2005382-013BMSD	Date Analyzed:	06/01/20	20 1317h							
Test Code:	200.7-W	Date Prepared:	05/29/20	20 1625h							
Calcium		480	mg/L	E200.7	2.11	10.0	10.00	487	-70.6	70 - 130	466
Lithium		5.07	mg/L	E200.7	0.207	1.00	1.000	4.08	98.3	75 - 125	5.05
Lab Sample II	D: 2005382-013BMSD	Date Analyzed:	06/03/20	20 1321h							
Test Code:	200.7-W	Date Prepared:	05/29/20	20 1625h							
Boron		3.48	mg/L	E200.7	0.0449	0.500	1.000	2.42	106	70 - 130	3.5
Lab Sample II	D: 2005382-014BMSD	Date Analyzed:	06/03/20	20 1403h							
Test Code:	200.7-W	Date Prepared:	05/29/20	20 1625h							
Boron		1.16	mg/L	E200.7	0.0449	0.500	1.000	0	116	70 - 130	1.16
Calcium		10.4	mg/L	E200.7	0.211	1.00	10.00	0	104	70 - 130	10.4
Lithium		1.08	mg/L	E200.7	0.0207	0.100	1.000	0	108	75 - 125	1.07

Lithium	1.08	mg/L	E200.7	0.0207	0.100	1.000	0	108	75 - 125	1.07	1.23	20
Lab Sample ID: 2005382-013BMSD Test Code: 200.8-W	Date Analyzed: Date Prepared:	06/01/202 05/29/202										
Antimony	0.213	mg/L	E200.8	0.000734	0.00400	0.2000	0	106	75 - 125	0.212	0.509	20
Arsenic	0.226	mg/L	E200.8	0.000298	0.00200	0.2000	0.000546	113	75 - 125	0.221	2.26	20
Barium	0.203	mg/L	E200.8	0.000544	0.00200	0.2000	0.0101	96.4	75 - 125	0.198	2.38	20
Beryllium	0.190	mg/L	E200.8	0.000198	0.00200	0.2000	0	95.1	75 - 125	0.185	2.94	20
Cadmium	0.194	mg/L	E200.8	0.0000742	0.000500	0.2000	0.000136	96.9	75 - 125	0.192	0.867	20
Chromium	0.189	mg/L	E200.8	0.00191	0.00200	0.2000	0	94.3	75 - 125	0.182	3.51	20
Cobalt	0.196	mg/L	E200.8	0.000300	0.00400	0.2000	0.007	94.7	75 - 125	0.189	3.64	20
Lead	0.183	mg/L	E200.8	0.000448	0.00200	0.2000	0	91.6	75 - 125	0.181	1.39	20
Molybdenum	0.225	mg/L	E200.8	0.000652	0.00200	0.2000	0.00377	111	75 - 125	0.226	0.296	20
Selenium	0.219	mg/L	E200.8	0.000508	0.00200	0.2000	0.00297	108	75 - 125	0.21	4.08	20
Thallium	0.178	mg/L	E200.8	0.000390	0.00200	0.2000	0	89.1	75 - 125	0.176	1.30	20
Lab Sample ID: 2005382-011BMSD Test Code: 200.8-W	Date Analyzed: Date Prepared:	06/01/202 06/01/202										

0.00245

104

75 - 125

0.426

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20

1.27

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. Confidential Business Information: This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

0.00800

0.4000

0.00147



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QC SUMMARY REPORT

Client:	PacifiCorp	Contact:	Jeff Tucker
Lab Set ID:	2005382	Dept:	ME
Project:	Hunter CCR Groundwater Sampling / PERCM052	QC Type:	MSD

RPD Ref. RPD Reporting Amount Spiked Spike Ref. MDL %REC % RPD Result Units Method Limits Limit Qual Analyte Limit Amt Amount Lab Sample ID: 2005382-011BMSD Date Analyzed: 06/01/2020 1534h Test Code: 200.8-W Date Prepared: 06/01/2020 1025h E200.8 0.00400 0.4000 0.000473 0.434 0.717 20 0.437 0.000596 109 75 - 125 Arsenic mg/L E200.8 Barium 0.390 0.00109 0.00400 0.4000 0.0111 94.6 75 - 125 0.387 0.713 20 mg/L E200.8 75 - 125 Beryllium 0.377 mg/L 0.000396 0.00400 0.4000 0 94.2 0.372 1.16 20 Cadmium 0.388 E200.8 0.000148 0.00100 0.4000 0.00162 96.6 75 - 125 0.393 1.35 20 mg/L E200.8 Chromium 0.376 0.00382 0.00400 0.4000 0 94.0 75 - 125 0.373 0.824 20 mg/L Cobalt 0.604 mg/L E200.8 0.000600 0.00800 0.4000 0.207 99.0 75 - 125 0.595 1.48 20 E200.8 Lead 0.388 0.000896 0.4000 0.00724 75 - 125 1.25 mg/L 0.00400 95.2 0.383 20 E200.8 Molybdenum 0.832 mg/L 0.00130 0.00400 0.4000 0.39 111 75 - 125 0.817 1.88 20 Selenium 0.397 E200.8 0.00102 0.00400 0.4000 0.0012 99.0 1.25 20 mg/L 75 - 125 0.392 Thallium 0.373 E200.8 0.000780 0.00400 0.4000 1.49 20 0.000547 93.2 75 - 125 0.368 mg/L Lab Sample ID: 2005382-002BMSD Date Analyzed: 05/29/2020 1750h HG-DW-245.1 Test Code: Date Prepared: 05/18/2020 1242h 0.00282 E245.1 0.0000396 0.0000900 0.003330 0 84.5 80 - 120 0.00281 0.118 20 Mercury mg/L

² - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

2005382-011BMSD: Insufficient sample amount was provided to allow for a full amount analysis of the MS/MSD. Reduced sample volume for the MS/MSD was used as a result.

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All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. Confidential Business Information: This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report is provided for the exclusive use of the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



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Jose Rocha QA Officer

QC SUMMARY REPORT

Client:	PacifiCorp	Contact:	Jeff Tucker
Lab Set ID:	: 2005382	Dept:	WC
Project:	Hunter CCR Groundwater Sampling / PERCM052	QC Type:	DUP

Test Code: PH-4500H+B pH @ 25° C 7 Lab Sample ID: 2005381-011ADUP Date Test Code: PH-4500H+B 7 DH @ 25° C 7 7 Lab Sample ID: 2005382-005ADUP Date Test Code: PH-4500H+B 7 DH @ 25° C 7 7 Lab Sample ID: 2005382-005ADUP Date pH @ 25° C 7 7 Lab Sample ID: 2005382-014ADUP Date pH @ 25° C 7 7 Lab Sample ID: 2005382-014ADUP Date Test Code: PH-4500H+B 7	e Analyzed: 7.90 e Analyzed:	05/15/2020 pH Units	1616h								
Lab Sample ID: 2005381-011 ADUP Data Test Code: PH-4500H+B PH pH @ 25° C 7 Lab Sample ID: 2005382-005 ADUP Data Test Code: PH-4500H+B PH pH @ 25° C 7 PH Lab Sample ID: 2005382-005 ADUP Data Test Code: PH-4500H+B PH pH @ 25° C 7 PH Lab Sample ID: 2005382-014 ADUP Data Test Code: PH-4500H+B PH		pH Units									
Test Code: PH-4500H+B pH @ 25° C 7 Lab Sample ID: 2005382-005ADUP Date Test Code: PH-4500H+B 7 pH @ 25° C 7 7 Lab Sample ID: 2005382-014ADUP Date pH @ 25° C 7 7 Lab Sample ID: 2005382-014ADUP Date Test Code: PH-4500H+B 7	e Analyzed	1	SM4500-H+B	1.00	1.00			7.85	0.635	5	Н
Lab Sample ID: 2005382-005ADUP Data Test Code: PH-4500H+B PH pH @ 25° C 7 Lab Sample ID: 2005382-014ADUP Data Test Code: PH-4500H+B PH	e 7 maryzea.	05/15/2020	1616h								
Test Code: PH-4500H+B pH @ 25° C 7 Lab Sample ID: 2005382-014ADUP Date Test Code: PH-4500H+B 7	7.28	pH Units	SM4500-H+B	1.00	1.00			7.25	0.413	5	Н
Lab Sample ID:2005382-014ADUPDateTest Code:PH-4500H+B	e Analyzed:	05/15/2020	1647h								
Test Code: PH-4500H+B	7.32	pH Units	SM4500-H+B	1.00	1.00			7.32	0	5	Н
рН @ 25° С	e Analyzed:	05/18/2020	1252h								
pri @ =o o	5.64	pH Units	SM4500-H+B	1.00	1.00			5.64	0	5	Н
Lab Sample ID:2005382-001ADUPDateTest Code:TDS-W-2540C	e Analyzed:	05/18/2020	1200h								
Total Dissolved Solids 34	4,600	mg/L	SM2540C	80.0	100			33600	2.93	5	
Lab Sample ID:2005381-013ADUPDateTest Code:TDS-W-2540C	e Analyzed:	06/04/2020	1120h								
Total Dissolved Solids 3	,200	mg/L	SM2540C	40.0	50.0			3220	0.623	5	H*
Lab Sample ID:2005382-012ADUPDateTest Code:TDS-W-2540C	e Analyzed:	06/04/2020	1120h								
Total Dissolved Solids 10		mg/L	SM2540C	400	500			9900	2.00	5	H*

H - Sample was received outside of the holding time.

H* - The original analysis performed within the holding time yielded an anomalous result; thus, the sample was reanalyzed outside the holding time.

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QC SUMMARY REPORT

Client:	PacifiCorp	Contact:	Jeff Tucker
Lab Set ID:	2005382	Dept:	WC
Project:	Hunter CCR Groundwater Sampling / PERCM052	QC Type:	LCS

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: Test Code:	LCS-R139212 300.0-W	Date Analyzed:	05/22/202	20 1034h										
Chloride		5.20	mg/L	E300.0	0.0565	0.100	5.000	0	104	90 - 110				
Fluoride		5.32	mg/L	E300.0	0.0240	0.100	5.000	0	106	90 - 110				
Sulfate		5.40	mg/L	E300.0	0.136	0.750	5.000	0	108	90 - 110				
Lab Sample ID: Test Code:	LCS-R139214 300.0-W	Date Analyzed:	05/27/202	20 1034h										
Fluoride		5.40	mg/L	E300.0	0.0240	0.100	5.000	0	108	90 - 110				
Lab Sample ID: Test Code:	LCS-R139335 F-W-4500FC	Date Analyzed:	05/29/202	20 1325h										
Fluoride		0.913	mg/L	SM4500-F-C	0.0378	0.100	1.000	0	91.3	90 - 110				
Lab Sample ID: Test Code:	LCS-R138872 PH-4500H+B	Date Analyzed:	05/15/202	20 1616h										
pH @ 25° C		9.01	pH Units	SM4500-H+B	1.00	1.00	9.000	0	100	98 - 102				
Lab Sample ID: Test Code:	LCS-R138873 PH-4500H+B	Date Analyzed:	05/15/202	20 1647h										
pH @ 25° C		9.07	pH Units	SM4500-H+B	1.00	1.00	9.000	0	101	98 - 102				
Lab Sample ID: Test Code:	LCS-R138916 PH-4500H+B	Date Analyzed:	05/18/202	20 1252h										
pH @ 25° C		9.09	pH Units	SM4500-H+B	1.00	1.00	9.000	0	101	98 - 102				
Lab Sample ID: Test Code:	LCS-R138945 TDS-W-2540C	Date Analyzed:	05/18/202	20 1200h										
Total Dissolved	Solids	208	mg/L	SM2540C	8.00	10.0	205.0	0	101	80 - 120				
Lab Sample ID: Test Code:	LCS-R139538 TDS-W-2540C	Date Analyzed:	06/04/202	20 1120h										
Total Dissolved	Solids	194	mg/L	SM2540C	8.00	10.0	205.0	0	94.6	80 - 120				
												ta: (10/20	20 D	20 642

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QC SUMMARY REPORT

Contact: Jeff Tucker

Kyle F. Gross Laboratory Director

Jose Rocha QA Officer

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QC SUMMARY REPORT

Client:	PacifiCorp	Contact:	Jeff Tucker		
Lab Set II	D: 2005382	Dept:	WC		
Project:	Hunter CCR Groundwater Sampling / PERCM052	QC Туре:	MBLK		
		Reporting Amount Spiked	Spike Ref.	RPD Ref.	RPD

Analyte		Result	Units	Method	MDL	Limit	Amount Spiked	Amount	%REC	Limits	Amt	% RPD	Limit	Qual
Lab Sample ID: Test Code:	MB-R139212 300.0-W	Date Analyzed:	05/22/20	20 1017h										
Chloride		< 0.100	mg/L	E300.0	0.0565	0.100								
Fluoride		< 0.100	mg/L	E300.0	0.0240	0.100								
Sulfate		< 0.750	mg/L	E300.0	0.136	0.750								
Lab Sample ID: Test Code:	MB-R139214 300.0-W	Date Analyzed:	05/27/20	20 1017h										
Fluoride		< 0.100	mg/L	E300.0	0.0240	0.100								
Lab Sample ID: Test Code:	MB-R139335 F-W-4500FC	Date Analyzed:	05/29/20	20 1325h										
Fluoride		< 0.100	mg/L	SM4500-F-C	0.0378	0.100								
Lab Sample ID: Test Code:	MB-R138945 TDS-W-2540C	Date Analyzed:	05/18/20	20 1200h										
Total Dissolved	Solids	< 10.0	mg/L	SM2540C	8.00	10.0								
Lab Sample ID: Test Code:	MB-R139538 TDS-W-2540C	Date Analyzed:	06/04/20	20 1120h										
Total Dissolved	Solids	< 10.0	mg/L	SM2540C	8.00	10.0								
						-			-		-		-	

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QC SUMMARY REPORT

		Reporting Amount Spiked	Spike Ref. RPD Ref.	
Project:	Hunter CCR Groundwater Sampling / PERCM052	QC Type:	MS	
Lab Set ID	2005382	Dept:	WC	
Client:	PacifiCorp	Contact:	Jeff Tucker	

Lab Sample ID: 2005382-004AMS 300.0-W Date Analyzed: 05/22/2020 1445h Test Code: 300.0-W 13,200 mg/L E300.0 113 200 10,000 2770 105 90 - 110 Fluoride 13,200 mg/L E300.0 48.0 200 10,000 0 105 90 - 110 Sulfate 18,800 mg/L E300.0 272 1,500 10,000 8300 105 90 - 110 Lab Sample ID: 2005382-005AMS Date Analyzed: 05/22/2020 1535h 205/22/2020 1535h 200 113 200 10,000 4160 104 90 - 110 Chloride 14,500 mg/L E300.0 113 200 10,000 4160 104 90 - 110 Fluoride 10,600 mg/L E300.0 48.0 200 10,000 0 106 90 - 110 Sulfate 19,000 mg/L E300.0 272 1,500 10,000 8220 108 90 - 110	% RPD	Limit	Qual
Fluoride 10,500 mg/L E300.0 48.0 200 10,000 0 105 90 - 110 Sulfate 18,800 mg/L E300.0 272 1,500 10,000 8300 105 90 - 110 Lab Sample ID: 2005382-005AMS Date Analyzed: 05/22/2020 1535h 5 5 Chloride 14,500 mg/L E300.0 113 200 10,000 4160 104 90 - 110 Chloride 14,500 mg/L E300.0 113 200 10,000 4160 104 90 - 110 Fluoride 10,600 mg/L E300.0 48.0 200 10,000 0 106 90 - 110			
Sulfate 18,800 mg/L E300.0 272 1,500 10,000 8300 105 90 - 110 Lab Sample ID: 2005382-005AMS Date Analyzed: 05/22/2020 1535h 5 5 5 5 Test Code: 300.0-W 14,500 mg/L E300.0 113 200 10,000 4160 104 90 - 110 Chloride 14,500 mg/L E300.0 48.0 200 10,000 0 106 90 - 110			
Lab Sample ID: 2005382-005AMS Date Analyzed: 05/22/2020 1535h Test Code: 300.0-W Chloride 14,500 mg/L E300.0 113 200 10,000 4160 104 90 - 110 Fluoride 10,600 mg/L E300.0 48.0 200 10,000 0 106 90 - 110			
Test Code: 300.0-W Chloride 14,500 mg/L E300.0 113 200 10,000 4160 104 90 - 110 Fluoride 10,600 mg/L E300.0 48.0 200 10,000 0 106 90 - 110			
Fluoride 10,600 mg/L E300.0 48.0 200 10,000 0 106 90 - 110			
Sulfate 19000 mg/L E300.0 272 1.500 10.000 8220 1.08 90 - 110			
Sunace 17,000 mg/L 25000 272 1,500 10,000 6220 106 70-110			
Lab Sample ID: 2005382-011AMS Date Analyzed: 05/27/2020 1124h Test Code: 300.0-W 5/27/2020 1124h 5/27/2020 1124h			
Fluoride 22.1 mg/L E300.0 0.0960 0.400 20.00 0.885 106 90 - 110			
Lab Sample ID: 2005382-012AMS Date Analyzed: 05/27/2020 1214h Test Code: 300.0-W 05/27/2020 1214h			
Fluoride 21.1 mg/L E300.0 0.0960 0.400 20.00 0.799 101 90 - 110			
Lab Sample ID: 2005381-014AMS Date Analyzed: 05/29/2020 1325h Test Code: F-W-4500FC 5-29/2020 1325h			
Fluoride 1.57 mg/L SM4500-F-C 0.0378 0.100 1.000 0.574 99.6 80 - 120			

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Jose Rocha QA Officer

QC SUMMARY REPORT

Client:	PacifiCorp	Contact:	Jeff Tucker
Lab Set ID:	2005382	Dept:	WC
Project:	Hunter CCR Groundwater Sampling / PERCM052	QC Type:	MSD

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	2005382-004AMSD	Date Analyzed:	05/22/202	20 1502h										
Test Code:	300.0-W													
Chloride		13,200	mg/L	E300.0	113	200	10,000	2770	104	90 - 110	13200	0.162	20	
Fluoride		10,400	mg/L	E300.0	48.0	200	10,000	0	104	90 - 110	10500	1.02	20	
Sulfate		18,800	mg/L	E300.0	272	1,500	10,000	8300	105	90 - 110	18800	0.0905	20	
Lab Sample ID:	2005382-005AMSD	Date Analyzed:	05/22/202	20 1552h										
Test Code:	300.0-W													
Chloride		14,500	mg/L	E300.0	113	200	10,000	4160	103	90 - 110	14500	0.235	20	
Fluoride		10,700	mg/L	E300.0	48.0	200	10,000	0	107	90 - 110	10600	0.590	20	
Sulfate		19,100	mg/L	E300.0	272	1,500	10,000	8220	109	90 - 110	19000	0.458	20	
Lab Sample ID:	2005382-011AMSD	Date Analyzed:	05/27/202	20 1141h										
Test Code:	300.0-W													
Fluoride		21.7	mg/L	E300.0	0.0960	0.400	20.00	0.885	104	90 - 110	22.1	1.85	20	
Lab Sample ID:	2005382-012AMSD	Date Analyzed:	05/27/202	20 1231h										
Test Code:	300.0-W													
Fluoride		21.4	mg/L	E300.0	0.0960	0.400	20.00	0.799	103	90 - 110	21.1	1.45	20	
Lab Sample ID: Test Code:	2005381-014AMSD F-W-4500FC	Date Analyzed:	05/29/202	20 1325h										
Fluoride		1.65	mg/L	SM4500-F-C	0.0378	0.100	1.000	0.574	108	80 - 120	1.57	4.97	10	

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American West Analytical Laboratories

REVISED: 5-29-20

Metals changed from 6010/6020 to 200.7/200.8 - DB

WORK O	RDER Summary				Work Orde	r: 2005382 Pa	age 1 of 6
Client:	PacifiCorp				Due Dat	e: 6/1/2020	
Client ID:	PAC900		Contact:	Jeff Tucker			
Project:	Hunter CCR Groundwater	Sampling / PERCM052	QC Leve	l: II+	WO Tvn	e: Project	
Comments:	QC2+. Include EDD. Footno		-			-	5 20
Comments.	20 - Metals changed from 601			ior Radium sent to ALS - F	i. Connis. Entan report a	nd EDD to 4 people. 3)-29- D/
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel Storage	<u>+</u> 1
2005382-001A	ELF-10	5/12/2020 2020h	5/15/2020 1426h	300.0-W 3 SEL Analytes: CL F SO4	Aqueous	df - we/tds	:
				PH-4500H+B		df - wc/tds	
				TDS-W-2540C		df - wc/tds	
2005382-001B				200.7-W		df - metals	
				3 SEL Analytes: B CA LI			
				200.7-W-PR		df - metals	
				200.8-W		df - metals	
		· .		······	BE CD CR CO PB MO SE TL		
	·	······		200.8-W-PR		df - metals	
	· · · · · · · · · · · · · · · · · · ·	·		HG-DW-245.1		df - metals	.
2005200 0010		·		HG-DW-PR		df - metals	
2005382-001C				OUTSIDE LAB		ALS - Ft. Collins.	
2005382-002A	ELF-11	5/12/2020 1730h	5/15/2020 1426h	300.0-W 3 SEL Analytes: CL F SO4	Aqueous	df - wo/tds	
				PH-4500H+B	· · · ·	df - wc/tds	
	_			TDS-W-2540C		df - wc/tds	
2005382-002B				200.7-W		df - metals	
	·		·	3 SEL Analytes: B CA LI			
			-	200.7-W-PR		df - metals	
				200.8-W		df - metals	
				-	BE CD CR CO PB MO SE TL		
		·		200.8-W-PR		df - metals df - metals	
				HG-DW-245.1 HG-DW-PR		df - metals	
2005382-002C				OUTSIDE LAB		ALS - Ft. Collins.	
2005382-002C	ELF-12	5/12/2020 1920h	5/15/2020 1426h	300.0-W	Aqueous	df - we/tds	· · · · ·
2003362-003A	ELT*14	5/12/2020 19201	5/15/2020 14201	3 SEL Analytes: CL F SO4	//queous	ui - wortus	
				PH-4500H+B		df - wc/tds	
				TDS-W-2540C		df - wc/tds	

WORK O	RDER Summary				Wo	rk Order: 2005382 Page 2 of
Client:	PacifiCorp				L	Due Date: 6/1/2020
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel Storage
2005382-003B	ELF-12	5/12/2020 1920h	5/15/2020 1426h	200.7-W	Aqueous	df - metals
				3 SEL Analytes: B C	4 LI	
				200.7-W-PR		df - metals
				200.8-W		df - metals
					AS BA BE CD CR CO PB M	
				200.8-W-PR		df - metals
				HG-DW-245.1		df - metals
				HG-DW-PR		df - metals
2005382-003C	·····	· · · · · · · · · · · · · · · · · · ·		OUTSIDE LAB		ALS - Ft. Collins.
2005382-004A	ELF-13	5/12/2020 1850h	5/15/2020 1426h	300.0-W	Aqueous	df - wc/tds
				3 SEL Analytes: CL I	F \$04	···
				PH-4500H+B		df - wc/tds
	····			TDS-W-2540C		df - wc/tds
2005382-004B				200.7-W		df - metals
				3 SEL Analytes: B C.	4 LI	16
	·	······		200.7-W-PR		df - metals
				200.8-W 11 SEL Analytes: SB	AS BA BE CD CR CO PB M	df - metals O SE TL
				200.8-W-PR		df - metals
	·	· · · · ·		HG-DW-245.1		df - metals
		······································		HG-DW-PR	·	df - metals
2005382-004C			· ·	OUTSIDE LAB		ALS - Ft. Collins.
2005382-005A	ELF-14	5/12/2020 1800h	5/15/2020 1426h	300.0-W	Aqueous	df - wc/tds
		ere en		3 SEL Analytes: CL I	F SO4	·
				PH-4500H+B		df - wc/tds
				TDS-W-2540C		df - wc/tds
2005382-005B				200.7-W		df - metals
				3 SEL Analytes: B C.	A LI	
				200.7-W-PR		df - metals
				200.8-W		df - metals
		·		in a st	AS BA BE CD CR CO PB M	
				200.8-W-PR		df - metals
				HG-DW-245.1		df - metals
2005382-005C	· · · ·			HG-DW-PR OUTSIDE LAB		df - metals ALS - Ft. Collins.
· · · ·		5/10/0000 1100L	5/15/0000 140/2	······································		df - wc/tds
2005382-006A	ELF-1D	5/13/2020 1130h	5/15/2020 1426h	300.0-W 3 SEL Analytes; CL .	Aqueous F SQ4	ui - wonus
				PH-4500H+B		df - wc/tds
Printed: 5/29/2020				 	нок	HOK COC Emailed

WORK O Client:	RDER Summary PacifiCorp					Work Order: 2005382 Page 3 of Due Date: 6/1/2020
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel Storage
- 2005382-006A	ELF-1D	5/13/2020 1130h	5/15/2020 1426h	TDS-W-2540C	Aqueous	df - wc/tds
2005382-006B				200.7-W 3 SEL Analytes: B CA LI		df - metals
			<u> </u>	200.7-W-PR		df - metals
				200.8-W 11 SEL Analytes: SB AS BA	PECDCPCO	df - metals
				200.8-W-PR	DE CD CR CO	df - metals
				HG-DW-245.1		df - metals
				HG-DW-PR		df - metals
2005382-006C	· · · · ·	<u> </u>		OUTSIDE LAB		ALS - Ft. Collins.
2005382-007A	ELF-2	5/13/2020 1045h	5/15/2020 1426h	300.0-W 3 SEL Analytes: CL F SO4	Aqueous	df - wc/tds
		,		PH-4500H+B		df - wc/tds
				TDS-W-2540C		df - wc/tds
2005382-007B				200.7-W 3 SEL Analytes: B CA LI		df - metals
	· · · · ·			200.7-W-PR		df - metals
	· · · · · · · · ·		· .	200.8-W 11 SEL Analytes: SB AS BA		df - metals
	·	· · · · · · · · · · · · · · · · · · ·		200.8-W-PR	<i>DD</i> OD ON CO	df - metals
				HG-DW-245.1		df - metals
				HG-DW-PR		
2005382-007C			· · · · ·	OUTSIDE LAB	.	ALS - Ft. Collins.
2005382-008A	ELF-3	5/13/2020 1330h-	5/15/2020 1426h	300.0-W 3 SEL Analytes: CL F SO4	Aqueous	df - wc/tds
			•	PH-4500H+B		df - wc/tđs
		•		TDS-W-2540C		df - wc/tds
2005382-008B				200.7-W 3 SEL Analytes: B CA LI	•	df - metals
				200.7-W-PR		df - metals
				200.8-W 11 SEL Analytes: SB AS BA	BE CD CP CO	df - metals PR MO SE TI
				200.8-W-PR	<u></u>	df - metals
				HG-DW-245.1		df - metals
				HG-DW-PR		df - metals
2005382-008C				OUTSIDE LAB		ALS - Ft. Collins,
2005382-009A	ELF-4	5/13/2020 1115h	5/15/2020 1426h	300.0-W 3 SEL Analytes: CL F SO4	Aqueous	df - wc/tds
Printed: 5/29/2020	LABORATORY CHECK: %				HOK	HOK COC Emailed

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	RDER Summary					k Order: 2005382 Page
Client:	PacifiCorp				D	ue Date: 6/1/2020
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel Storage
2005382-009A	ELF-4	5/13/2020 1115h	5/15/2020 1426h	PH-4500H+B	Aqueous	df - wc/tds
				TDS-W-2540C		df - wo/tds
2005382-009B				200.7-W		df - metals
				3 SEL Analytes: B CA	LI	
				200.7-W-PR		df - metals
				200.8-W		df - metals
				11 SEL Analytes: SB /	<u>AS BA BE CD</u> CR CO PB MC	D SE TL
				200.8-W-PR		df - metals
		·		HG-DW-245.1	<u>-</u>	df - metals
				HG-DW-PR		df - metals
2005382-009C				OUTSIDE LAB		ALS - Ft. Collins.
2005382-010A	ELF-7	5/13/2020 1205h	5/15/2020 1426h	300.0-W	Aqueous	df - we/tds
				3 SEL Analytes: CL F	SO4	
				PH-4500H+B		df - wc/tds
		•		TDS-W-2540C		df - wc/tds
2005382-010B				200.7-W		df - metals
		· · · · ·		3 SEL Analytes: B CA	<u>LI</u>	
				200.7-W-PR		df - metals
	· · · · · ·			200.8-W		df - metals
				11 SEL Analytes: SB A	AS BA BE CD CR CO PB MC	
				200.8-W-PR		df - metals
				HG-DW-245.1	· · · · · · · · · · · · · · · · · · ·	df - metals
				HG-DW-PR		df - metals
2005382-010C	• • •	and the second		OUTSIDE LAB	·	ALS - Ft. Collins.
2005382-011A	ELF-8	5/13/2020 0945h	5/15/2020 1426h	300.0-W 3 SEL Analytes: CL F	Aqueous `SO4	df - wc/tds
				PH-4500H+B		df - wc/tds
				TDS-W-2540C	-	df - wc/tds
2005382-011B				200.7-W		df - metals
				3 SEL Analytes: B CA	LI	
				200.7-W-PR		df - metals
			_	200.8-W		df - metals
				11 SEL Analytes: SB .	AS BA BE CD CR CO PB M	O SE TL
		· · · · · · · · · · · · · · · · · · ·		200.8-W-PR		df - metals
				HG-DW-245.1		df - metals
				HG-DW-PR		df - metals
2005382-011C				OUTSIDE LAB		ALS - Ft. Collins.

Printed; 5/29/2020

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Client:	PacifiCorp					Due Date: 6/1/2020	
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	 Matrix	Sel Storage	
	-		· · · · ·				
2005382-012A	ELF-9	5/13/2020 1300h	5/15/2020 1426h	300.0-W	Aqueous	df - wc/tds	1
	5			3 SEL Analytes: CL F SO4			
				PH-4500H+B		df - wc/tds	
				TDS-W-2540C		df - wc/tds	
2005382-012B				200.7-W		df - metals	
	· · ·			3 SEL Analytes: B CA LI		df - metals	
				200.7-W-PR			
				200.8-W	RECOCECO PR	df - metals	
				11 SEL Analytes: SB AS BA 200.8-W-PR	$\underline{BE} \cup \underline{CE} \cup \underline{CE} \cup \underline{CE}$	df - metals	
		·····		HG-DW-245.1		df - metals	
	·			HG-DW-PR		df - metals	
2005382-012C		· · · · · · · · · · · · · · · · · · ·		OUTSIDE LAB		ALS - Ft, Collins,	
2005382-012A	Group B - DUP	5/12/2020	5/15/2020 1426h	300.0-W	Aqueous	df - wc/tds	
2003382-013A	Group B - DOF	571272020	3/13/2020 14201	3 SEL Analytes: CL F SO4	Aqueous	ut - works	1
			•	PH-4500H+B		df - wc/tds	
	·			TDS-W-2540C		df - we/tds	
2005382-013B				200.7-W		df - metals	
				3 SEL Analytes: B CA LI			
				200.7-W-PR		df - metals	· · ·
			· · · · ·	200.8-W		df - metals	
				11 SEL Analytes: SB AS BA	BE CD CR CO PB	MO SE TL	
				200.8-W-PR		df - metals	
		· · · ·		HG-DW-245.1		df - metals	
				HG-DW-PR		df - metals	· · _
2005382-013C			,	OUTSIDE LAB		ALS - Ft. Collins.	
2005382-014A	Group B - Blank	5/13/2020 1120h	5/15/2020 1426h	300.0-W	Aqueous	df - wc/tds	
	-			3 SEL Analytes: CL F SO4	-		
				PH-4500H+B		df - wc/tds	
				TDS-W-2540C		df - wc/tds	
2005382-014B				200.7-W		df - metals	
				3 SEL Analytes: B CA LI			
				200.7-W-PR		df - metals	
				200.8-W		df - metals	
				11 SEL Analytes: SB AS BA	BE CD CR CO PB		
		· · · · · ·		200.8-W-PR	,,,	df - metals	
			,	HG-DW-245.1		df - metals	
				HG-DW-PR		df - metals	

WORK O	RDER Summary				Wor	k Order: 2005382	Page 6 of 6
Client:	PacifiCorp				D	ue Date: 6/1/2020	
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel Storage	
2005382-014C	Group B - Blank	5/13/2020 1120h	5/15/2020 1426h	OUTSIDE LAB	Aqueous	ALS - Ft. Colli	ns. 2

AWAL Use Only - One or more samples expired upon receipt:

Test Code

PH-4500H+B

American V Analytical Labo 3425 700 W. Salutado (i) Phore # (2001) 263-8666 - Tel. Free	pratories	Alkanetty os eros de constitución como (XEE) Logite DCD - materia e se	CHAIN OF CUST	mikel using AWAE is standard and via list-and regarding	20053357 AWAL (AD Simple Set 7
Fact (\$91) 263-8697 - Eduard av		QC Level:	Turn Around Time;	Tintes or fra acting and the frame beau market suggest	Page i e 2
www.awal-labs	.com	1 2 2+ 3 3+	1 2 3 4 5 (Strid)	reports will be omented by 5:00 p.m. on the day they because	6/119
Client: Pacificorp-UT Address City, State, Zip: Contact: Jeff Tucker Phone #: Codi =: E-mail: Jeff, Tucker@Pacificorp.com Hundra CCP. Come Junker Semanling		et v Evad Eikes Ver a) sample - no analysis		Report down to the MDL Include EDD Lab Riter for Field Piller for For Compfiance With: NELAP O PCRA C CWA C CWA D SDVA	Laboratory Use Only COCTupe Was E. Brownt on Outer Packary Y. N. 2. Lybrichen wy Gelor Packary Y. K. N. 5. Present on Senapti N. A.
Project Name: Hunter CCR Groundwater Sampling Project #: PO #: Sampler Name: Mike Shirtey Sample ID:	Date Jime Sampled Sampled	lt de Cestaintre Sumple Matrix - F24.v Group J (see attached) Not enough water to sam		E BLAP/ACLA E BLAP/ACLA D NLLAF C New-Compliance O Other Known Hazards Sample Compacts	Calarsher on Sample Y N NA Samples Ware: J Stapped or hark (c) fortut Ambient or fortun
1 ELF-10 2 ELF-11	5/12/2003 2020			.saupis Connactits	A Record Intera
3 ELF-12	5/12/000 1920	4 " X			
4 ELF-13 5 ELF-14	5/12/2020 19:50	4 w X 4 w X			5 (ThipDay Preserved Y N Checked at itemet
ELF-1D ELF-2 ELF-3 ELF-3 ELF-4 ELF-5	5/13/000 /1/30 5/13/2000 /04/5- 5/13/2000 1330 5/13/2000 1115	4 w x 4 w x 4 w x 4 w x 4 w x 4 w x 4 w x			* Received Within A Distribution Designation Definitio Definition Definition Definition Definition Definit
ELF-6 ELF-7 I ELF-7 I ELF-8 I ELF-9	57/3/2020 1205 57/3/2020 1205 57/3/2020 1205 5/13/2020 1300	4 w × 4 w × 4 w × 4 w ×			Sandhe Labyla and COC Record Match?
BROUP B - DUP	51/2/200	4 × x		Samid lutra ilean	
Printhan Perris Vanderbergt Retingelskellig Signal we Print Malue: Retingersteal by:	Cold Constant Cold Constant Hang: Cold Scientific Sciences by Plane United Parties Larte Weter May	Dervise Bri	14:20 14:20 14:20 14: 14: 14:	Special instructions: Please CC analytical report and EDD to: mholland@waterenvtech.com eerickson@waterenvtech.com derickson@waterenvtech.com	
SLouturo Print Nance			Time.	werrensyne yraterenviechteonr	

By signing this Chain of Custody you are agreeing to permit AWAL to subcontract any analyses not normally performed at AWAL.

KEW COLLER

	American Analytical Lab 340 5 700 W. Sattase C Phane \$(801) 2004-080 Table	Oratories		Alia	intelysis	w! tes	sonder mats (N	cled using QL) unice	g NELAR SAPERITI	(f assered	्रत्व मन्त्र	ttods ar	ખી તરી લીટ	ata well b	N: FUENIS	DDY tool using AWAU-standard analytic lists and reporting body analism attached documentation.	20053857 AWAL Lob Sample Set 0 Page 2 at 2
	Fax # (801) 263-8687 - Firmult .						Level					Arou		_		Unless other arrangements have been made signed reports will be entailed by	the Dan
	www.awal-lab	5.ccm			1	2 2	2+3	3+			12	34	56	md)	<u></u>	5:00pm on the day they are due.	6/1/19
Address: City, State, Zip:	Pacificorp-U/T				S - DB/ Am		s									Report down to the MDL To t	Laboratory Use Only COC Tape Was: P Present on Outer Fackage Y N
Contact:	Jeff Tucker	•			Ĩ		alysi								ł	Far Case allow Mittle	2 Untroken on Duter Package
	Cell Jeff. Tucken@Pacificors.com Hunter CCR Groundwater Sampling	·	· · · · · · · · · · · · · · · · · · ·		Bred Gifts		npie - no an									For Compliance With; D NELAP D RCHA CWA SDWA	Y N NA 3 Present in Sampler N
	PERCM052	·····			1 76	attached)	Not enough water to sample - no analysis									ELAP/ A2LA NELAP Non-Compliance Othere	1 Unbasken on Sample NA
Sampler Name:	Mike Shirley	Date	Time	of Containwrs	Sample Matrix	Group & (see attached)	t enough v								ľ	Known Hazards &	Samplex Work L Shipped or have delivered 2 Ambentor (refs)
1ป	Sample ID: GROUP B - BLANK	Sampled 5/17/2-20	Sampled	3	- S W	1 <u>5</u> 1	ž									Sample Comments	J Tempstature 0.5 c
						· · · ·											5 (Troperty Prosvered N Checked at correct
· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·								-								6 Receiver VIIISAN Halding Tirzen V BEUER (P) PH-HAR EUT OF WORLD
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Refining bleed by: Sivert Network De h	JULS Vanderbeef	5-15-20 15-15-20 15-15-20	Signature Print Neynet Received by: Si toolate		~~				<u>לת</u> 12	es U	in	Ţ	inic:	15/2 4!X	_	Brecial Instructions: Please CC analytical report and EDD to: mholland@waterenvtech.com	
Print Nators References by: Sinestare	·····	fine Gates Fine:	Print Nome: Received by: Signature										ine: utr:			eerickson@waterenvtech.com derickson@waterenvtech.com	
Print Name:	By signuty this Chuin of Custody y		Print Neme:														355.54 Tells

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	GROUP A	GROUP B	GROUP C	GROUP D	GROUP E
	Alkalinity	Alkalinity	Alkalinity	Total Dissolved Solids	Alkalinity
	Specific Conductance	Specific Conductance	Specific Conductance	Fluoride	Specific Conductance
	Total Dissolved Solids	Total Dissolved Solids	Total Dissolved Solids	На	Total Dissolved Solids
	рН	рН	pH	Radium	Fluoride
	Boron	Boron	Boron	Antimony	рН
	Calcium	Calcium	Calcium	Arsenic	Radium
L	Magnesium	Magnesium	Magnesium	Barium	Antimony
	Potassium	Potassium	Potassium	Beryllium	Arsenic
	Sodium	Sodium	Sodium	Boron	Barium
L	Chloride	Chloride	Chloride	Cadmium	Beryllium
L	Sulfate	Sulfate	Sulfate	Calcium	Boron
	Nitrate	Nitrate	Nitrate	Chromium	Cadmium
	· · · ·	Selenium	Aluminum	Cobalt	Calcium
ł			Total Iron	Lead	Chromium
	· · · ·			Lithium	Cobalt
				Molybdenum	Lead
				Selenium	Lithium
				Thallium	Magnesium
	· · · · · · · · · · · · · · · · · · ·		· · · ·	Mercury	Molybdenum
				Chloride	Potassium
				Sulfate	Selenium
					Sodium
					Thallium
					Mercury
					Chloride
		1			Sulfate
					Nitrate

Lab Set ID:	2005382
pH Lot #:	6299

Preservation Check Sheet

Sample Set Extension and pH

Analysis	Preservative	-001	-002_	-003	-004		· · · · · · · · · · · · · · · · · · ·		-008		-010	-011	-01Z	-013	-014			
Ammonia	pH <2 H ₂ SO ₄																	
COD	pH <2 H ₂ SO ₄																	
Cyanide	pH >12 NaOH																	
Metals	pH <2 IINO3	vies	Nes	ves	Jes	Ves	ves	ves	ves	ves	Ves	yes	Ves	ves	Ves			
NO ₂ /NO ₃	pH <2 II ₂ SO ₄	7		1	1	1	•	1	1	+	1	1	r -	1	1			
0&G	pH <2 IICL																 -	
Phenols	pH <2 H ₂ SO ₄																	
Sulfide	pH >9 NaOH,																	
Builde	Zn Acetate																	
TKN	pH <2 H ₂ SO ₄																	
T PO ₄	pH <2 H ₂ SO ₄																	
Cr VI+	pH >9 (NH ₄) ₂ SO ₄																	
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Procedure: 1) Pour a small amount of sample in the sample lid

2) Pour sample from lid gently over wide range pH paper

3) Do Not dip the pH paper in the sample bottle or lid

4) If sample is not preserved, properly list its extension and receiving pH in the appropriate column above

5) Flag COC, notify client if requested

6) Place client conversation on COC

7) Samples may be adjusted

Frequency: All samples requiring preservation

- * The sample required additional preservative upon receipt.
- + The sample was received unpreserved.
- ▲ The sample was received unpreserved and therefore preserved upon receipt.
- # The sample pH was unadjustable to a pH ≤ 2 due to the sample matrix.
- The sample pH was unadjustable to a $pH > ____$ due to the sample matrix interference.



Radium-226

Case Narrative

American West Analytical Labs

Hunter CCR Groundwater Sampling – PERCM052 -2005382

Work Order Number: 2005312

- 1. This report consists of the analytical results for 14 water samples received by ALS on 05/21/2020.
- 2. These samples were prepared and analyzed according to the current revision of SOP 783. Due to limited sample volume, samples 2005312-1 and -6 were run sequentially after the Ra-228 analysis from batch RA200529-1. The analyses were completed on 06/16/2020.
- 3. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
- 4. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate in both batches.
- 5. Due to uncertainty associated with the ICP-AES determination of barium concentration in the samples, the calculated yield for samples 2005312-1 and -6 fell between 100% and 110%. To minimize the potential for low bias, results have been calculated conservatively assuming quantitative chemical yield (100%). The magnitude of the low bias is estimated to be less than 10% of the reported value and is acceptable according the ALS LQAP. These samples are identified with a "Y1" flag on the final reports.
- ALS uses the following convention for reporting significant digits in the TPU and MDC results. The TPU value is rounded to two significant digits. The MDC value is rounded to the same decimal place as the TPU value. In practice, this could result in an MDC reported value of zero for samples with significant activity, including the batch laboratory control sample.
- 7. No anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

ee ner Pik Yee Yuen

Radiochemistry Primary Data Reviewer

Radiochemistry Final Data Reviewer

<u>6/16/20</u> Date

6/16/20 Date

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2005312 Client Name: American West Analytical Labs Client Project Name: Hunter CCR Groundwater Sampling Client Project Number: PERCM052 Client PO Number: 2005382

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
ELF-10	2005312-1		WATER	12-May-20	20:20
ELF-11	2005312-2		WATER	12-May-20	17:30
ELF-12	2005312-3		WATER	12-May-20	19:20
ELF-13	2005312-4		WATER	12-May-20	18:50
ELF-14	2005312-5		WATER	12-May-20	18:00
ELF-1D	2005312-6		WATER	13-May-20	11:30
ELF-2	2005312-7		WATER	13-May-20	10:45
ELF-3	2005312-8		WATER	13-May-20	13:30
ELF-4	2005312-9		WATER	13-May-20	11:15
ELF-7	2005312-10		WATER	13-May-20	12:05
ELF-8	2005312-11		WATER	13-May-20	9:45
ELF-9	2005312-12		WATER	13-May-20	13:00
Group B - DUP	2005312-13		WATER	12-May-20	
Group B - Blank	2005312-14		WATER	13-May-20	11:20



American West

Analytical Laboratories 3408.700 W. Sallake Giy. UT 9419

3440.5. 700 W. Salt Lake City. UT 84119	JT 84119		ž	sisylsis	will be conducted using N	IELAP accredited met	hods and all dat	a will be r	All analysis will be conducted using NELAP accredited methods and all data will be reported using AWAL's standard analyte lists and	AWAL Lab Sample Set #
Phone # (801) 263-6686 Toll Free # (888) 261-8686	(\$\$6) 24,1-8696			ž	eting limits (PQL) unless 1	pectically requested	otherwise on this	Chang	reporting limits (PQU) unless specifically requested otherwise on this Chain of Custody and/or attached documentation.	Page 1 of 🕇
Fax # (801) 263-8687 Email awalmawaHats.com	irawal-labs.com			ð	QC Level:	Tum An	Tum Around Time:		Unless other arrangements have been made, signed executs will be enabled her	Due Date:
www.awal-labs.com	E.				24	Star	Standard		5:00 pm on the day they are due.	
Client: American West Analytical Laboratories									Report down to the MDL	Laboratory Use Only
Address: 3440 S. 700 W.	-									COC Tape Was:
City, State, Zip. Salt Lake City, UT 84119					 				D Field Filtered For:	1 Present on Outer Pactuage Y N N NA
Contact: Elona Hayward										2 Unthroten on Outer Partiage
Phone 4: (801) 263-8686 Cell 4:								-	for Compliance With: D NFI AP	VN N X
E-mail: elona@awal-labs.com; denise@awal-labs.com					Paul				C RCRA	 Present on Sample Y
Project Name: Hunter CCR Groundwater Sampling										 Understen on Sample
Project #. PERCM052										VN N
PO.4, 2005382			s		ż pure					Samples Were
Sampler Name:			rənistn		• 522 v				Known Hazards	1 Shipped or hand delivered
Samole (D:	Date Samoled	Time Sampled	10) jo (əįdureg	nuibei				غhmula Comments	Arabient or Chilled
ELF-10	5/12/2020	20:20	~							a lemperature
E4-11	5/12/2020	17:30	~	3	×		-			2
ELF-12	5/12/2020	19-20	2	3	×					
ELF-13	5/12/2020	18:50	~	3	×					5 Property Preserved Y N Checked at bench
ELF-14	5/12/2020	18:00	2	×	×					
QI-s13	5/13/2020	06:11	2	X	×					
ELF-2	5/13/2020	10:45	2	≩	×					6 Received Withten Holding Times
ELF-3	5/13/2020	13:30	~	3	×					2
F-313	5/13/2020	11:15	2	W	×					
ELF-7	5/13/2020	12:05	2	w	X					
ELF-6	5/13/2020	9:45	2	W	× ×					2 Sample Labels and COC Record Match?
ELF-9	5/13/2020	13:00	2	X	×	-				2 ~
Group B - DUP	5/12/2020		2	W	×					
Group B • Blank	5/13/2020	11:20	2	×	×					
Signature	2/18/20	Received by: / Signature	puu	177	11 Marco		Date	<u>ا</u> ر	Special Instructions:	
Ē	^{1m2} 8:30	G.	The second se	З Ч	K-Ohart		Tünc		QC 2+ = Final Report, COC, surrogate, recoveries, MB, LCS	te, recoveries, MB, LCS,
Reingeutsbezi by: Biggnetiure	Dute		•				Date	~	MS/MSD performed on customer sample	ample
Mriti Nexe.	Time:	Print Name:					Tame:	Π		
ketingusaken by: Bysmanare	Dete	Received by: Signature					Date		Samples sent to ALS - Ft. Collins.	
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200372 CHAIN OF CUSTODY



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ALS Environmental - Fort Collins CONDITION OF SAMPLE UPON RECEIPT FORM

Client:	Americ	an West Ar	nalytical	Labs	Workor	der No:		2	00531	2			
Project Manager:		KMO			Initials:	AK	D	ate:	05/21	1/20	20		
1. Are airbills / shippin	ng docume	ents present a	and/or re	movable	?				DROP OFF	V	YES	$\overline{\Box}$	NO
2. Are custody seals o	n shippini	containers i	ntact?				4	$\overline{\mathbf{v}}$	NONE	1	YESS	av	NÖ *
3. Are custody seals o	n sample	containers in	tact?					V	NONE	F	YES	┢	NO *
4. Is there a COC (chai	in-of-custo	ody) present?								レ	YES	ł	NO *
Is the COC in agree containers, matrix,				Ds, dates,	times, # 0	fsamp	les, # of				YES		NO *
6. Are short-hold sam			·							┢	YES		NQ
7 Are all samples with	nin holding	g times for th	e request	ted analy	/ses?				:	5	YES	بنا	NO *
8. Were all sample co			•	•					-	7	YES		NO *
Is there sufficient s										$\overline{\checkmark}$	YES		NO *
10. Are samples in prop	per contai	ners for reque	ested ana	alyses? (fo	orm 250, Sa	mple Ha	ndling Gu	ıideli	nes)	\checkmark	YES		NO *
11. Are all aqueous san	ples pres	erved correct	ly, if requ	uired? (e	xcluding	volatile	s)	Г	N/A	V	YES	ノ	NO *
Are all samples require 6 mm (1/4 inch) dia				RSK/ME	E, radon)	free of	fbubble	 s > [/	 ק ^{א/מ}		YES		
13. Were the samples s	hipped or	ice?						Ľ		j	YES	レ	NO
^{14.} Were cooler tempera	tures meas	ured at 0.1-6.0)°C?	IR gun used*:	↓ #3	└ <u>#</u> 5		\	RAD ONLY		YES	Ī	NO
Cooler #:	1	2	· •					<u></u>		•		<u> </u>	
Temperature (°C):	AMB	AMB		······································				•					
# of custody seals on cooler:		······································			·			<u> </u>					
External mR/hr reading:	9	9	······································		·								
Background mR/hr reading:	11		······································				·			•			
Were external mR/hr readi	ngs ≤ two tim	es background and	d within DOT	acceptance	criteria V	ESIMO	/ NA life	n. see	Form 008	. 1			
* Please provide details h						_					w/ log	in.	
Sample 312-1-2 limi													
Sample 312-6-2 limi	ted Volu	me			•								
Samples below had	a pH >2;	listed are s	ample-b	ottle nu	imbers 8	k amoi	unt of H	INC)3 (lot i	# 23	3482	2)	
added to achieve th	e pH < 2.								-			-	
312-2-1,2: 1.0ml									-		•		
312-3-1,2: 1.0ml													
312-8-1,2: 4.0ml													
												-	
Were unpreserved bo	ottles pH ch	eckedO/ES/	NAO	All	client bot	tle ID's	vs ALS la	b ID'	s double	e-che	cked	by:	M
if applicable, was the client	contacted?	YES / NO / NA	Contact: _					_	Date/Ti	me:			<u> 11 -</u>
Project Manager Signatu	ire / Date:	_ph	-An		- 5(<u>u r</u>	2		-				
Form 201r29.xls (10/15/2019)				, VWR SN 13 , VWR SN 11									

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Hand the package to any UPS driver in your area. Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.

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SHIP TO: KATIE BILLING: P/P ELONA HAYWARD 801-263-8686 AMERICAN WEST ANALYTICAL LABS 3440 S 700 W SALT LAKE CITY UT 84119 TRACKING #: 1Z 9E7 258 03 9025 6915 ALS FORT COLLINS CO 80524-2762 225 COMMERCE DR. 970-218-4543 LIFE SCIENCES/ENVIRONMENTAL **O'BRIEN** ROUND UIS 22.0.11. 26 0000/140 28.02 05/VILING LBS DWT: 26,15,13 AH 4 0F 4

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. In the folded label using clear plastic shipping tape over the entire label. 2. Fold the printed label at the solid line below. Place the label in a UPS Shipping Pouch. If you do not have a pouch,

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Radium-226 by Radon Emanation - Method 903.1 PAI 783 Rev 15 Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RE200526-2MB

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 26-May-20 Date Prepared: 26-May-20 Date Analyzed: 07-Jun-20 Prep Batch: RE200526-2 QCBatchID: RE200526-2-2 Run ID: RE200526-2A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.04 +/- 0.16	0.34	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16220	16030	ug	98.8	40 - 110 %	

Comments:

Qualifiers/Flags:

 ${\sf U}~$ - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: RE2005312-1

Radium-226 by Radon Emanation - Method 903.1 PAI 783 Rev 15 Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RE200529-11MB

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 29-May-20 Date Prepared: 29-May-20 Date Analyzed: 16-Jun-20 Prep Batch: RE200529-11 QCBatchID: RE200529-11-1 Run ID: RE200529-11A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.22 +/- 0.22	0.32	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	31870	30170	ug	94.7	40 - 110 %	

Comments:

Qualifiers/Flags:

 ${\sf U}~$ - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: RE2005312-1

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RE200526-2LCS

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 26-May-20 Date Prepared: 26-May-20 Date Analyzed: 07-Jun-20 Prep Batch: RE200526-2 QCBatchID: RE200526-2-2 Run ID: RE200526-2A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added		Contro I Limits	Lab Qualifier
13982-63-3	Ra-226	44 +/- 11	1	46.46	95.3	67 - 120	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16220	15840	ug	97.6	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RE2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RE200526-2LCSD

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 26-May-20 Date Prepared: 26-May-20 Date Analyzed: 07-Jun-20 Prep Batch: RE200526-2 QCBatchID: RE200526-2-2 Run ID: RE200526-2A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added		Contro I Limits	Lab Qualifier
13982-63-3	Ra-226	45 +/- 11	1	46.46	96.8	67 - 120	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16220	16070	ug	99.0	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RE2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RE200529-11LCS

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 29-May-20 Date Prepared: 29-May-20 Date Analyzed: 16-Jun-20 Prep Batch: RE200529-11 QCBatchID: RE200529-11-1 Run ID: RE200529-11A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added		Contro I Limits	Lab Qualifier
13982-63-3	Ra-226	34.0 +/- 8.5	0.2	46.46	73.3	67 - 120	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	31870	31590	ug	99.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RE2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RE200529-11LCSD

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 29-May-20 Date Prepared: 29-May-20 Date Analyzed: 16-Jun-20 Prep Batch: RE200529-11 QCBatchID: RE200529-11-1 Run ID: RE200529-11A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added		Contro I Limits	Lab Qualifier
13982-63-3	Ra-226	48 +/- 12	0	46.46	103	67 - 120	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	31870	28920	ug	90.7	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RE2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty
Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 15

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: Lab ID: R	E200526-2LCSD	Sample Matrix: WATER Prep SOP: PAI 783 Date Collected: 26-May- Date Prepared: 26-May- Date Analyzed: 07-Jun-	Rev 15 20 20	QCBat R	Batch: RE200526-2 tchID: RE200526-2-2 un ID: RE200526-2A Time: 15 minutes	Moisture(% Result Unit	i s: Unfiltered 6): NA		
CASNO	Analyte	Sample Result +/- 2 s TPU	MDC	Flags	Duplic Result +/- 2 s TPU	cate	Flags	DER	DER Lim

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

- Y2 Chemical Yield outside default limits.
- W DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

LT - Result is less than Request MDC, greater than sample specific MDC

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported

activity is greater than the reported MDC L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

The LCG Nectivery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

Data Package ID: RE2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

DER - Duplicate Error Ratio

BDL - Below Detection Limit

NR - Not Reported

Page 1 of 2

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 15

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: Lab ID: R	E200529-11LCSD	Sample Matrix: WATER Prep SOP: PAI 783 Date Collected: 29-May Date Prepared: 29-May Date Analyzed: 16-Jun-	8 Rev 15 -20 -20	QCBa R	Batch: RE200529-11 tchID: RE200529-11-1 un ID: RE200529-11A Time: 15 minutes	Moisture(% Result Unit	i s: Unfiltered 6): NA		
CASNO	Analyte	Sample Result +/- 2 s TPU) MDC	Flags	Dupli Result +/- 2 s TPU	cate MDC	Flags	DER	DER Lim
13982-63-3	Ra-226	34.0 +/- 8.5	0.2	P	48 +/- 12	0	P	0.949	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42 $\,$

D - DER is greater than Control Limit of 2.13

LT - Result is less than Request MDC, greater than sample specific MDC

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported

activity is greater than the reported MDC L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

Data Package ID: RE2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

DER - Duplicate Error Ratio

BDL - Below Detection Limit

NR - Not Reported

Page 2 of 2

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-10	Sample Matrix: WATER	Prep Batch: RE200529-11	Final Aliquot: 995 ml	
Lab ID: 2005312-1		Prep SOP: PAI 783 Rev 15 Date Collected: 12-May-20	QCBatchID: RE200529-11-1 Run ID: RE200529-11A	Prep Basis: Unfiltered Moisture(%): NA	
		Date Prepared: 29-May-20	Count Time: 15 minutes	Result Units: pCi/l	
		Date Analyzed: 16-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry	

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.29 +/- 0.26	0.38	1	NA	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	31890	32480	ug	102	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-11	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml	
Lab ID:	2005312-2	Prep SOP: PAI 783 Rev 15 Date Collected: 12-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA	
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l	
_		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry	

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.40 +/- 0.25	0.27	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16240	15820	ug	97.4	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-12	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-3	Prep SOP: PAI 783 Rev 15 Date Collected: 12-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.28 +/- 0.23	0.30	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16230	15890	ug	97.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-13	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 945 ml	
Lab ID: 2005312-4		Prep SOP: PAI 783 Rev 15 Date Collected: 12-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA	
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l	
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry	

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.42 +/- 0.27	0.33	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16230	15810	ug	97.4	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-14	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-5	Prep SOP: PAI 783 Rev 15 Date Collected: 12-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.34 +/- 0.24	0.29	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16230	15820	ug	97.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-1D	Sample Matrix: WATER	Prep Batch: RE200529-11	Final Aliquot: 995 ml
Lab ID:	2005312-6	Prep SOP: PAI 783 Rev 15 Date Collected: 13-May-20	QCBatchID: RE200529-11-1 Run ID: RE200529-11A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 29-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 16-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.51 +/- 0.29	0.28	1	NA	Y1

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	31900	32170	ug	101	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-2	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-7	Prep SOP: PAI 783 Rev 15 Date Collected: 13-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.16 +/- 0.20	0.30	1	NA	U

Chemical Yield Summary

,	Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
	BARIUM	16230	15820	ug	97.4	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-3	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-8	Prep SOP: PAI 783 Rev 15 Date Collected: 13-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.71 +/- 0.36	0.29	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16250	15520	ug	95.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-4	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-9	Prep SOP: PAI 783 Rev 15 Date Collected: 13-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.27 +/- 0.36	0.58	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16230	15410	ug	94.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-7	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-10	Prep SOP: PAI 783 Rev 15 Date Collected: 13-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
_		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.53 +/- 0.31	0.32	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16230	15840	ug	97.6	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-8	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-11	Prep SOP: PAI 783 Rev 15 Date Collected: 13-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.37 +/- 0.22	0.20	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16240	15960	ug	98.3	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-9	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-12	Prep SOP: PAI 783 Rev 15 Date Collected: 13-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.21 +/- 0.21	0.29	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16240	15770	ug	97.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	Group B - DUP	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 995 ml
Lab ID:	2005312-13	Prep SOP: PAI 783 Rev 15 Date Collected: 12-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.41 +/- 0.37	0.54	1	NA	U

Chemical Yield Summary

C	Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
	BARIUM	16230	15580	ug	96.0	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	Group B - Blank	Sample Matrix: WATER	Prep Batch: RE200526-2	Final Aliquot: 985 ml
Lab ID:	2005312-14	Prep SOP: PAI 783 Rev 15 Date Collected: 13-May-20	QCBatchID: RE200526-2-2 Run ID: RE200526-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 26-May-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.08 +/- 0.20	0.36	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	16220	15600	ug	96.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level



Radium-228

Case Narrative

American West Analytical Labs

Hunter CCR Groundwater Sampling – PERCM052 - 2005382

Work Order Number: 2005312

- 1. This report consists of the analytical results for 14 water samples received by ALS on 05/21/2020.
- 2. These samples were prepared according to the current revision of SOP 749.
- 3. The samples were analyzed for the presence of ²²⁸Ra by low background gas flow proportional counting of ²²⁸Ac, which is the ingrown progeny of ²²⁸Ra, according to the current revision of SOP 724. The analyses were completed on 06/16/2020.
- 4. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
- 5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate in both batches.
- 6. The requested MDC was not met for sample 2005312-8. The reported activity for the sample exceeds the achieved MDC. This sample is identified with am "M3" qualifier on the final reports. Results are submitted without further qualification.
- 7. No further anomalous situations were noted during the preparation and analysis of these samples. All remaining quality control criteria were met.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

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Radiochemistry Primary Data Reviewer

Radiochemistry Final Data Reviewer

6/16/20 Date

6/16/20 Date

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2005312 Client Name: American West Analytical Labs Client Project Name: Hunter CCR Groundwater Sampling Client Project Number: PERCM052 Client PO Number: 2005382

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
ELF-10	2005312-1		WATER	12-May-20	20:20
ELF-11	2005312-2		WATER	12-May-20	17:30
ELF-12	2005312-3		WATER	12-May-20	19:20
ELF-13	2005312-4		WATER	12-May-20	18:50
ELF-14	2005312-5		WATER	12-May-20	18:00
ELF-1D	2005312-6		WATER	13-May-20	11:30
ELF-2	2005312-7		WATER	13-May-20	10:45
ELF-3	2005312-8		WATER	13-May-20	13:30
ELF-4	2005312-9		WATER	13-May-20	11:15
ELF-7	2005312-10		WATER	13-May-20	12:05
ELF-8	2005312-11		WATER	13-May-20	9:45
ELF-9	2005312-12		WATER	13-May-20	13:00
Group B - DUP	2005312-13		WATER	12-May-20	
Group B - Blank	2005312-14		WATER	13-May-20	11:20

American W	aet													2005312	
								(CH	AIN	OF	CUS	5T)	ODY	
Analytical Labor. 3440 S, 700 W. Salt Lake City. U	atories								-						AWAL Lab Sample Set #
AnalytiCal Labor 3440 S. 700 W. Salt Lake City. U Phone # (801) 263-8686 Toll Free # (Fax # (801) 263-8687 Email avail			<u> </u>					4-						e reported using AWAL's standard analyte lists and of Cuslody and/or attached documentation.	Page 1 of
Fax # (601) 263-8687 Email awal@	awal-labs.com				QC	Level	:	٦ſ	т	ırn An	ound 1	lime:		Unless other arrangements have been made, signed	Due Date:
www.awal-labs.co	m				2	2+				Star	ndard			reports will be emailed by	
					1	1		╧		1	1	F 1		5:00 pm on the day they are due.	
Client: American West Analytical Laboratories					1									Report down to the MDL Include EDD:	Laboratory Use Only
Address: 3440 S. 700 W.						ł								Lab Filter for:	COC Tape Was: 1 Present on Outer Package
City, State, Zip: Salt Lake City, UT 84119														Field Filtered For:	Y N NA
Contact: Elona Hayward						-								For Compliance With:	2 Unbroken on Outer Package Y N NA
Phone #: (801) 263-8686 Cel) #:						ł									
E-mail: elona@awal-labs.com; denise@awal-labs.com	ı 				ai le										3 Present on Sample Y N
Project Name: Hunter CCR Groundwater Sampling					and 228 Combined									D SDWA D ELAP/A2LA	4 Unbroken on Sample Y N NA
Project #: PERCM052					នឹ									NULAP Non-Compliance	Y N NA
PO #: 2005382			ers	.#	The second									Other:	Samples Were:
Sampler Name:			Containers	Sample Matrix	n 226									Known Hazards	1 Shipped or hand delivered
6	Date	Time	l of Co	ample	Radium	ł									2 Ambient or Chilled
Sample ID: ELF-10	Sampled 5/12/2020	Sampled 20:20	2	З W	<u>₹</u> ×	<u> </u>	┼╌╌┿╸		+	+	+	┨━─┨╸		Sample Comments	3 Temperature*C
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ELF-2 ELF-3	5/13/2020	13:30		w	x	-	╞┈┟	_	-+-	+	+	+	_		Holding Times Y N
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Daius Manue	Time:	Brint Mouro									Time				·



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ALS Environmental - Fort Collins CONDITION OF SAMPLE UPON RECEIPT FORM

Client:	Americ	an West Ar	nalytical	Labs	Workor	der No:		2	00531	2			
Project Manager:		KMO			Initials:	AK	D	ate:	05/21	1/20	20		
1. Are airbills / shippin	ng docume	ents present a	and/or re	movable	?				DROP OFF	V	YES	$\overline{\Box}$	NO
2. Are custody seals o	n shippini	containers i	ntact?				4	$\overline{\mathbf{v}}$	NONE	1	YESS	av	NÖ *
3. Are custody seals o	n sample	containers in	tact?					V	NONE	F	YES	┢	NO *
4. Is there a COC (chai	in-of-custo	ody) present?								レ	YES	ł	NO *
Is the COC in agree containers, matrix,				Ds, dates,	times, # 0	fsamp	les, # of				YES		NO *
6. Are short-hold sam			·							┢	YES		NQ
7 Are all samples with	nin holding	g times for th	e request	ted analy	/ses?				:	5	YES	بنا	NO *
8. Were all sample co			•	•					-	7	YES		NO *
Is there sufficient s										$\overline{\checkmark}$	YES		NO *
10. Are samples in prop	per contai	ners for reque	ested ana	alyses? (fo	orm 250, Sa	mple Ha	ndling Gu	ıideli	nes)	\checkmark	YES		NO *
11. Are all aqueous san	ples pres	erved correct	ly, if requ	uired? (e	xcluding	volatile	s)	Г	N/A	V	YES	ノ	NO *
Are all samples require 6 mm (1/4 inch) dia				RSK/ME	E, radon)	free of	fbubble	 s > [/	 ק ^{א/מ}		YES		
13. Were the samples s	hipped or	ice?						Ľ		j	YES	レ	NO
^{14.} Were cooler tempera	tures meas	ured at 0.1-6.0)°C?	IR gun used*:	↓ #3	└ <u>#</u> 5		\	RAD ONLY		YES	Ī	NO
Cooler #:	1	2	· •					<u></u>		•		<u> </u>	
Temperature (°C):	AMB	AMB		······································				•					
# of custody seals on cooler:		······································			·			<u> </u>					
External mR/hr reading:	9	9	······································		·								
Background mR/hr reading:	11		······································				·			•			
Were external mR/hr readi	ngs ≤ two tim	es background and	d within DOT	acceptance	criteria V	ESIMO	/ NA life	n. see	Form 008	. 1			
* Please provide details h						_					w/ log	in.	
Sample 312-1-2 limi													
Sample 312-6-2 limi	ted Volu	me			•								
Samples below had	a pH >2;	listed are s	ample-b	ottle nu	imbers 8	k amoi	unt of H	INC)3 (lot i	# 23	3482	2)	
added to achieve th	e pH < 2.								-			-	
312-2-1,2: 1.0ml									-		•		
312-3-1,2: 1.0ml													
312-8-1,2: 4.0ml													
												-	
Were unpreserved bo	ottles pH ch	eckedO/ES/	NAO	All	client bot	tle ID's	vs ALS la	b ID'	s double	e-che	cked	by:	M
if applicable, was the client	contacted?	YES / NO / NA	Contact: _					_	Date/Ti	me:			<u> 11 -</u>
Project Manager Signatu	ire / Date:	_ph	-An		- 5(<u>u r</u>	2		-				
Form 201r29.xls (10/15/2019)				, VWR SN 13 , VWR SN 11									

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affix the folded label using clear plastic shipping tape over the entire label. 2. Fold the printed label at the solid line below. Place the label in a UPS Shipping Pouch. If you do not have a pouch,

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Radium-228 Analysis by GFPC PAI 724 Rev 14 Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312 Client Name: American West Analytical Labs ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RA200529-1MB

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 29-May-20 Date Prepared: 29-May-20 Date Analyzed: 04-Jun-20 Prep Batch: RA200529-1 QCBatchID: RA200529-1-2 Run ID: RA200529-1A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC0604

(CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
1	5262-20-1	Ra-228	0.17 +/- 0.32	0.70	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	34400	33050	ug	96.1	40 - 110 %	

Comments:

Qualifiers/Flags:

 ${\sf U}~$ - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Radium-228 Analysis by GFPC PAI 724 Rev 14 Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312 Client Name: American West Analytical Labs ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RA200601-1MB

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 01-Jun-20 Date Prepared: 01-Jun-20 Date Analyzed: 05-Jun-20 Prep Batch: RA200601-1 QCBatchID: RA200601-1-1 Run ID: RA200601-1A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC0605

CAS	SNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262	2-20-1	Ra-228	0.18 +/- 0.35	0.75	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33870	32000	ug	94.5	40 - 110 %	

Comments:

Qualifiers/Flags:

 ${\sf U}~$ - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

PAI 724 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RA200529-1LCS

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 29-May-20 Date Prepared: 29-May-20 Date Analyzed: 04-Jun-20 Prep Batch: RA200529-1 QCBatchID: RA200529-1-2 Run ID: RA200529-1A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC0604

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added		Contro I Limits	Lab Qualifier
15262-20-1	Ra-228	26.7 +/- 6.2	0.7	24.63	108	70 - 130	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	34400	32700	ug	95.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RA2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

PAI 724 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RA200529-1LCSD

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 29-May-20 Date Prepared: 29-May-20 Date Analyzed: 04-Jun-20 Prep Batch: RA200529-1 QCBatchID: RA200529-1-2 Run ID: RA200529-1A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC0604

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Contro I Limits	Lab Qualifier
15262-20-1	Ra-228	25.6 +/- 5.9	0.7	24.63	104	70 - 130	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	34400	33130	ug	96.3	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RA2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

PAI 724 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RA200601-1LCS

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 01-Jun-20 Date Prepared: 01-Jun-20 Date Analyzed: 05-Jun-20 Prep Batch: RA200601-1 QCBatchID: RA200601-1-1 Run ID: RA200601-1A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC0605

CAS	SNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Contro I Limits	Lab Qualifier
15262	2-20-1	Ra-228	24.9 +/- 5.8	0.8	24.62	101	70 - 130	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33870	32290	ug	95.3	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RA2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

PAI 724 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Lab ID: RA200601-1LCSD

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 01-Jun-20 Date Prepared: 01-Jun-20 Date Analyzed: 05-Jun-20 Prep Batch: RA200601-1 QCBatchID: RA200601-1-1 Run ID: RA200601-1A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC0605

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Contro I Limits	Lab Qualifier
15262-20-1	Ra-228	20.4 +/- 4.8	0.7	24.62	82.8	70 - 130	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33870	32010	ug	94.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RA2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

PAI 724 Rev 14 **Duplicate Sample Results (DER)**

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: Lab ID: R	A200529-1LCSD	Sample Matrix: WATEL Prep SOP: SOP74 Date Collected: 29-May Date Prepared: 29-May Date Analyzed: 04-Jun	9 Rev 7 7-20 7-20	QCBat Ru	atch: RA200529-1 chID: RA200529-1-2 in ID: RA200529-1A fime: 150 minutes	Final Aliquot: 997 ml Prep Basis: Unfiltered Moisture(%): NA Result Units: pCi/l File Name: RAC0604			
CASNO	Analyte	Sample Result +/- 2 s TPU	e MDC	Flags	Duplic Result +/- 2 s TPU	cate MDC	Flags	DER	DER Lim
15262-20-1	Ra-228	26.7 +/- 6.2	0.7	Р	25.6 +/- 5.9	0.7	Р	0.126	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

- Y2 Chemical Yield outside default limits.
- W DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

LT - Result is less than Request MDC, greater than sample specific MDC

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported

activity is greater than the reported MDC L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

Data Package ID: RA2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

DER - Duplicate Error Ratio

BDL - Below Detection Limit

NR - Not Reported

Page 1 of 2

PAI 724 Rev 14 Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Ra-228

15262-20-1

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

24.9 +/- 5.8

Field ID: Lab ID: R	A200601-1LCSD	Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 01-Jun-20 Date Prepared: 01-Jun-20 Date Analyzed: 05-Jun-20	Prep Batch: RA200601-1 QCBatchID: RA200601-1-1 Run ID: RA200601-1A Count Time: 150 minutes		ID: RA200601-1-1 Prep Basis: Unfiltered ID: RA200601-1A Moisture(%): NA			
CASNO	Analyte	Sample Result +/- 2 s TPU MDC	Flags	Dup Result +/- 2 s TPU	licate MDC	Flags	DER	DER Lim

Ρ

20.4 +/- 4.8

0.8

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

- Y2 Chemical Yield outside default limits.
- W DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

LT - Result is less than Request MDC, greater than sample specific MDC

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported

activity is greater than the reported MDC L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

Data Package ID: RA2005312-1

Abbreviations:

TPU - Total Propagated Uncertainty

Ρ

0.606

2.13

0.7

DER - Duplicate Error Ratio

BDL - Below Detection Limit

NR - Not Reported

Page 2 of 2

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-10	Sample Matrix: WATER	Prep Batch: RA200529-1	Final Aliquot: 997 ml
Lab ID: 2005312-1	Prep SOP: SOP749 Rev 7	QCBatchID: RA200529-1-2	Prep Basis: Unfiltered
	Date Collected: 12-May-20	Run ID: RA200529-1A	Moisture(%): NA
	Date Prepared: 29-May-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 16-Jun-20	Report Basis: Unfiltered	File Name: RAC0604

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.41	0.72	1	NA	
15262-20-1	Ra-228	2.41 +/- 0.71	0.72	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	34420	31250	ug	90.8	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-11	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2005312-2	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
Lab ID. 2000012-2	Date Collected: 12-May-20	Run ID: RA200601-1A	Moisture(%): NA
	Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.67	0.71	1	NA	
15262-20-1	Ra-228	2.27 +/- 0.68	0.71	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33890	32360	ug	95.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-12	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID:	2005312-3	Prep SOP: SOP749 Rev 7 Date Collected: 12-May-20	QCBatchID: RA200601-1-1 Run ID: RA200601-1A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	3.12	0.73	1	NA	
15262-20-1	Ra-228	3.12 +/- 0.86	0.73	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33880	32090	ug	94.7	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-13	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2005312-4	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
Lab ID. 2000012-4	Date Collected: 12-May-20	Run ID: RA200601-1A	Moisture(%): NA
	Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASN	O Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.49	0.72	1	NA	
15262-20-1	Ra-228	2.07 +/- 0.64	0.72	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	ount Added Result		Yield	Control Limits	Flag
BARIUM	33880	31700	ug	93.6	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-14	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml	
Lab ID: 2005312-5	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered	
	Date Collected: 12-May-20 Date Prepared: 01-Jun-20	Run ID: RA200601-1A Count Time: 150 minutes	Moisture(%): NA Result Units: pCi/l	
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605	

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.22	0.73	1	NA	
15262-20-1	Ra-228	1.88 +/- 0.60	0.73	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33890	31800	ug	93.8	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level
Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-1D	Sample Matrix: WATER	Prep Batch: RA200529-1	Final Aliquot: 997 ml
Lab ID: 2005312-6	Prep SOP: SOP749 Rev 7	QCBatchID: RA200529-1-2	Prep Basis: Unfiltered
	Date Collected: 13-May-20	Run ID: RA200529-1A	Moisture(%): NA
	Date Prepared: 29-May-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 16-Jun-20	Report Basis: Unfiltered	File Name: RAC0604

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.2	0.8	1	NA	
15262-20-1	Ra-228	1.69 +/- 0.59	0.80	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	34430	28870	ug	83.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-2	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2005312-7	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
	Date Collected: 13-May-20	Run ID: RA200601-1A	Moisture(%): NA
	Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.17	0.73	1	NA	
15262-20-1	Ra-228	2.17 +/- 0.66	0.73	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33880	32400	ug	95.6	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-3	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2005312-8	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
	Date Collected: 13-May-20	Run ID: RA200601-1A	Moisture(%): NA
	Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	5.41	1.1	1	NA	
15262-20-1	Ra-228	4.7 +/- 1.3	1.1	1	NA	M3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33910	22740	ug	67.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-4	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2005312-9	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
	Date Collected: 13-May-20	Run ID: RA200601-1A	Moisture(%): NA
	Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

	CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
		COMBINED RA (226+228)	2	0.73	1	NA	
1	5262-20-1	Ra-228	2.00 +/- 0.63	0.73	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33880	31640	ug	93.4	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: E	ELF-7	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2	005312-10	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
	.003312-10	Date Collected: 13-May-20	Run ID: RA200601-1A	Moisture(%): NA
		Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	1.73	0.76	1	NA	
15262-20-1	Ra-228	1.20 +/- 0.49	0.76	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33880	32380	ug	95.6	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: ELF-8	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2005312-11	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
	Date Collected: 13-May-20	Run ID: RA200601-1A	Moisture(%): NA
	Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	1.65	0.71	1	NA	
15262-20-1	Ra-228	1.28 +/- 0.49	0.71	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33880	32710	ug	96.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID:	ELF-9	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID:	2005312-12	Prep SOP: SOP749 Rev 7 Date Collected: 13-May-20	QCBatchID: RA200601-1-1 Run ID: RA200601-1A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	1.56	0.77	1	NA	
15262-20-1	Ra-228	1.56 +/- 0.56	0.77	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33890	31550	ug	93.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: Group B - DUP	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2005312-13	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
	Date Collected: 12-May-20	Run ID: RA200601-1A	Moisture(%): NA
	Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

	CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
ĺ		COMBINED RA (226+228)	1.79	0.75	1	NA	
	15262-20-1	Ra-228	1.79 +/- 0.59	0.75	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33880	31780	ug	93.8	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2005312

Client Name: American West Analytical Labs

ClientProject ID: Hunter CCR Groundwater Sampling PERCM052

Field ID: Group B - Blank	Sample Matrix: WATER	Prep Batch: RA200601-1	Final Aliquot: 997 ml
Lab ID: 2005312-14	Prep SOP: SOP749 Rev 7	QCBatchID: RA200601-1-1	Prep Basis: Unfiltered
	Date Collected: 13-May-20	Run ID: RA200601-1A	Moisture(%): NA
	Date Prepared: 01-Jun-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 07-Jun-20	Report Basis: Unfiltered	File Name: RAC0605

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	0	0.88	1	NA	U
15262-20-1	Ra-228	0.34 +/- 0.42	0.88	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33870	32490	ug	95.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level



ATTACHMENT B:

Field Summary Report - October 2020 Event



Facility Name:	Hunter Power Plant – CCR Landfill
Event Description:	Assessment Monitoring
Event Dates:	October 28-29, 2020
Field Personnel:	Dennis Vanderbeek

ACTIVITY SUMMARY. PacifiCorp personnel arrived onsite October 28, 2020 and performed groundwater sampling at Hunter CCR Landfill. Prior to collecting samples, field instruments were calibrated, followed by the collection of water levels in the CCR monitoring wells. After recording water levels, the wells were purged in accordance with the EPA low-flow method. Field parameters were monitored during well purging in accordance with the site-specific sampling and analysis plan (SAP). Once field parameters met the SAP stabilization requirements, groundwater samples were collected for Appendix III and Appendix IV constituents. All calibration data and field measurements were recorded on the WET electronic field form. The wells that underwent sampling during this sampling event included:

• • •	ELF-10 ELF-11 ELF-12 ELF-13 ELF-14 ELF-1D ELF-2	• • •	ELF-3 ELF-4 ELF-5 ELF-6 ELF-7 ELF-8
•	ELF-2		ELF-9

The following details dates for conducting field work and post-field work data processing:

- Date fieldwork completed: 10/29/2020
- Dates unvalidated lab data received: 11/05/2020
- Data validation completion date: 01/07/2021

After collection, the samples were preserved in accordance with the SAP, placed on ice, chain of custody forms were completed, and the samples were transported to American West Analytical Laboratories (AWAL) in Salt Lake City, Utah for analysis. Samples arrived at AWAL on 10/29/2020. AWAL subcontracted Radium analyses to ALS Global in Fort Collins, Colorado. Samples arrived at ALS on 11/03/2020. The following information is attached to this summary as a supplement:

- Attachment A: Groundwater Contour Map
- Attachment B: Data Validation Summary
- Attachment C: Statistical Analysis
- Attachment D: Field Data Sheets
- Attachment E: Laboratory Analytical Reports

SAP DEVIATIONS. Wells ELF-5, ELF-6, and ELF-7, and ELF-1D did not have enough water to sample.



Attachment A:

Groundwater Contour Map







HUNTER POWER PLANT

Groundwater Elevation Map CCR Landfill

Job#: PERCM052

Date: 12/2/2020

Path: M:\PERC_CCR\2020_CCR_Sampling\Hunter\OCTOBER_2020\HUNTER_FALL2020.aprx, Author: jleprowse

Attachment A



Attachment B:

Data Validation Summary

DATA VALIDATION SUMMARY CCR COMPLIANCE SAMPLING

Facility Name:	Hunter Power Plant					
Validator:	Janelle Garza (1/8/2021)				
Reviewer:	Marcus Hollan	d (1/11/2021)				
Laboratory:		t Analytical Laboratories; Salt Lake City, UT ries; Fort Collins, CO (third party lab for Ra analyses)				
Laboratory Work Order#:	2010965					
Sample Media:	Aqueous					
Review Element:	Complete / Criteria Met? (Yes/No)	If no, describe:				
Chain of Custody:	No	No time was entered for the duplicate sample.				
Field Documentation:	Yes					
Holding Times & Sample Preservation:	No	pH was analyzed past the 15-minute holding time. All samples were qualified as estimated (J).				
Calibrations:	Yes					
Blanks:	No	 Field: ★ Field Blank (representing all samples): ▶ TDS was detected at 40 mg/L, above the limit of 10 mg/L. No qualification was required due to sample results ≥10x blank. 				
Laboratory Control Sample:	Yes					
Duplicates:	Yes					
Matrix Spike:	No	 Lab ID 2010965-002BMS (Sample ID ELF-11): Calcium was recovered at 138% and 137%, above the limits of 70-130%. The analyte concentration is too high for accurate MS %R and/or RPD. No qualification applied. Lab ID 2010965-001BMS/D (Sample ID ELF-10): Mercury was recovered at 6.16% and 5.61%, below the limits of 80-120%. The method is in control as indicated by the LCS. No qualification applied. 				

Overall Assessment:

Out of 240 total data points, 230 data points (95.8%) remain unqualified, or were qualified as nondetect (U), and are considered quantitative. The remaining ten data points (4.2%) were qualified as estimated due to pH holding time exceedance and are considered qualitative data. No data points were rejected; thus, this sample delivery group is 100% complete and usable.



Attachment C:

Statistical Analysis

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1.0 INTRODUCTION

This appendix contains a statistical analysis of the data collected from the groundwater monitoring wells associated with the CCR Landfill at the Hunter Power Plant in Castle Dale, Utah. Methods used to compare upgradient with downgradient wells vary depending on the characteristics of the upgradient well data. Upgradient well data were analyzed for outliers, normality, non-detects, and other characteristics that affect the comparison measures. A comprehensive statistical analysis is presented along with a discussion of the methods used to compare upgradient with downgradient water quality. Table C.1 lists the upgradient and downgradient wells that are used in this analysis. Note that if a well appears in Table C.1 and not in the tables and figures in this appendix it means that no samples were able to be collected from that well.

Upgradient Well	Downgradient Well
ELF-1D	ELF-3
ELF-2	ELF-4
ELF-9	ELF-5
ELF-10	ELF-6
	ELF-7
	ELF-8
	ELF-11
	ELF-12
	ELF-13
	ELF-14

Table C.1. Upgradient and downgradient wells for the CCR Landfill.

2.0 PRELIMINARY DATA ANALYSIS

The primary purpose of this statistical analysis was to establish background values from the upgradient well data, and compare these to the downgradient well data to determine if the downgradient water quality has been impacted by the CCR Landfill. Familiarity with numerical and distributional characteristics of the upgradient wells aids in computing appropriate limits and in correctly interpreting those limits. This section contains a statistical summary of the upgradient well data. It is essential to understand the statistical characteristics of the data, prior to making the upgradient / downgradient well comparison. This understanding helps to ensure the appropriate calculations have been done and comparisons are completed using the proper statistical measures. The mean, standard deviation, quartiles, and other statistical quantities and corresponding graphs are presented in the following sections.

2.1 Data Analysis Techniques

The following sections summarize the statistical tools and techniques, used to evaluate upgradient well data from the CCR Landfill.

2.1.1 Mean

One measure of primary interest is the center of the data. The average (\bar{x}), or the mean, is the most commonly used measure of the central tendency of the data. However, it can be heavily influenced by outliers and by asymmetric data. The mean is calculated using Equation (1):

$$\overline{x} = \frac{\sum_{i=1}^{n} x_i}{n} \tag{1}$$

Where:

 \overline{x} = mean n = number of observations x_i = i^{th} observation.

2.1.2 Standard Deviation

Another quantity of interest is the spread of the data. The standard deviation (s) is the most commonly used measure of spread, as it is easy to interpret and is used in many other statistical methods. Because it is calculated using the average, it is also sensitive to outliers and affected by data that are not symmetric. The standard deviation is calculated using Equation (2):

$$s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n - 1}}$$
(2)

Where:

s =standard deviation

n = number of observations

 $x_i = i^{th}$ observation

 \bar{x} = mean of the observations.

2.1.3 Coefficient of Variance

The coefficient of variance (CV) is a relative measure of variation in the sample data which expresses the standard deviation relative to the mean. The CV is expressed as a percentage and provides a direct comparison to the standard deviations of two different data sets. It is important to note the mean of the data may be very close to or very far away from zero and the spread may be independent of the distance from the mean to zero. Therefore, no firm guidelines have been established for interpreting the CV.

The CV was calculated for each detected analyte in each data grouping using Equation (3):

$$CV = \frac{s}{\overline{X}} \times 100\% \tag{3}$$

Where:

s = standard deviation

 \overline{X} = mean of the observations

2.1.4 Quartiles and the Five Number Summary

The five-number summary is a set of five numbers that are used to assess the spread of the data. It consists of the minimum value, first quartile, median, third quartile, and maximum of the data value. The first quartile is the 25th percentile of the data, the median is the 50th percentile of the data, and the third quartile is the 75th percentile of the data. The 25th percentile of the data is the number such that 25% of the data are less than that number and 75% of the data are above the 25th percentile. The median and third quartiles are found in a similar manner.

2.2 Visual Tools

It is difficult to review numerical summary statistics and identify the degree of symmetry or normality of data without the aid of visual tools. In completing the statistical analysis for the CCR Landfill, histograms and dot plots were developed for each of the analytes with at least one detectable observation. All graphs were developed using the R Statistical Package (R Core Team 2020).

2.2.1 Histograms

Histograms display the distribution and symmetry of the data. The data are displayed in such a way, that deviations from a normal (i.e., bell shaped) distribution can easily be observed. Outliers are also often identifiable in a histogram. Histograms for the upgradient wells were generated using both non-detects and detected results. The method detection limits (MDL) are plotted on the histogram with a blue line to show which observations are non-detects.

If an analyte has more than one MDL there will be more than one blue line on the histogram. Figure C.1 below is a histogram of fluoride data for the upgradient wells for the CCR Landfill. It is provided here to illustrate data distribution using a histogram. All of the histograms used to examine the analytes from the CCR Landfill upgradient well data, are provided at the end of this appendix in Figure C.3.





2.2.2 Dot Plots

A dot plot is a graphical tool used to determine the spread of the data and to look for outliers. Each measured concentration is plotted on the graph so that non-detects and outliers are clearly visible. The MDL for non-detects are shown as green points on the plot. Figure C.2 uses the same fluoride data points used to develop the Figure C.1. Several of the points are non-detects and the concentrations in well ELF-10 are larger than those in the other wells. All of the dot plots used to examine the CCR Landfill upgradient well data are provided at the end of this appendix in Figure C.3.





2.2.3 Outliers

Outliers are data points that are notably larger or smaller than the rest of the data set and may indicate a problem with the data point or the data set as a whole. Examples which may be indicative of outliers include: 1) a misreported or erroneous concentration, 2) analytical error(s), or 3) natural variations in groundwater concentrations. Outliers are generally not omitted from project data simply because they are outliers. Rather, the result is examined individually or by project, to ensure the outlier does not represent an erroneous result or another concern warranting either additional sampling or omission of the outlier. For example, if outliers which represent exceedingly low concentrations are used to compute background concentrations, they may result in background levels which are too conservative. Conversely, use of excessively high outlier concentrations to compute background values, may result in an overestimation of background concentrations resulting in false-negative comparisons for downgradient groundwater quality.

Outliers were detected in the cadmium, cobalt, lead, and radium data CCR Landfill data. However, none of the outliers are extreme enough to warrant removal from the dataset. The MDLs for the non-detects in the boron upgradient data were 5 mg/L and the largest detected value was less than 4 mg/L. This is an unusually large MDL and its inclusion would have resulted in a Groundwater Protection Standard (GWPS) that was larger than any concentration detected in the upgradient wells. Thus, the non-detects were removed from the upgradient boron data and are not included in any tables or graphs in this appendix.

2.2.4 Treatment of Non-Detects

Non-detect values are common in environmental data. When present in data sets, non-detects produce difficulties in computing statistical metrics because reliable values cannot be assigned. Substituting a value such as the MDL or one-half of the MDL for non-detects are common practices. However, use of the detection limit, or one-half of the detection limit, can produce unstable or unreliable results (EPA 2009). Statistical methods, such as Kaplan-Meier (Helsel 2004), can be used to appropriately evaluate data sets containing significant quantities of non-detects, by producing estimates of the survival probability function for non-detects. These estimates can then be used to compute summary statistics on the data set. However, Kaplan-Meier does not perform well if more than 50% of the results are non-detects or if fewer than eight detections are available for evaluation.

The arsenic, cadmium, chromium, cobalt, and lead data have more than 50% non-detects. Antimony, beryllium, mercury, and thallium were not detected in any of the samples. Thus, statistical analysis cannot be done for those analytes. The fluoride and selenium data have more than 15% non-detects, but more than half of the data are detected. As a result, Kaplan-Meier was used to compute means, standard deviations, and statistical limits used to compare the upgradient to downgradient water quality for fluoride and selenium.

2.3 Summary Results

Table C.2 provides summary statistics for the CCR Landfill upgradient well data. Although the data from the upgradient wells were combined when compared to the downgradient wells, the summary statistics presented in this section are separated by well and are presented as pooled data. The data are presented in this way, due to observed differences between the different wells for many of the analytes. These tables in conjunction with the histograms and normal-quantile plots, provide information about differences between wells and the data properties of the combined data. Analytes that were not detected in any upgradient well samples are not listed in Table C.2.

Analyte	Well	Number of Samples	Samples Detected	Median (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
Arsenic	ELF-1D	4	0	< 0.002	NA	NA	NA
Arsenic	ELF-2	16	0	< 0.002	NA	NA	NA
Arsenic	ELF-9	14	14	0.007	0.008	0.0021	28
Arsenic	ELF-10	13	3	< 0.002	NA	NA	NA
Arsenic	Pooled	47	17	< 0.002	NA	NA	NA
Barium	ELF-1D	4	4	0.0094	NA	NA	NA
Barium	ELF-2	16	15	0.0102	0.0136	0.0102	75
Barium	ELF-9	14	14	0.0256	0.0401	0.0333	83
Barium	ELF-10	13	13	0.0353	0.0402	0.0220	55
Barium	Pooled	47	46	0.0145	0.0285	0.0258	90
Boron	ELF-1D	3	3	2.19	NA	NA	NA
Boron	ELF-2	15	15	3.33	3.36	0.18	5
Boron	ELF-9	12	12	1.44	1.50	0.21	14
Boron	ELF-10	12	12	1.61	1.66	0.17	10
Boron	Pooled	42	42	1.86	2.26	0.87	38
Cadmium	ELF-1D	4	0	< 0.0005	NA	NA	NA
Cadmium	ELF-2	16	0	< 0.0005	NA	NA	NA
Cadmium	ELF-9	14	1	< 0.0005	NA	NA	NA
Cadmium	ELF-10	13	6	< 0.0005	NA	NA	NA
Cadmium	Pooled	47	7	< 0.0005	NA	NA	NA
Calcium	ELF-1D	3	3	366	NA	NA	NA
Calcium	ELF-2	15	15	404	400	23.4	6
Calcium	ELF-9	13	13	58.7	74.2	33.1	45
Calcium	ELF-10	12	12	472	474	34.7	7
Calcium	Pooled	43	43	395	320	169	53

Table C.2. Summary statistics for the CCR Landfill upgradient wells

Analyte	Well	Number of Samples	Samples Detected	Median (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
Chloride	ELF-1D	3	3	6640	NA	NA	NA
Chloride	ELF-2	15	15	439	369	115	31
Chloride	ELF-9	13	13	391	404	92.3	23
Chloride	ELF-10	12	12	7530	8254	2012	24
Chloride	Pooled	43	43	461	3018	3804	126
Chromium	ELF-1D	4	1	< 0.002	NA	NA	NA
Chromium	ELF-2	16	2	< 0.002	NA	NA	NA
Chromium	ELF-9	14	7	0.003	NA	NA	NA
Chromium	ELF-10	13	10	0.003	0.005	0.004	84
Chromium	Pooled	47	20	< 0.002	NA	NA	NA
Cobalt	ELF-1D	4	1	< 0.004	NA	NA	NA
Cobalt	ELF-2	16	9	0.0047	0.0054	0.0020	37
Cobalt	ELF-9	14	2	< 0.004	NA	NA	NA
Cobalt	ELF-10	13	10	0.0043	0.0050	0.0014	28
Cobalt	Pooled	47	22	< 0.004	NA	NA	NA
Fluoride	ELF-1D	3	0	< 0.1	NA	NA	NA
Fluoride	ELF-2	15	7	< 0.1	NA	NA	NA
Fluoride	ELF-9	13	11	1.16	0.94	0.59	63
Fluoride	ELF-10	12	5	< 0.1	NA	NA	NA
Fluoride	Pooled	43	23	0.2	0.8	1.2	156
Lead	ELF-1D	4	0	< 0.002	NA	NA	NA
Lead	ELF-2	16	1	< 0.002	NA	NA	NA
Lead	ELF-9	14	4	< 0.002	NA	NA	NA
Lead	ELF-10	13	6	< 0.002	NA	NA	NA
Lead	Pooled	47	11	< 0.002	NA	NA	NA
Lithium	ELF-1D	4	4	2.16	NA	NA	NA
Lithium	ELF-2	16	16	1.68	2.38	1.23	52
Lithium	ELF-9	14	14	0.881	1.05	0.474	45
Lithium	ELF-10	13	13	2.17	2.33	1.06	45
Lithium	Pooled	47	47	1.61	1.95	1.10	56
Molybdenum	ELF-1D	4	4	0.0163	NA	NA	NA
Molybdenum	ELF-2	16	15	0.0031	0.0032	0.0007	23
Molybdenum	ELF-9	14	14	0.1150	0.1110	0.0267	24
Molybdenum	ELF-10	13	13	0.0855	0.0827	0.0333	40
Molybdenum	Pooled	47	46	0.0546	0.0585	0.0520	89

Analyte	Well	Number of Samples	Samples Detected	Median (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
рН	ELF-1D	3	3	7.27	NA	NA	NA
рН	ELF-2	15	15	7.24	7.30	0.17	2
pН	ELF-9	13	13	7.94	7.90	0.15	2
рН	ELF-10	12	12	7.18	7.27	0.43	6
рН	Pooled	43	43	7.30	7.47	0.39	5
Radium	ELF-1D	4	4	1.72	NA	NA	NA
Radium	ELF-2	16	16	1.43	1.93	1.78	92
Radium	ELF-9	14	14	1.37	1.43	0.58	41
Radium	ELF-10	13	13	2.41	3.06	3.50	114
Radium	Pooled	47	47	1.50	2.08	2.18	105
Selenium	ELF-1D	4	0	< 0.002	NA	NA	NA
Selenium	ELF-2	16	16	0.382	0.298	0.225	76
Selenium	ELF-9	14	1	< 0.002	NA	NA	NA
Selenium	ELF-10	13	9	0.009	0.088	0.132	149
Selenium	Pooled	47	26	0.004	0.127	0.194	154
Sulfate	ELF-1D	3	3	8640	NA	NA	NA
Sulfate	ELF-2	15	15	7900	7591	694	9
Sulfate	ELF-9	13	13	6530	6497	756	12
Sulfate	ELF-10	12	12	17050	15428	4817	31
Sulfate	Pooled	43	43	7950	9506	4542	48
TDS	ELF-1D	3	3	27000	NA	NA	NA
TDS	ELF-2	15	15	12000	11927	415	3
TDS	ELF-9	13	13	10600	10755	804	7
TDS	ELF-10	12	12	38000	37267	2478	7
TDS	Pooled	43	43	12000	19731	11864	60

Table C.3 provides the five-number summaries for the CCR Landfill upgradient wells. As with the summary statistics, a five-number summary was computed for each well as well as for the pooled data. If a minimum or a quartile falls within the range of non-detects it is denoted using a less-than (<) symbol. Analytes that were not detected in any of the upgradient well samples are not listed in Table C.3.

Analyte	Well	Minimum (mg/L)	First Quartile (mg/L)	Median (mg/L)	Third Quartile (mg/L)	Maximum (mg/L)
Arsenic	ELF-1D	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Arsenic	ELF-2	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002
Arsenic	ELF-9	0.005	0.0063	0.0068	0.0081	0.0117
Arsenic	ELF-10	< 0.002	< 0.002	< 0.002	< 0.002	0.0093
Arsenic	Pooled	< 0.001	< 0.002	< 0.002	0.0058	0.0117
Barium	ELF-1D	0.0084	0.0084	0.0094	0.0103	0.0103
Barium	ELF-2	< 0.0084	0.0094	0.0102	0.0122	0.0500
Barium	ELF-9	0.0126	0.0135	0.0256	0.0678	0.1020
Barium	ELF-10	0.0145	0.0205	0.0353	0.0519	0.0863
Barium	Pooled	< 0.0084	0.0104	0.0145	0.0372	0.1020
Boron	ELF-1D	2.10	2.15	2.19	2.21	2.23
Boron	ELF-2	3.11	3.25	3.33	3.49	3.77
Boron	ELF-9	1.27	1.34	1.44	1.58	1.91
Boron	ELF-10	1.48	1.56	1.61	1.69	2.12
Boron	Pooled	1.27	1.55	1.86	3.25	3.77
Cadmium	ELF-1D	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cadmium	ELF-2	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.001
Cadmium	ELF-9	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0005
Cadmium	ELF-10	< 0.0005	< 0.0005	< 0.0005	0.0006	0.0011
Cadmium	Pooled	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0011
Calcium	ELF-1D	353	360	366	372	377
Calcium	ELF-2	356	388	404	419	430
Calcium	ELF-9	48.9	57	59	84	166
Calcium	ELF-10	407	454	472	488	543
Calcium	Pooled	48.9	102	395	438	543
Chloride	ELF-1D	6430	6535	6640	6760	6880
Chloride	ELF-2	197	234	439	459	473
Chloride	ELF-9	282	352	391	446	595
Chloride	ELF-10	5710	7080	7530	9068	12100
Chloride	Pooled	197	367	461	6835	12100
Chromium	ELF-1D	< 0.002	< 0.002	< 0.002	0.0021	0.0023
Chromium	ELF-2	< 0.001	< 0.002	< 0.002	< 0.002	0.011
Chromium	ELF-9	< 0.002	< 0.002	0.0028	0.0117	0.0201
Chromium	ELF-10	< 0.002	0.0020	0.0030	0.0057	0.0164
Chromium	Pooled	< 0.001	< 0.002	< 0.002	0.0051	0.0201
Cobalt	ELF-1D	< 0.004	< 0.004	< 0.004	0.0044	0.0054

 Table C.3. Five-number summary for the CCR Landfill upgradient wells.

Analyte	Well	Minimum (mg/L)	First Quartile (mg/L)	Median (mg/L)	Third Quartile (mg/L)	Maximum (mg/L)
Cobalt	ELF-2	< 0.004	< 0.004	0.0047	0.0060	0.0114
Cobalt	ELF-9	< 0.004	< 0.004	< 0.004	< 0.004	0.0052
Cobalt	ELF-10	< 0.004	0.0041	0.0043	0.0055	0.0079
Cobalt	Pooled	< 0.004	< 0.004	< 0.004	0.0053	0.0114
Fluoride	ELF-1D	< 0.1	< 0.1	< 0.1	< 0.15	<0.2
Fluoride	ELF-2	<0.1	< 0.1	< 0.1	0.235	0.500
Fluoride	ELF-9	<0.1	0.276	1.16	1.29	1.84
Fluoride	ELF-10	<0.1	< 0.1	< 0.1	3.90	4.36
Fluoride	Pooled	<0.1	< 0.1	0.200	0.980	4.36
Lead	ELF-1D	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Lead	ELF-2	< 0.001	< 0.002	< 0.002	< 0.002	0.002
Lead	ELF-9	< 0.002	< 0.002	< 0.002	0.0038	0.0077
Lead	ELF-10	< 0.002	< 0.002	< 0.002	0.0031	0.012
Lead	Pooled	< 0.001	< 0.002	< 0.002	< 0.002	0.012
Lithium	ELF-1D	1.96	2.08	2.16	2.19	2.20
Lithium	ELF-2	1.34	1.52	1.68	3.61	4.93
Lithium	ELF-9	0.724	0.765	0.881	1.06	2.48
Lithium	ELF-10	0.841	1.76	2.17	2.90	4.59
Lithium	Pooled	0.724	1.08	1.61	2.20	4.93
Molybdenum	ELF-1D	0.0153	0.0159	0.0163	0.0175	0.0207
Molybdenum	ELF-2	< 0.002	0.0029	0.0031	0.0035	0.0050
Molybdenum	ELF-9	0.0657	0.1002	0.115	0.126	0.158
Molybdenum	ELF-10	0.0331	0.0546	0.0855	0.115	0.124
Molybdenum	Pooled	< 0.002	0.0036	0.0546	0.111	0.158
pН	ELF-1D	7.02	7.15	7.27	7.29	7.30
рН	ELF-2	7.12	7.19	7.24	7.36	7.76
pН	ELF-9	7.51	7.86	7.94	8.03	8.06
рН	ELF-10	6.85	7.00	7.18	7.31	8.37
pН	Pooled	6.85	7.19	7.30	7.84	8.37
Radium	ELF-1D	1.09	1.20	1.72	2.31	2.63
Radium	ELF-2	0.61	0.92	1.43	2.20	8.10
Radium	ELF-9	0.64	1.14	1.37	1.77	2.60
Radium	ELF-10	0.46	1.14	2.41	3.10	14.2
Radium	Pooled	0.46	1.10	1.50	2.30	14.2
Selenium	ELF-1D	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Selenium	ELF-2	0.0042	0.066	0.382	0.472	0.608

Analyte	Well	Minimum (mg/L)	First Quartile (mg/L)	Median (mg/L)	Third Quartile (mg/L)	Maximum (mg/L)
Selenium	ELF-9	< 0.002	< 0.002	< 0.002	< 0.002	0.0042
Selenium	ELF-10	< 0.002	< 0.002	0.009	0.146	0.410
Selenium	Pooled	< 0.002	< 0.002	0.0042	0.1775	0.608
Sulfate	ELF-1D	7730	8185	8640	8790	8940
Sulfate	ELF-2	6030	7070	7900	8095	8370
Sulfate	ELF-9	5460	5830	6530	6900	8030
Sulfate	ELF-10	8610	10225	17050	19825	20700
Sulfate	Pooled	5460	6840	7950	9085	20700
TDS	ELF-1D	26800	26900	27000	27850	28700
TDS	ELF-2	11300	11550	12000	12250	12600
TDS	ELF-9	9420	10300	10600	11200	12000
TDS	ELF-10	32900	35275	38000	38850	40300
TDS	Pooled	9420	11350	12000	33250	40300

3.0 UPGRADIENT AND DOWNGRADIENT WELL COMPARISON

Groundwater quality was assessed using upper tolerance limits (UTLs) and the Maximum Contaminant Levels (MCL) for each of the Appendix III and IV analytes. The data measured from the upgradient/background wells, was used to compute a UTL, which serves as the background value. The larger of the UTL and MCL was used as the Groundwater Protection Standard (GWPS). Data obtained from the downgradient wells were compared point-by-point to the GWPSs to determine if the site complies with the *Final Rule*. The software package Sanitas[©] v.2016, was used to compute the UTLs. As part of this evaluation, groundwater data were examined for characteristics that impact how the UTL was computed. These characteristics include the:

- Number of non-detect results
- Data distribution
- Site-wide false-positive rate (SWFPR)
- Spatial and seasonal variability.

Summary statistics and other statistical characteristics of the data are discussed in the previous section. These characteristics were used to compute the appropriate UTL for each analyte.

3.1 Groundwater Protection Standards

The shape or distribution of the data was assessed to ensure that the most appropriate UTL was used for comparison purposes. The most efficient UTL is a parametric UTL that assumes the data follow a normal distribution. If the data do not follow a normal distribution, a non-parametric UTL is typically used. Thus, the data for each analyte are assessed to determine if a

parametric UTL can be computed from the data. The parametric UTL is computed using the formula below:

$$UTL = \bar{X} + \kappa \times S$$

Where:

 \overline{X} = the average of the background data

- κ = multiplier from EPA Unified Guidance, March 2009
- S = standard deviation of the background data
- 3.1.1 Normal Distribution

Histograms and dot plots were used to visually inspect the data for deviations from normality and to determine if outliers are present. This examination reveals the outliers are present in the cadmium, cobalt, lead, pH, and radium data. The Shapiro-Wilk test was used to assess normality in conjunction with the normal quantile plots. If the p-value associated with the test was greater than or equal to 0.05, the data are considered normally distributed and a parametric UTL was computed using the upgradient measurements. If the p-value is less than 0.05, then the maximum detected value was used as the UTL.

Note: The 0.05 p-value is not a hard and fast rule. Parametric UTLs were computed for analytes whose p-values were sufficiently close to 0.05 as determined by the Sanitas software (Sanitas 2016).

If the data for an analyte were not normally distributed, the ladder of powers method was used to determine if a reasonable transformation existed that would produce normal data. The ladder of powers tests different monotonic transformations of the data, such as the natural logarithm or square, to see if the transformed data have a normal distribution. If a transformation within the ladder of powers can be found that produces normal data, a parametric UTL was computed using the transformed data. If a transformation was identified, it was applied to both upgradient / background and downgradient groundwater data prior to comparison.

A non-parametric UTL was computed for data that are not normally distributed and cannot be transformed. The non-parametric UTL is the largest value measured in the upgradient / background wells. Table C.4 summarizes the results of the Shapiro-Wilk test for each of the Appendix III and IV analytes where at least 50% of the measurements were detects. An appropriate transformation was found for lithium and radium. Non-parametric UTLs were computed for all of the analytes except for lithium and radium.

Analyte	W-Statistic	P-Value	Normal
Barium	0.7627	< 0.0001	No
Boron	0.8220	< 0.0001	No
Calcium	0.7965	< 0.0001	No
Chloride	0.7097	< 0.0001	No
Fluoride	0.6083	< 0.0001	No
Cube Root of Lithium	0.9427	0.0225	Yes

Table C.4. Shapiro-Wilk Test for the CCR Landfill upgradient wells.

Analyte	W-Statistic	P-Value	Normal
Lithium	0.8742	0.0001	No
Molybdenum	0.8531	< 0.0001	No
рН	0.9236	0.0071	No
Radium	0.5334	< 0.0001	No
LN of Radium	0.9479	0.0357	Yes
Selenium	0.6781	< 0.0001	No
Sulfate	0.7095	< 0.0001	No
TDS	0.7138	< 0.0001	No

3.1.2 Upper Tolerance Limits and Groundwater Protection Standard

This section contains the GWPS computed for each analyte. Table C.5 lists the UTL, MCL, and GWPS for each of the analytes detected in the upgradient wells. The following criteria were used for determining each GWPS:

- If more than 50% of the data were detected and have a normal distribution, a parametric UTL was computed.
- If the data were not normally distributed or more than 50% of the data were nondetects, the greater of the largest MDL and maximum detected value was used as the UTL.
- If all of the upgradient samples were non-detects, the largest MDL was used as the UTL.
- The larger of the MCL and the UTL was used as the GWPS.
- Fluoride is compared to both the MCL and the UTL if the MCL exceeds the UTL, to meet the criteria for Appendix III constituents.

Figure C.4 shows graphs that were constructed for each of the analytes that had at least one detectable measurement in the downgradient wells. The graphs illustrate the GWPS as a horizontal line with the measurements from each of the downgradient wells plotted on the same graph. Non-detects are represented by hollow gray circles on the graphs. These graphs clearly depict how the downgradient measurements compare to the GWPS.

Results above the GWPS line represent values exceeding the GWPS. As the graphs illustrate, boron, cobalt, molybdenum, sulfate, and total dissolved solids exceed the GWPS. Table C.5 list the GWPSs and the wells that exceed the GWPS for each analyte (Figure C.4). GWPS plots are not provided for analytes that were not detected in any downgradient samples.

Analyte	Upper Tolerance Limit (mg/L)	Maximum Contaminant Level (mg/L)	Groundwater Protection Standard (mg/L)	Downgradient Wells that Exceed Groundwater Protection Standard
Boron	3.77	NA	3.77	ELF-4, ELF-8, ELF-11
Calcium	543	NA	543	Within Limit
Chloride	12100	NA	12100	Within Limit
Fluoride Appx III	4.36	NA	4.36	Within Limit
pH Acidic Range	6.85	NA	6.85	Within Limit
pH Basic Range	8.37	NA	8.37	Within Limit
Sulfate	20700	NA	20700	ELF-3
TDS	40300	NA	40300	ELF-3
Antimony	0.004	0.006	0.006	Within Limit
Arsenic	0.0117	0.01	0.0117	Within Limit
Barium	0.102	2.00	2.00	Within Limit
Beryllium	0.002	0.004	0.004	Within Limit
Cadmium	0.0011	0.005	0.005	Within Limit
Chromium	0.0201	0.1000	0.1000	Within Limit
Cobalt	0.0114	0.006	0.0114	ELF-8, ELF-11
Fluoride Appx IV	4.36	4.00	4.36	Within Limit
Lead	0.012	0.015	0.015	Within Limit
Lithium	4.65	0.040	4.65	Within Limit
Mercury	0.00009	0.002	0.002	Within Limit
Molybdenum	0.158	0.100	0.158	ELF-8
Radium	6.28	5.0	6.28	Within Limit
Selenium	0.608	0.1	0.608	Within Limit
Thallium	0.002	0.002	0.002	Within Limit

Table C.5. Comparison of downgradient wells to the Groundwater Protection Standard

4.0 CONCLUSIONS

Groundwater data was collected from the CCR Landfill monitoring network at the Hunter Power Plant. A comprehensive data analysis was completed on the upgradient wells to ensure that comparisons between upgradient and downgradient wells were done correctly. During the October 2020 sampling event, statistically significant increases (SSIs) above background were noted for Appendix III constituents:

- boron
- sulfate
- total dissolved solids

SSIs above groundwater protection standards were noted for Appendix IV constituents:

- cobalt
- molybdenum

5.0 **REFERENCES**

- EPA, 2009, "Statistical Analysis Of Groundwater Monitoring Data At RCRA Facilities Unified Guidance," EPA 530/R-09-007, U.S. Environmental Protection Agency, March 2009.
- Helsel, Dennis, 2004, *Nondetects and Data Analysis: Statistic for Censored Environmental Data*, New York: Wiley Interscience.
- R Core Team, 2020, *R: A Language and Environment for Statistical Computing*, <u>https://www.R-project.org</u>, R Foundation for Statistical Computing, Vienna, Austria.

Sanitas Technologies, 2016, Sanitas, www.sanitastech.com, Shawnee, Kansas.



Figure C.3. Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.


Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.3 (cont.). Histograms and dot plots for the upgradient CCR Landfill data.



Figure C.4. Groundwater Protection Standard plots for the CCR Landfill.



Figure C.4 (cont.). Groundwater Protection Standard plots for the CCR Landfill.



Figure C.4 (cont.). Groundwater Protection Standard plots for the CCR Landfill.



Attachment D:

Field Data Sheets



GROUNDWATER SAMPLING FORM					
Project Name	Hunter Power Plant Project Location Castle Dale UT				
Job number(s)	PERCM052 Sample ID ELF-1D				
Sampling Method	Low Flow Bladder Pump Sample Date October 29, 2020				
Decon Method	Dedicated Equipment Sample Time 01:00				
Sampler(s) Initials	DV Depth to Water (ft.) 85.48				
Field Conditions	Field Conditions Clear and sunny 40°F. Light wind.				

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	TURBIDITY (NTU)

SAMPLE COLLECTION					
APPENDIX FOR	CURRENT SAMPLE	Not Applicable			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
COMMENTS/OBSERVATIONS					
	Water level below top of pump. Hit top of pump with meter at 83.75 feetPulled the pump, depth towater equals 84.29 feetNo Sample				



GROUNDWATER SAMPLING FORM				
Project Name	Hunter Power Plant Project Location Castle Dale UT			
Job number(s)	PERCM052	Sample ID	ELF-10	
Sampling Method	Low Flow Bladder Pump Sample Date October 28, 2020		October 28, 2020	
Decon Method	Dedicated Equipment Sample Time 17:50		17:50	
Sampler(s) Initials	DV Depth to Water (ft.) 50.42			
Field Conditions	eld Conditions sunny and clear, 54°F, no wind			

FIELD PARAMETERS					
WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
14.23	46300	1.19	6.81	158	14
14.2	46300	1.16	6.8	156	11.3
14.16	46300	1.09	6.79	153	10.6
14.12	46400	1.06	6.79	151	9.7
	TEMP (C) 14.23 14.2 14.16	TEMP (C) (uS) 14.23 46300 14.2 46300 14.16 46300	WATER TEMP (C) SC (uS) DO (mg/l) 14.23 46300 1.19 14.2 46300 1.16 14.16 46300 1.09	WATER TEMP (C) SC (uS) DO (mg/l) pH (s.u.) 14.23 46300 1.19 6.81 14.2 46300 1.16 6.8 14.16 46300 1.09 6.79	WATER TEMP (C) SC (uS) DO (mg/l) pH (s.u.) ORP (mv) 14.23 46300 1.19 6.81 158 14.2 46300 1.16 6.8 156 14.16 46300 1.09 6.79 153

SAMPLE COLLECTION				
APPENDIX FO	R CURRENT SAMPLE	3&4		
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS	
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228	
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury	
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite	
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity	
3	(1) 250 mL poly	HNO3	Total metals	
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite	
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity	
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228	
4	(1) 250 mL poly	HNO3	Total metals, Total mercury	
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite	
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity	
		COMMENTS/O	BSERVATIONS	
Vany paar p	raducing wall Vary a	low to comple 1	2 D 14 V 69 psi water level during campling	

Very poor producing well. Very slow to sample. 12 D , 14 V. 68 psi water level during sampling dropped below top of pump. It took 1.5 hours to collect samples.



GROUNDWATER SAMPLING FORM					
Project Name	Hunter Power Plant Project Location Castle Dale UT				
Job number(s)	PERCM052 Sample ID ELF-2				
Sampling Method	Low Flow Bladder Pump Sample Date October 29, 2020				
Decon Method	Dedicated Equipment Sample Time 10:45				
Sampler(s) Initials	DV Depth to Water (ft.) 24.69				
Field Conditions 42°F, clear and sunny, light wind					

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
1010	13.39	13600	1.51	7.06	193	0
1020	13.41	13500	1.45	7.06	195	0
1030	13.41	13500	1.39	7.06	195	0

SAMPLE COLLECTION				
APPENDIX FOR	CURRENT SAMPLE	3&4		
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS	
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228	
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury	
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite	
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity	
3	(1) 250 mL poly	HNO3	Total metals	
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite	
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity	
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228	
4	(1) 250 mL poly	HNO3	Total metals, Total mercury	
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite	
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity	
COMMENTS/OBSERVATIONS				
Good produc	Good producer, Clearwater. Stabilized quickly. 7D, 7S 40 PSI			



GROUNDWATER SAMPLING FORM					
Project Name	Hunter Power Plant Project Location Castle Dale UT				
Job number(s)	PERCM052	Sample ID	ELF-3		
Sampling Method	Low Flow Bladder Pump Sample Date October 28, 202		October 28, 2020		
Decon Method	Dedicated Equipment Sample Time 17:00		17:00		
Sampler(s) Initials	tials DV Depth to Water (ft.) 30.89				
Field Conditions Clear and sunny, 55°F, no wind					

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
1615	13.48	44900	2.01	7.32	74	73.5
1625	13.38	44800	2.09	7.32	81	78.4
1635	13.37	44800	2.14	7.33	93	77.4
1645	13.42	44900	2.19	7.33	97	76.9
1655	13.42	44900	2.23	7.33	99	74.8

	SAMPLE COLLECTION				
APPENDIX FO	R CURRENT SAMPLE	3&4			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
		COMMENTS/O	BSERVATIONS		

Water level is up on this well which is unusual. Able to collect samples in not too long time



GROUNDWATER SAMPLING FORM					
Project Name	Project Name Hunter Power Plant Project Location Castle Dale UT				
Job number(s)	PERCM052	Sample ID	ELF-4		
Sampling Method	Low Flow Bladder Pump	Sample Date	October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	14:52		
Sampler(s) Initials	DV Depth to Water (ft.) 17.70				
Field Conditions	Id Conditions sunny and clear, 55°F, no wind				

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
1415	14.49	14900	1.21	6.94	221	0
1425	14.4	14800	1.14	6.94	222	0
1435	14.38	14800	1.06	6.94	222	0
1445	14.39	14800	1.03	6.93	222	0

SAMPLE COLLECTION					
APPENDIX FO	R CURRENT SAMPLE	3&4			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
		COMMENTS/	OBSERVATIONS		

Yellow water but clear. Good producer.



GROUNDWATER SAMPLING FORM					
Project Name	Hunter Power Plant	Project Location	Castle Dale UT		
Job number(s)	PERCM052	Sample ID	ELF-5		
Sampling Method	Low Flow Bladder Pump	Sample Date	October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	14:00		
Sampler(s) Initials	mpler(s) Initials DV Depth to Water (ft.) 18.75				
Field Conditions	litions Sunny and clear, 55°F, no wind				

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	TURBIDITY (NTU)

	SAMPLE COLLECTION				
APPENDIX FOR	R CURRENT SAMPLE	Not Applicable			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
		COMMENTS/OE	SERVATIONS		

Water level at top of the pump 18.3 feet. Not able to bring water to surface to collect a sample. No sample.



GROUNDWATER SAMPLING FORM					
Project Name	Hunter Power Plant	Project Location	Castle Dale UT		
Job number(s)	PERCM052	Sample ID	ELF-6		
Sampling Method	Low Flow Bladder Pump	Sample Date	October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	01:00		
Sampler(s) Initials DV Depth to Water (ft.) 0					
Field Conditions 55°F, clear and sunny, no wind					

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)

	SAMPLE COLLECTION				
APPENDIX FOR	CURRENT SAMPLE	Not Applicable			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
		COMMENTS/OE	SERVATIONS		

Water level below top of pump. Measured to top of pump 16.4 feet, no water.Pulled pump. Took water level reading no water! No sample.



GROUNDWATER SAMPLING FORM					
Project Name	Hunter Power Plant	Project Location	Castle Dale UT		
Job number(s)	PERCM052	Sample ID	ELF-7		
Sampling Method	Low Flow Bladder Pump	Sample Date	October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	01:00		
Sampler(s) Initials	DV	Depth to Water (ft.)	16.12		
Field Conditions	Sunny and clear, 56°F, no wind				

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	TURBIDITY (NTU)

	SAMPLE COLLECTION				
APPENDIX FOR	CURRENT SAMPLE	Not Applicable			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
		COMMENTS/OB	SERVATIONS		

Water level is below top of pump at 15.60 feet. Pulled pump and DTW was 16.12 feet Able to bring very small amount of water to the surface but not able to continue to pump enough for samples. No samples



	GROUNDWATER SAMPLING FORM				
Project NameHunter Power PlantProject LocationCastle Dale UT					
Job number(s)	PERCM052	Sample ID	ELF-8		
Sampling Method	Low Flow Bladder Pump	Sample Date	October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	11:40		
Sampler(s) Initials	Sampler(s) InitialsDVDepth to Water (ft.)10.52				
Field Conditions	35°F, clear sunny, light breeze.				

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
1105	14.79	11300	1	7.44	158	12.8
1115	14.89	11200	0.78	7.44	157	3.1
1125	14.94	11200	0.75	7.44	156	0
1135	14.97	11200	0.73	7.43	154	0

APPENDIX FO	R CURRENT SAMPLE	3&4			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
	COMMENTS/OBSERVATIONS				

Very good producer, cleared up nicely. 6D, 10 V



GROUNDWATER SAMPLING FORM					
Project Name Hunter Power Plant Project Location Castle Dale UT					
Job number(s)	PERCM052 Sample ID		ELF-9		
Sampling Method	Low Flow Bladder Pump	Sample Date	October 29, 2020		
Decon Method	Dedicated Equipment	Sample Time	09:48		
Sampler(s) Initials	Sampler(s) InitialsDVDepth to Water (ft.)23.14				
Field Conditions	34°F clear and sunny, no wind				

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
910	11.76	15900	2.7	7.8	105	91
920	11.64	14800	1.79	7.81	86	3.1
930	11.61	14600	1.72	7.8	82	0
940	11.59	14500	1.65	7.81	78	0

SAMPLE COLLECTION					
APPENDIX FO	R CURRENT SAMPLE	3&4			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
	COMMENTS/OBSERVATIONS				
Muddy but o	cleared up. Water lev	el dropped significant	tly 11 D, 10V. 70 psi		



	GROUNDWATER SAMPLING FORM				
Project Name Hunter Power Plant Project Location Castle Dale UT					
Job number(s)	PERCM052	Sample ID	ELF-11		
Sampling Method	ing Method Low Flow Bladder Pump		October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	10:55		
Sampler(s) Initials	Sampler(s) Initials DV Depth to Water (ft.) 30.28				
Field Conditions 33°F, clear, light breeze.					

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
1025	13.01	19500	2.12	7.09	125	119
1035	13.06	19400	1.71	7.1	130	98
1045	13.12	19500	1.64	7.09	131	100
1055	13.12	19500	1.59	7.1	132	104

SAMPLE COLLECTION					
APPENDIX FOR	R CURRENT SAMPLE	3&4			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
	COMMENTS/OBSERVATIONS				
Good produc	Good producer, muddy at first but cleared up. 8 D, 6V				



GROUNDWATER SAMPLING FORM					
Project Name	Project Name Hunter Power Plant Project Location Castle Dale UT				
Job number(s)	PERCM052 Sample ID		ELF-12		
Sampling Method	Low Flow Bladder Pump	Sample Date	October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	16:00		
Sampler(s) Initials	Sampler(s) Initials DV Depth to Water (ft.) 20.48				
Field Conditions	ons 56°F, clear and sunny, no wind				

	FIELD PARAMETERS					
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
1520	13.59	21600	1.17	7.43	-38	127
1530	13.29	21600	1.09	7.43	-54	21.6
1540	13.38	21500	1.08	7.43	-59	11.8
1550	13.28	21500	1.09	7.42	-61	10.6

SAMPLE COLLECTION					
APPENDIX FO	R CURRENT SAMPLE	3&4			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
COMMENTS/OBSERVATIONS					
Slow, mud	Slow, muddy at first but cleared up. 11D, 9V				

eu up



GROUNDWATER SAMPLING FORM					
Project Name	Hunter Power Plant Project Location Castle Dale UT				
Job number(s)	PERCM052 Sample ID ELF-13				
Sampling Method	Low Flow Bladder Pump	Sample Date	October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	13:10		
Sampler(s) Initials	DV Depth to Water (ft.) 4.63				
Field Conditions	50°F, clear and sunny, no wind		·		

FIELD PARAMETERS						
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	рН (s.u.)	ORP (mv)	TURBIDITY (NTU)
1235	13.12	20400	1.01	6.95	179	0
1245	13.06	20400	0.91	6.94	180	0
1255	13.08	20400	0.87	6.94	180	0
1305	13.06	20400	0.85	6.93	180	0

SAMPLE COLLECTION					
APPENDIX FOR	R CURRENT SAMPLE	3&4			
APPENDIX	CONTAINERS	PRESERVATIVES	ANALYTES/COMMENTS		
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
COMMENTS/OBSERVATIONS					
Group B Duplicate sample taken this well. 6D 12 V					



GROUNDWATER SAMPLING FORM					
Project Name	Hunter Power Plant Project Location Castle Dale UT				
Job number(s)	PERCM052	Sample ID	ELF-14		
Sampling Method	Low Flow Bladder Pump	Sample Date	October 28, 2020		
Decon Method	Dedicated Equipment	Sample Time	12:25		
Sampler(s) Initials	DV Depth to Water (ft.) 6.00				
Field Conditions	38°F, clear and sunny, no wind.				

FIELD PARAMETERS						
TIME (min)	WATER TEMP (C)	SC (uS)	DO (mg/l)	pH (s.u.)	ORP (mv)	TURBIDITY (NTU)
1150	14.77	23400	1.09	7.08	70	391
1200	14.98	23200	1.14	7.08	79	218
1210	15.01	23100	1.07	7.08	81	202
1220	15.03	23200	1.03	7.07	83	198

SAMPLE COLLECTION					
APPENDIX FOR CURRENT SAMPLE		3&4			
APPENDIX	CONTAINERS	PRESERVATIVES ANALYTES/COMMENTS			
3&4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
3&4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
3&4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3&4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
3	(1) 250 mL poly	HNO3	Total metals		
3	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
3	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
4	(1) 1/2 gal poly	HNO3	Radium 226 + 228		
4	(1) 250 mL poly	HNO3	Total metals, Total mercury		
4	(1) 250 mL poly	H2SO4	Nitrate + Nitrite		
4	(1) 1-L poly	None	TDS, pH, anions, fluoride, alkalinity		
COMMENTS/OBSERVATIONS					
Good producer, muddy but clears a lot. 6D, 11 V					

d producer, muddy but clears a lot. 6D, 11 V



Attachment E:

Laboratory Analytical Reports



Radium-226

Case Narrative

American West Analytical Labs

Hunter Power Plant – CCR – 2010965

Work Order Number: 2011028

- 1. This report consists of the analytical results for 12 water samples received by ALS on 11/03/2020.
- 2. These samples were prepared and analyzed according to the current revision of SOP 783. The analyses were completed on 11/27/2020.
- 3. The analysis results for these samples are reported in units of pCi/L. These samples were not filtered prior to analysis.
- 4. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate.
- 5. Due to uncertainty associated with the ICP-AES determination of barium concentration in the samples, the calculated yield for all samples and associated QC samples fell between 100% and 110%. To minimize the potential for low bias, results have been calculated conservatively assuming quantitative chemical yield (100%). The magnitude of the low bias is estimated to be less than 10% of the reported value and is acceptable according the ALS LQAP. These samples are identified with a "Y1" flag on the final reports.
- ALS uses the following convention for reporting significant digits in the TPU and MDC results. The TPU value is rounded to two significant digits. The MDC value is rounded to the same decimal place as the TPU value. In practice, this could result in an MDC reported value of zero for samples with significant activity, including the batch laboratory control sample.
- 7. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining quality control criteria were met.


The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

derson Jean Anderson

Radiochemistry Primary Data Reviewer

Radiochemistry Final Data Reviewer

<u>11/28/20</u> Date

11/30/20

Date

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2011028 Client Name: American West Analytical Labs Client Project Name: Hunter Power Plant - CCR Client Project Number: 2010965 Client PO Number: 2010965

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
ELF-10	2011028-1		WATER	28-Oct-20	17:50
ELF-11	2011028-2		WATER	28-Oct-20	10:55
ELF-12	2011028-3		WATER	28-Oct-20	16:00
ELF-13	2011028-4		WATER	28-Oct-20	13:05
ELF-14	2011028-5		WATER	28-Oct-20	12:25
ELF-2	2011028-6		WATER	28-Oct-20	10:42
ELF-3	2011028-7		WATER	28-Oct-20	17:00
ELF-4	2011028-8		WATER	28-Oct-20	14:52
ELF-8	2011028-9		WATER	28-Oct-20	11:40
ELF-9	2011028-10		WATER	29-Oct-20	9:48
Duplicate	2011028-11		WATER	28-Oct-20	
Field Blank	2011028-12		WATER	29-Oct-20	10:45

American West	vest						CHAIN	CHAIN OF CUSTODY	STODY	
Analytical Laboratories	UT 8419			•						201102
Phone # (801) 263-8686 Tall Free # (888) 263-8686	(HH8) 263-8686			ll analys ref	is will be orting li	· conducted usin mits (PQL) unles	g NELAP accredited n s specifically requeste	ucthods and all data v d otherwise on this C	All analysis will be conducted using NELAP accredited methods and all data will be reported using AWAL's standard analyte lists and reporting limits (PQI) unless specifically requested otherwise on this Chain of Custody and/or attached documentation.	AWAL Lab Sample Set # Page 1 of 2
Fax # (KUI) 263-8647 Email awalenwal-lats.com	leawal-labs.com				QC Level:	/el:	Turn A	Turn Around Time:	Unless other arrangements have been made, signed	Due Dale:
www.awal-labs.com	uu				5+		St	Standard	reports will be emailed by 5:00 ptm on the day they are due.	
Client: American West Analytical Laboratories					\vdash				l.≊.	Laboratory Use Only
Address: 3440 S. 700 W.					(pa				 Include EDD: Lab Filter for: 	
City, State, Zip: Salt Lake City , UT 84119					uid				Eield Filtered For:	pe Was: esent on Outer Package
Contact: Elona Hayward					woo					VN X
Phone #: (801) 263-8686 Cell #:					28 9:					2 Unbroken on Outer Package Y N N NA
E-mail: elona@awal-labs.com; denise@awal-labs.com; jose@awal-labs.com	n; jose@awal-l	abs.com			erec					3 Present on Sample
Project Name: Hunter Power Plant - CCR					ləs)				CWA SDWA	
Project #:					87Z					4 Unbroken on Sample Y N NA
PO#: 2010965			9		pue				Non-Compliance Other:	
Sampler Name:			tainer	xinteA	977 u					Samples Were: 1 Shipped or hand delivered
	Date	Time	no⊃		uni				Known Hazards	
Sample ID:	Sampled	Sampled	J0 #	_	реу				& Sample Commonis	Ambient or Chilled
i ELF-10	10/28/2020	17:50	2		×					
2 ELF-11	10/28/2020	10:55	2	3	×					4 Received Intact Y N
3 ELF-12	10/28/2020	16:00	5	3	×					
4 ELF-13	10/28/2020	13:05	2	3	×					5 Properly Preserved
5 ELF-14	10/28/2020	12:25	7	3	×					Y N Checked at bench
• ELF-2	10/28/2020	10:42	2	3	×				-	
7 ELF-3	10/28/2020	17:00	~	3	×					6 Received Within
k ELF-4	10/28/2020	14:52	1	+	×					Holding Times Y
9 ELF-8	10/28/2020	11:40	10	3	×					
III ELF-9	10/29/2020	9:48	10	3	×					
11 Duplicate	10/28/2020		5	3	×					
12 Field Blank	10/29/2020	10:45	7	3	×					Semple Labels and COC Record Match?
2										
2										
Auren Aug A		Received by: Signature	N.	$ \mathcal{I} $				Pate 11	Special Instructions:	
Elme Hayword		Print Name:	1	C S	3	x wessed	1.	lime: 1210	QC 2+ = Final Report, COC, surrogate, recoveries, MB, LCS,	, recoveries, MB, LCS,
scranguesca rej. Signature		Received by: Signature	2					Pate:	MS/MSD performed on customer sample	tple
Port Nume. Particulation		Print Name:						l'inc.		
Rugature Saudure		Received by: Signature						Pate	Samples sent to ALS - Ft. Collins.	
Print Name:	l'ine:	Print Name:						l'ine:		



ALS Environmental - Fort Collins CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:	AV	/AL	Workorder No:	201	1028
Project Manager:	KMO	Initials:	ТМ	Date:	11/3/20
1. Are airbills / shipping	g documents present	and/or removable?	 ·· · ·	Drop Off	YES NO
2. Are custody seals on	shipping containers i	ntact?			
3. Are custody seals on	sample containers in	tact?			
4. Is there a COC (chain	-of-custody) present?			\checkmark	
5. Is the COC in agreem	ent with samples reci	ved? (IDs, dates, times, # of samp	les, # of containers, matrix, requested an	alyses, etc.)	YES 🛄 NO+
6. Are short-hold samp	les present?				YES 🗸 NO
7. Are all samples withi	n holding times for th	e requested analyses?		\checkmark	YES NO.
s. Were all sample cont	tainers received intac	? (not broken or leaking)	·	\checkmark	
9. Is there sufficient sar	nple for the requeste	d analyses?		\checkmark	
10. Are samples in prop	er containers for requ	iested analyses? (form 250, s	ample Handling Guidelines)	\checkmark	YES 🗌 NO+
11. Are all aqueous sam	ples preserved correc	tly, if required?		🗌 N/A 🔽	YES NO+
22. Were unpreserved s	amples pH checked, i	f required?		🗸 N/A 🗌	YES 🚺 NO
13. Are all samples requiri	ing no headspace (voc. GR	D, RSK/MEE, radon) free of bubbl	es > 6 mm in diameter?	V N/A	YES 🗌 NO
14. Were the samples s	hipped on ice?				YES 🗸 NO
15. Were cooler temper	atures measured at 0	.1 - 6.0°C? (R gun used':	#3 #5	Rad Only	YES 🗸 NO
Cooler #:	1 2				
Temperature (°C):	amb amb				
# of custody seals on cooler:	1 1				
External mR/hr reading:	11 10				ľ
Background mR/hr reading:	10 Were extern	al mR/hr readings ≤ two times acceptance criteria? (If no, s		🗌 N/A 🗸	
* Please provide	details below for 'NO' resp		r 2 thru 5 & 7 thru 12, notify Pl	M & continue w/ l	ogin.
					ľ
		• •			
			All client bottle ID's vs ALS lab I	D's double-checke	ed by: TM
If applicable, was the c	lient contacted?	YES N/A Contact	Name	D	ate:
Project Manager Sig	nature / Date:	ull-Ab-1	1/1/20		
······	•		√∽ *		.

View/Print Label

- 1. Ensure there are no other shipping or tracking labels attached to your package. Select the Print button on the print dialogue box that appears. Note: If your browser does not support this function, select Print from the File menu to print the label.
- 2. Fold the printed label at the solid line below. Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
- 3. GETTING YOUR SHIPMENT TO UPS
 - Customers with a scheduled Pickup
 - Your driver will pickup your shipment(s) as usual.

Customers without a scheduled Pickup

- · Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
- Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

UPS Access Point™ ADVANCE AUTO PARTS STORE 4719	UPS Access Point [™] CVS STORE # 10741	UPS Access Point™ ADVANCE AUTO PARTS STORE 3954
1931 W 3500 S	4082 S REDWOOD RD	4306 S STATE ST
WEST VALLEY CITY UT 84119-3437	SALT LAKE CITY UT 84123-1132	SALT LAKE CITY UT 84107-2620

FOLD HERE



View/Print Label

- 1. Ensure there are no other shipping or tracking labels attached to your package. Select the Print button on the print dialogue box that appears. Note: If your browser does not support this function, select Print from the File menu to print the label.
- 2. Fold the printed label at the solid line below. Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
- 3. GETTING YOUR SHIPMENT TO UPS
 - Customers with a scheduled Pickup
 - Your driver will pickup your shipment(s) as usual.

Customers without a scheduled Pickup

- Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
- Take your package to any location of The UPS Store[®], UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples[®] or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

UPS Access Point™ ADVANCE AUTO PARTS STORE 4719	UPS Access Point [™] CVS STORE # 10741	UPS Access Point™ ADVANCE AUTO PARTS STORE 3954
1931 W 3500 S	4082 S REDWOOD RD	4306 S STATE ST
WEST VALLEY CITY UT 84119-3437	SALT LAKE CITY UT 84123-1132	SALT LAKE CITY UT 84107-2620

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Radium-226 by Radon Emanation - Method 903.1 PAI 783 Rev 15 Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Lab ID: RE201119-1MB

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 19-Nov-20 Date Prepared: 19-Nov-20 Date Analyzed: 27-Nov-20 Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.03 +/- 0.16	0.36	1	NA	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15490	15880	ug	103	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

 ${\sf U}~$ - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Radium-226 by Radon Emanation - Method 903.1 PAI 783 Rev 15

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs

ClientProject ID: Hunter Power Plant - CCR 2010965

Lab ID: RE201119-1LCS

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 19-Nov-20 Date Prepared: 19-Nov-20 Date Analyzed: 27-Nov-20 Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added		Contro I Limits	Lab Qualifier
13982-63-3	Ra-226	41 +/- 10	0	46.80	87.4	67 - 120	P,Y1

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15490	15790	ug	102	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RE2011028-1

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

Radium-226 by Radon Emanation - Method 903.1 PAI 783 Rev 15

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs

ClientProject ID: Hunter Power Plant - CCR 2010965

Lab ID: RE201119-1LCSD

Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 19-Nov-20 Date Prepared: 19-Nov-20 Date Analyzed: 27-Nov-20 Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A Count Time: 15 minutes Final Aliquot: 995 ml Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added		Contro I Limits	Lab Qualifier
13982-63-3	Ra-226	46 +/- 12	0	46.80	99.3	67 - 120	P,Y1

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15490	15880	ug	103	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RE2011028-1

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

Radium-226 by Radon Emanation - Method 903.1

PAI 783 Rev 15

Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: Lab ID: R	E201119-1LCSD	Sample Matrix: WATEL Prep SOP: PAI 78: Date Collected: 19-Nov Date Prepared: 19-Nov Date Analyzed: 27-Nov	3 Rev 15 -20 -20	QCBate Ru	atch: RE201119-1 chID: RE201119-1-2 n ID: RE201119-1A 'ime: 15 minutes	Moisture(% Result Unit	is: Unfiltered 6): NA		
CASNO	Analyte	Sample Result +/- 2 s TPU	e MDC	Flags	Duplie Result +/- 2 s TPU	cate MDC	Flags	DER	DER Lim

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

- Y2 Chemical Yield outside default limits.
- W DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

LT - Result is less than Request MDC, greater than sample specific MDC

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported

activity is greater than the reported MDC L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

Data Package ID: RE2011028-1

Abbreviations:

TPU - Total Propagated Uncertainty

DER - Duplicate Error Ratio

BDL - Below Detection Limit

NR - Not Reported

Page 1 of 1

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: ELF-10 Lab ID: 2011028-1	Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Final Aliquot: 995 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.23 +/- 0.27	0.42	1	NA	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15830	ug	102	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: ELF-11 Lab ID: 2011028-2	Sample Matrix: WATER	Prep Batch: RE201119-1	Final Aliquot: 995 ml
	Prep SOP: PAI 783 Rev 15	QCBatchID: RE201119-1-2	Prep Basis: Unfiltered
	Date Collected: 28-Oct-20	Run ID: RE201119-1A	Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.14 +/- 0.17	0.26	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15510	15350	ug	98.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: ELF-12 Lab ID: 2011028-3	Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Final Aliquot: 995 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.09 +/- 0.22	0.39	1	NA	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15940	ug	103	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:	ELF-13	Sample Matrix: WATER	Prep Batch: RE201119-1	Final Aliquot: 995 ml
Lab ID:	2011028-4	Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.95 +/- 0.50	0.51	1	NA	Y1

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15600	ug	101	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: ELF-14 Lab ID: 2011028-5	Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Final Aliquot: 995 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.35 +/- 0.36	0.55	1	NA	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15510	15610	ug	101	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: Lab ID:	ELF-2 2011028-6	Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Final Aliquot: 995 ml Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 19-Nov-20 Date Analyzed: 26-Nov-20	Count Time: 15 minutes Report Basis: Unfiltered	Result Units: pCi/l File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.27 +/- 0.53	0.41	1	NA	Y1

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15840	ug	102	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: ELF-3 Lab ID: 2011028-7	Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Final Aliquot: 995 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.21 +/- 0.23	0.33	1	NA	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15840	ug	102	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:	ELF-4	Sample Matrix: WATER	Prep Batch: RE201119-1	Final Aliquot: 995 ml
Lab ID:	2011028-8	Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.27 +/- 0.22	0.29	1	NA	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15620	ug	101	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: ELF-8 Lab ID: 2011028-9	Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Final Aliquot: 995 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.82 +/- 0.37	0.21	1	NA	Y1

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15710	ug	101	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: ELF-9 Lab ID: 2011028-10	Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 29-Oct-20	Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Final Aliquot: 995 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.31 +/- 0.23	0.26	1	NA	Y1

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15640	ug	101	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:DuplicateLab ID:2011028-11	Sample Matrix: WATER Prep SOP: PAI 783 Rev 15 Date Collected: 28-Oct-20	Prep Batch: RE201119-1 QCBatchID: RE201119-1-2 Run ID: RE201119-1A	Final Aliquot: 995 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 27-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.62 +/- 0.34	0.36	1	NA	Y1

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15560	ug	100	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:Field BlankLab ID:2011028-12	Sample Matrix: WATER	Prep Batch: RE201119-1	Final Aliquot: 995 ml
	Prep SOP: PAI 783 Rev 15	QCBatchID: RE201119-1-2	Prep Basis: Unfiltered
	Date Collected: 29-Oct-20	Run ID: RE201119-1A	Moisture(%): NA
	Date Prepared: 19-Nov-20	Count Time: 15 minutes	Result Units: pCi/l
	Date Analyzed: 27-Nov-20	Report Basis: Unfiltered	File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	-0.03 +/- 0.15	0.29	1	NA	Y1,U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	15500	15730	ug	101	40 - 110 %	Y1

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level



Radium-228

Case Narrative

American West Analytical Labs

Hunter Power Plant – CCR – 2010965

Work Order Number: 2011028

- 1. This report consists of the analytical results for 12 water samples received by ALS on 11/03/2020.
- 2. These samples were prepared according to the current revision of SOP 749.
- 3. The samples were analyzed for the presence of ²²⁸Ra by low background gas flow proportional counting of ²²⁸Ac, which is the ingrown progeny of ²²⁸Ra, according to the current revision of SOP 724. The analyses were completed on 11/20/2020.
- 4. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
- 5. Sample volume was insufficient to allow preparation of a duplicate. A laboratory control sample duplicate (LCSD) was prepared in lieu of a client sample duplicate.
- 6. The requested MDC was not met for samples 2011028-3 and -5. These samples are identified with an "M3" qualifier on the final reports. The reported activity for these samples exceeds the achieved MDC.
- 7. No further anomalous situations were noted during the preparation and analysis of these samples. All remaining quality control criteria were met.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

12 on Jean Anderson

Radiochemistry Primary Data Reviewer

Radiochemistry Final Data Reviewer

<u>11/28/20</u> Date

11/30/20 Date

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2011028 Client Name: American West Analytical Labs Client Project Name: Hunter Power Plant - CCR Client Project Number: 2010965 Client PO Number: 2010965

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
ELF-10	2011028-1		WATER	28-Oct-20	17:50
ELF-11	2011028-2		WATER	28-Oct-20	10:55
ELF-12	2011028-3		WATER	28-Oct-20	16:00
ELF-13	2011028-4		WATER	28-Oct-20	13:05
ELF-14	2011028-5		WATER	28-Oct-20	12:25
ELF-2	2011028-6		WATER	28-Oct-20	10:42
ELF-3	2011028-7		WATER	28-Oct-20	17:00
ELF-4	2011028-8		WATER	28-Oct-20	14:52
ELF-8	2011028-9		WATER	28-Oct-20	11:40
ELF-9	2011028-10		WATER	29-Oct-20	9:48
Duplicate	2011028-11		WATER	28-Oct-20	
Field Blank	2011028-12		WATER	29-Oct-20	10:45

	American W									C	HA	IN C	OF C	USI	ſODY	
	Analytical Labor	atories														AWAL Lab Sample Set #
]-	3440 S. 700 W. Salt Lake City, U Phone # (801) 263-8686 Toll Free #				All ana	ilysis wi reporti	ll be co ne limi	onducted its (POL)	d using N) unless	NELAP a	accredit	ed method rested othe	is and all c erwise on t	ilata wil bis Cha	l be reported using AWAL's standard analyte lists and in of Custody and/or attached documentation.	
	Fax # (801) 263-8687 Email awak									, 1					Unless other arrangements have been made, signed	Page 1 of 2
						-	Level	1:			lur		nd Time	2:	reports will be emailed by	Due Date:
	www.awal-labs.co	m					2+					Standa	ard		5:00 pm on the day they are due.	
Client:	American West Analytical Laboratories						Γ	Τ						Τ	 Report down to the MDL Include EDD: 	Laboratory Use Only
Address:	3440 S. 700 W.					(ç									Lab Filter for:	COC 7
City, State, Zip:	Salt Lake City , UT 84119					combined)									Field Filtered For:	COC Tape Was: 1 Present on Outer Package Y N NA
Contact:	Elona Hayward															
Phone #:	(801) 263-8686 Cell #:					te &									For Compliance With:	2 Unbroken on Outer Package Y N NA
E-mail:	elona@awal-labs.com; denise@awal-labs.com	; jose@awal-l	abs.com			(separate									C RCRA	3 Present on Sample
Project Name:	Hunter Power Plant - CCR					3 (sej									CWA SDWA ELAP/A2LA	Y N
Project #:						1 228									🗇 NLLAP	4 Unbroken on Sampie Y N NA
PO #:	2010965			γ.		and									Non-Compliance Other:	
Sampler Name:				Containers	Sample Matrix	1 226										Samples Were: 1 Shipped or hand delivered
		Date	Time		ple V	Radium									Known Hazards &	2 Ambient or Chilled
	Sample ID:	Sampled	Sampled	‡ of	Sam	Rac									Sample Comments	3 Temperature °C
ELF-10		10/28/2020	17:50	2	w	х										4 Received Intact
2 ELF-11		10/28/2020	10:55	2	w	x										Y N
BELF-12		10/28/2020	16:00	2	w	х										
ELF-13		10/28/2020	13:05	2	w	х										5 Properly Preserved Y N Checked at bench
5 ELF-14		10/28/2020	12:25	2	w	x										Y N Checked at bench
ELF-2		10/28/2020	10:42	2	w	x								1		
ELF-3		10/28/2020	17:00	2	w	x										6 Received Within A Holding Times
ELF-4		10/28/2020	14:52	2	w	x										Y N
ELF-8		10/28/2020	11:40	2	w	x										
ELF-9		10/29/2020	9:48	2	w	x										
Duplicate		10/28/2020		2	w	x								1		Semala Labels and COC D
² Field Blank		10/29/2020	10:45	2	w	x		\square								Sample Labels and COC Record Match? Y N
3														1		
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Relinquished by Signature	man ellas	14/30/20	Received by: Signature		4	~						Pate	il3h		Special Instructions:	
Print Name: Elm		Time:		5				550	~			lim	4**		QC 2+ = Final Report, COC, surrogate	recoveries MR LCC
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Religguished by: Segnature		Date:	Print Name: Received by:							-		Date				
		Time:	Signature									Time			Samples sent to ALS - Ft. Collins.	
Print Name:	Nome: Print Nome: Print Nome:						1									



ALS Environmental - Fort Collins CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:	AV	/AL	Workorder No:	201	1028
Project Manager:	KMO	Initials:	ТМ	Date:	11/3/20
1. Are airbills / shipping	g documents present	and/or removable?	 ·· · ·	Drop Off	YES NO
2. Are custody seals on	shipping containers i	ntact?			
3. Are custody seals on	sample containers in	tact?			
4. Is there a COC (chain	-of-custody) present?			\checkmark	
5. Is the COC in agreem	ent with samples reci	ved? (IDs, dates, times, # of samp	les, # of containers, matrix, requested an	alyses, etc.)	YES 🛄 NO+
6. Are short-hold samp	les present?				YES 🗸 NO
7. Are all samples withi	n holding times for th	e requested analyses?		\checkmark	YES NO.
s. Were all sample cont	tainers received intac	? (not broken or leaking)	·	\checkmark	
9. Is there sufficient sar	nple for the requeste	d analyses?		\checkmark	
10. Are samples in prop	er containers for requ	iested analyses? (form 250, s	ample Handling Guidelines)	\checkmark	YES 🗌 NO+
11. Are all aqueous sam	ples preserved correc	tly, if required?		🗌 N/A 🔽	YES NO+
22. Were unpreserved s	amples pH checked, i	f required?		🗸 N/A 🗌	YES 🚺 NO
13. Are all samples requiri	ing no headspace (voc. GR	D, RSK/MEE, radon) free of bubbl	es > 6 mm in diameter?	V N/A	YES 🗌 NO
14. Were the samples s	hipped on ice?				YES 🗸 NO
15. Were cooler temper	atures measured at 0	.1 - 6.0°C? (R gun used':	#3 #5	Rad Only	YES 🗸 NO
Cooler #:	1 2				
Temperature (°C):	amb amb				
# of custody seals on cooler:	1 1				
External mR/hr reading:	11 10				ľ
Background mR/hr reading:	10 Were extern	al mR/hr readings ≤ two times acceptance criteria? (If no, s		🗌 N/A 🗸	
* Please provide	details below for 'NO' resp		r 2 thru 5 & 7 thru 12, notify Pl	M & continue w/ l	ogin.
					ľ
		• •			
			All client bottle ID's vs ALS lab I	D's double-checke	ed by: TM
If applicable, was the c	lient contacted?	YES N/A Contact	Name	D	ate:
Project Manager Sig	nature / Date:	ull-Ab-1	1/1/20		
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View/Print Label

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- 2. Fold the printed label at the solid line below. Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
- 3. GETTING YOUR SHIPMENT TO UPS
 - Customers with a scheduled Pickup
 - Your driver will pickup your shipment(s) as usual.

Customers without a scheduled Pickup

- · Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
- Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

UPS Access Point™ ADVANCE AUTO PARTS STORE 4719	UPS Access Point™ CVS STORE # 10741	UPS Access Point™ ADVANCE AUTO PARTS STORE 3954
1931 W 3500 S	4082 S REDWOOD RD	4306 S STATE ST
WEST VALLEY CITY UT 84119-3437	SALT LAKE CITY UT 84123-1132	SALT LAKE CITY UT 84107-2620

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- 2. Fold the printed label at the solid line below. Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
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 - Your driver will pickup your shipment(s) as usual.

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- Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
- Take your package to any location of The UPS Store[®], UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples[®] or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

UPS Access Point™ ADVANCE AUTO PARTS STORE 4719	UPS Access Point [™] CVS STORE # 10741	UPS Access Point™ ADVANCE AUTO PARTS STORE 3954
1931 W 3500 S	4082 S REDWOOD RD	4306 S STATE ST
WEST VALLEY CITY UT 84119-3437	SALT LAKE CITY UT 84123-1132	SALT LAKE CITY UT 84107-2620

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Radium-228 Analysis by GFPC PAI 724 Rev 14 Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Lab ID: RA201113-2MB

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 13-Nov-20 Date Prepared: 13-Nov-20 Date Analyzed: 20-Nov-20 Prep Batch: RA201113-2 QCBatchID: RA201113-2-1 Run ID: RA201113-2A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC1120

CAS	SNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
1526	2-20-1	Ra-228	0.71 +/- 0.40	0.73	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33080	32260	ug	97.5	40 - 110 %	

Comments:

Qualifiers/Flags:

 ${\sf U}~$ - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Radium-228 Analysis by GFPC PAI 724 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028 Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Lab ID: RA201113-2LCS

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 13-Nov-20 Date Prepared: 13-Nov-20 Date Analyzed: 20-Nov-20 Prep Batch: RA201113-2 QCBatchID: RA201113-2-1 Run ID: RA201113-2A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC1120

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Contro I Limits	Lab Qualifier
15262-20-1	Ra-228	24.5 +/- 5.7	0.8	23.29	105	70 - 130	Р

Chemical Yield Summary

(Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
	BARIUM	33080	30920	ug	93.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RA2011028-1

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

Radium-228 Analysis by GFPC PAI 724 Rev 14

Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028 Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Lab ID: RA201113-2LCSD

Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 13-Nov-20 Date Prepared: 13-Nov-20 Date Analyzed: 20-Nov-20 Prep Batch: RA201113-2 QCBatchID: RA201113-2-1 Run ID: RA201113-2A Count Time: 150 minutes Final Aliquot: 997 ml Result Units: pCi/l File Name: RAC1120

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Contro I Limits	Lab Qualifier
15262-20-1	Ra-228	20.8 +/- 4.9	0.7	23.29	89.3	70 - 130	Р

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33080	32010	ug	96.8	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

- Y2 Chemical Yield outside default limits.
- L LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Data Package ID: RA2011028-1

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

Radium-228 Analysis by GFPC

PAI 724 Rev 14 Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: Lab ID: R	A201113-2LCSD	Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 13-Nov-20 Date Prepared: 13-Nov-20 Date Analyzed: 20-Nov-20		QCBat Rt	atch: RA201113-2 chID: RA201113-2-1 un ID: RA201113-2A Time: 150 minutes	Final Aliquo Prep Basi Moisture(% Result Unit File Nam			
CASNO	Analyte	Sample Result +/- 2 s TPU	e MDC	Flags	Dupli Result +/- 2 s TPU	cate MDC	Flags	DER	DER Lim
15262-20-1	Ra-228	24.5 +/- 5.7	0.8	Р	20.8 +/- 4.9	0.7	P	0.501	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

LT - Result is less than Request MDC, greater than sample specific MDC

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported

activity is greater than the reported MDC L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

Data Package ID: RA2011028-1

Abbreviations:

TPU - Total Propagated Uncertainty

DER - Duplicate Error Ratio

BDL - Below Detection Limit

NR - Not Reported

Page 1 of 1

Radium-228 Analysis by GFPC PAI 724 Rev 14 Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: Lab ID:	ELF-10 2011028-1	Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 28-Oct-20	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1	Final Aliquot: 997 ml Prep Basis: Unfiltered Moisture(%): NA
	_	Date Prepared: 13-Nov-20 Date Analyzed: 26-Nov-20	Run ID: RA201113-2A Count Time: 150 minutes Report Basis: Unfiltered	Result Units: pCi/l File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	1.1	0.71	1	NA	
15262-20-1	Ra-228	1.10 +/- 0.45	0.71	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	31120	ug	94.0	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Radium-228 Analysis by GFPC PAI 724 Rev 14 Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:	ELF-11	Sample Matrix: WATER Prep SOP: SOP749 Rev 7	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1	Final Aliquot: 997 ml
Lab ID:	2011028-2	Date Collected: 28-Oct-20	Run ID: RA201113-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 13-Nov-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.75	1.26	1	NA	
15262-20-1	Ra-228	2.75 +/- 0.95	1.26	1	NA	M3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33130	18320	ug	55.3	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Radium-228 Analysis by GFPC PAI 724 Rev 14 Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:ELLab ID:20	 Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 28-Oct-20	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1 Run ID: RA201113-2A	Final Aliquot: 997 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 13-Nov-20 Date Analyzed: 26-Nov-20	Count Time: 150 minutes Report Basis: Unfiltered	Result Units: pCi/l File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.42	0.68	1	NA	
15262-20-1	Ra-228	2.42 +/- 0.70	0.68	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	31270	ug	94.5	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level
Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: Lab ID:	ELF-13 2011028-4	Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 28-Oct-20	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1 Run ID: RA201113-2A	Final Aliquot: 997 ml Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 13-Nov-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.32	0.69	1	NA	
15262-20-1	Ra-228	1.37 +/- 0.50	0.69	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	31390	ug	94.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: Lab ID:	ELF-14 2011028-5	Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 28-Oct-20	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1 Run ID: RA201113-2A	Final Aliquot: 997 ml Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 13-Nov-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.12	1.01	1	NA	
15262-20-1	Ra-228	2.12 +/- 0.74	1.01	1	NA	M3

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	23400	ug	70.7	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: Lab ID:	ELF-2 2011028-6	Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 28-Oct-20	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1	Final Aliquot: 997 ml Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 13-Nov-20 Date Analyzed: 26-Nov-20	Run ID: RA201113-2A Count Time: 150 minutes Report Basis: Unfiltered	Result Units: pCi/l File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.08	0.76	1	NA	
15262-20-1	Ra-228	0.81 +/- 0.43	0.76	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	31040	ug	93.8	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:	ELF-3	Sample Matrix: WATER Prep SOP: SOP749 Rev 7	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1	Final Aliquot: 997 ml
Lab ID: 2011028-7	2011028-7	Date Collected: 28-Oct-20	Run ID: RA201113-2A	Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 13-Nov-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	1.32	0.72	1	NA	
15262-20-1	Ra-228	1.32 +/- 0.50	0.72	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	31390	ug	94.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:	ELF-4	Sample Matrix: WATER Prep SOP: SOP749 Rev 7	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1	Final Aliquot: 997 ml	
Lab ID:	2011028-8	Date Collected: 28-Oct-20	Run ID: RA201113-2A	Prep Basis: Unfiltered Moisture(%): NA	
		Date Prepared: 13-Nov-20	Count Time: 150 minutes	Result Units: pCi/l	
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: RAC1120	

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	1.53	0.75	1	NA	
15262-20-1	Ra-228	1.53 +/- 0.54	0.75	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	30510	ug	92.2	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID:		Sample Matrix: WATER Prep SOP: SOP749 Rev 7	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1	Final Aliquot: 997 ml Prep Basis: Unfiltered
Lab ID:	2011028-9	Date Collected: 28-Oct-20	Run ID: RA201113-2A	Moisture(%): NA
		Date Prepared: 13-Nov-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	2.11	0.73	1	NA	
15262-20-1	Ra-228	1.29 +/- 0.49	0.73	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	31040	ug	93.8	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Field ID: Lab ID:	ELF-9 2011028-10	Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 29-Oct-20	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1 Run ID: RA201113-2A	Final Aliquot: 997 ml Prep Basis: Unfiltered Moisture(%): NA
		Date Prepared: 13-Nov-20	Count Time: 150 minutes	Result Units: pCi/l
		Date Analyzed: 26-Nov-20	Report Basis: Unfiltered	File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	1.36	0.73	1	NA	
15262-20-1	Ra-228	1.05 +/- 0.45	0.73	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	31510	ug	95.2	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

Duplicate 2011028-11	Sample Matrix: WATER Prep SOP: SOP749 Rev 7 Date Collected: 28-Oct-20	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1 Run ID: RA201113-2A	Final Aliquot: 997 ml Prep Basis: Unfiltered Moisture(%): NA
	Date Prepared: 13-Nov-20	Count Time: 150 minutes	Result Units: pCi/l
	Date Analyzed: 27-Nov-20	Report Basis: Unfiltered	File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	1.72	0.74	1	NA	
15262-20-1	Ra-228	1.10 +/- 0.46	0.74	1	NA	

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33090	31390	ug	94.9	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Lab Name: ALS -- Fort Collins

Work Order Number: 2011028

Client Name: American West Analytical Labs ClientProject ID: Hunter Power Plant - CCR 2010965

		Sample Matrix: WATER Prep SOP: SOP749 Rev 7	Prep Batch: RA201113-2 QCBatchID: RA201113-2-1	Final Aliquot: 997 ml Prep Basis: Unfiltered
Lab ID:	2011028-12	Date Collected: 29-Oct-20	Run ID: RA201113-2A	Moisture(%): NA
		Date Prepared: 13-Nov-20 Date Analyzed: 27-Nov-20	Count Time: 150 minutes Report Basis: Unfiltered	Result Units: pCi/l File Name: RAC1120

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
	COMBINED RA (226+228)	0	0.78	1	NA	U
15262-20-1	Ra-228	0.16 +/- 0.36	0.78	1	NA	U

Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
BARIUM	33080	32440	ug	98.1	40 - 110 %	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level



Jeff Tucker PacifiCorp 1407 West North Temple, #280 Salt Lake City, UT 84116 TEL: (801) 220-2989

	RE: Hunter Power Plant - CCR / Group	В						
3440 South 700 West	Dear Jeff Tucker:	Lab Set ID:	2010965					
Salt Lake City, UT 84119	American West Analytical Laboratories received sample(s) on 10/29/2020 for the analyses presented in the following report.							
Phone: (801) 263-8686	American West Analytical Laboratories (Environmental Laboratory Accreditation							
Toll Free: (888) 263-8686	state accredited in Colorado, Idaho, New	e (
Fax: (801) 263-8687								
e-mail: awal@awal-labs.com	All analyses were performed in accordant otherwise. Accreditation scope document	1						
web: www.awal-labs.com	questions or concerns regarding this repo	rt please feel free to call.						
	The abbreviation "Surr" found in organic	reports indicates a surrogate co	ompound that is					
Kyle F. Gross	intentionally added by the laboratory to d purging efficiency. The "Reporting Limi	1 0						
Laboratory Director	practical quantitation limit (PQL). This i reported by the method referenced and th							
Jose Rocha	confused with any regulatory limit. Anal	1 1 0						

QA Officer

Thank You,		
· · · · · · · · · · · · · · · · · · ·	Jose G	Digitally signed by Jose G.
	Rocha	Rocha Date: 2020.11.17
Approved by:		14:12:29 -07'00'

figures for quality control and calculation purposes.

Laboratory Director or designee

Sample(s) were subcontracted for the following analyses:

Radiological Testing



Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-001Client Sample ID:ELF-10Collection Date:10/28/2020 1750hReceived Date:10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00200	0.0155	
Dhoma: (201) 262 2626	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1035h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	11/5/2020 1007h	11/9/2020 1322h	E200.7	0.500	1.54	
Toll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1319h	E200.7	10.0	407	
e-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00200	0.00221	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00400	0.00421	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1322h	E200.7	0.100	2.18	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 927h	E245.1	0.0000900	< 0.0000900	1
Laboratory Director	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00200	0.0341	
	Selenium	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00200	< 0.00200	
	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1731h	E200.8	0.00200	< 0.00200	

Jose Rocha

 a_{1} - Matrix spike recovery indicates matrix interference. The method is in control as indicated by the LCS.

QA Officer

Report Date: 11/17/2020 Page 2 of 36



Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-002Client Sample ID:ELF-11Collection Date:10/28/2020 1055hReceived Date:10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qua
alt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00200	0.0108	
Phone: (801) 263-8686	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1039h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	11/5/2020 1007h	11/9/2020 1324h	E200.7	0.500	15.6	
Foll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1439h	E200.7	10.0	384	2
-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00400	0.0197	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1324h	E200.7	0.100	3.15	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 939h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00200	0.0183	
	Selenium	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00200	0.0669	
	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1735h	E200.8	0.00200	< 0.00200	

Jose Rocha ² - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

QA Officer



Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-003Client Sample ID:ELF-12Collection Date:10/28/2020 1600hReceived Date:10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.00200	0.0101	
Phone: (801) 263-8686	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1049h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	11/5/2020 1007h	11/9/2020 1333h	E200.7	0.500	1.31	
Toll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1322h	E200.7	5.00	139	
e-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1333h	E200.7	0.100	0.738	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 941h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.00200	< 0.00200	
Laboratory Director	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1049h	E200.8	0.00200	< 0.00200	
	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1814h	E200.8	0.00200	< 0.00200	
I D I								

Jose Rocha

QA Officer

Report Date: 11/17/2020 Page 4 of 36



Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-004Client Sample ID:ELF-13Collection Date:10/28/2020 1305hReceived Date:10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.00200	0.0100	
Phone: (801) 263-8686	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1053h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	11/5/2020 1007h	11/9/2020 1335h	E200.7	0.500	0.609	
Toll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1325h	E200.7	10.0	411	
e-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.00400	0.00421	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1335h	E200.7	0.100	1.74	
Kyle F. Gross Laboratory Director	Mercury	mg/L	11/9/2020 1206h	11/10/2020 943h	E245.1	0.0000900	< 0.0000900	
	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.00200	< 0.00200	
	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1053h	E200.8	0.00200	< 0.00200	
	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1818h	E200.8	0.00200	< 0.00200	
T D L								

Jose Rocha

QA Officer

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Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-005Client Sample ID:ELF-14Collection Date:10/28/2020 1225hReceived Date:10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.00200	0.0129	
Phone: (801) 263-8686	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1057h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	11/5/2020 1007h	11/9/2020 1338h	E200.7	0.500	2.79	
Foll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1328h	E200.7	10.0	443	
-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.00400	0.00841	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1338h	E200.7	0.100	4.15	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 949h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.00200	0.00399	
	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1057h	E200.8	0.00200	0.00573	
	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1822h	E200.8	0.00200	< 0.00200	

Jose Rocha

QA Officer

Report Date: 11/17/2020 Page 6 of 36



Client: PacifiCorp Hunter Power Plant - CCR / Group B **Project:** 2010965-006 Lab Sample ID: **Client Sample ID:** ELF-2 **Collection Date:** 10/28/2020 1042h **Received Date:** 10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.00200	0.00965	
Phone: (801) 263-8686	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1100h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	11/5/2020 1007h	11/9/2020 1341h	E200.7	0.500	3.18	
Toll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1447h	E200.7	10.0	356	2
e-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.00400	0.00438	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1341h	E200.7	0.100	1.42	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 951h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.00200	< 0.00200	
Laboratory Director	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1100h	E200.8	0.00200	0.00423	
	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1826h	E200.8	0.00200	< 0.00200	

Jose Rocha ² - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

QA Officer



Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-007Client Sample ID:ELF-3Collection Date:10/28/2020 1700hReceived Date:10/29/2020 1519h

Analytical Results

TOTAL METALS

Contact: Jeff Tucker

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.00200	0.0107	
Phone: (801) 263-8686	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1133h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	11/5/2020 1007h	11/9/2020 1356h	E200.7	0.500	1.05	
Toll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1357h	E200.7	10.0	390	
e-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1356h	E200.7	0.100	3.61	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 953h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.00200	0.0157	
Laboratory Director	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1133h	E200.8	0.00200	0.450	
	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1849h	E200.8	0.00200	< 0.00200	
T D L								

Jose Rocha

QA Officer

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Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-008Client Sample ID:ELF-4Collection Date:10/28/2020 1452hReceived Date:10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.00200	0.0111	
Phone: (801) 263-8686	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1137h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	11/5/2020 1007h	11/9/2020 1359h	E200.7	0.500	4.74	
Foll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1400h	E200.7	10.0	446	
-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.00400	0.00638	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1359h	E200.7	0.100	1.62	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 955h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.00200	0.00261	
Laboratory Director	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1137h	E200.8	0.00200	< 0.00200	
	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1853h	E200.8	0.00200	< 0.00200	
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Jose Rocha

QA Officer

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Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-009Client Sample ID:ELF-8Collection Date:10/28/2020 1140hReceived Date:10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.00200	0.0115	
Phone: (801) 263-8686	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1141h	E200.8	0.00200	< 0.00200	
	Boron	mg/L	11/5/2020 1007h	11/6/2020 1403h	E200.7	10.0	27.6	
Foll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.000500	0.00159	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1403h	E200.7	20.0	527	
-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.00400	0.198	
veb: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.00200	0.00786	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1402h	E200.7	0.100	3.20	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 957h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.00200	0.430	
Laboratory Director	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1141h	E200.8	0.00200	< 0.00200	
Constant i cana and	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1857h	E200.8	0.00200	< 0.00200	
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Jose Rocha

QA Officer

Report Date: 11/17/2020 Page 10 of 36



Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-010Client Sample ID:ELF-9Collection Date:10/29/2020 948hReceived Date:10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Antimony	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.00400	< 0.00400	
Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.00200	0.00678	
Barium	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.00200	0.0126	
Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1145h	E200.8	0.00200	< 0.00200	
Boron	mg/L	11/5/2020 1007h	11/6/2020 1607h	E200.7	0.500	1.27	
Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.000500	< 0.000500	
Calcium	mg/L	11/5/2020 1007h	11/6/2020 1607h	E200.7	1.00	48.9	
Chromium	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.00200	< 0.00200	
Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.00400	< 0.00400	
Lead	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.00200	< 0.00200	
Lithium	mg/L	11/5/2020 1007h	11/6/2020 1607h	E200.7	0.100	0.873	
Mercury	mg/L	11/9/2020 1206h	11/10/2020 959h	E245.1	0.0000900	< 0.0000900	
Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.00200	0.0657	
Selenium	mg/L	11/5/2020 1007h	11/12/2020 1145h	E200.8	0.00200	< 0.00200	
Thallium	mg/L	11/5/2020 1007h	11/9/2020 1901h	E200.8	0.00200	< 0.00200	
	Antimony Arsenic Barium Beryllium Boron Cadmium Calcium Chromium Cobalt Lead Lithium Mercury Molybdenum Selenium	Antimonymg/LArsenicmg/LBariummg/LBerylliummg/LBoronmg/LCadmiummg/LCalciummg/LChromiummg/LCobaltmg/LLeadmg/LLithiummg/LMercurymg/LMolybdenummg/LSeleniummg/L	Compound Units Prepared Antimony mg/L 11/5/2020 1007h Arsenic mg/L 11/5/2020 1007h Barium mg/L 11/5/2020 1007h Beryllium mg/L 11/5/2020 1007h Boron mg/L 11/5/2020 1007h Cadmium mg/L 11/5/2020 1007h Cadenium mg/L 11/5/2020 1007h Calcium mg/L 11/5/2020 1007h Chromium mg/L 11/5/2020 1007h Lead mg/L 11/5/2020 1007h Lithium mg/L 11/5/2020 1007h Mercury mg/L 11/5/2020 1007h Molybdenum mg/L 11/5/2020 1007h Selenium mg/L 11/5/2020 1007h	CompoundUnitsPreparedAnalyzedAntimonymg/L11/5/2020 1007h11/9/2020 1901hArsenicmg/L11/5/2020 1007h11/9/2020 1901hBariummg/L11/5/2020 1007h11/9/2020 1901hBerylliummg/L11/5/2020 1007h11/9/2020 1901hBoronmg/L11/5/2020 1007h11/2/2020 1607hCadmiummg/L11/5/2020 1007h11/9/2020 1607hCadeiummg/L11/5/2020 1007h11/9/2020 1901hCalciummg/L11/5/2020 1007h11/9/2020 1901hCobaltmg/L11/5/2020 1007h11/9/2020 1901hLeadmg/L11/5/2020 1007h11/9/2020 1901hLithiummg/L11/5/2020 1007h11/9/2020 1901hMolybdenummg/L11/5/2020 1007h11/9/2020 1901hSeleniummg/L11/5/2020 1007h11/9/2020 1901h	CompoundUnitsPreparedAnalyzedUsedAntimonymg/L11/5/2020 1007h11/9/2020 1901hE200.8Arsenicmg/L11/5/2020 1007h11/9/2020 1901hE200.8Bariummg/L11/5/2020 1007h11/9/2020 1901hE200.8Berylliummg/L11/5/2020 1007h11/9/2020 1901hE200.8Boronmg/L11/5/2020 1007h11/6/2020 1607hE200.7Cadmiummg/L11/5/2020 1007h11/6/2020 1607hE200.7Cadciummg/L11/5/2020 1007h11/6/2020 1607hE200.7Chromiummg/L11/5/2020 1007h11/9/2020 1901hE200.8Cobaltmg/L11/5/2020 1007h11/9/2020 1901hE200.8Leadmg/L11/5/2020 1007h11/9/2020 1901hE200.7Mercurymg/L11/5/2020 1007h11/9/2020 1901hE200.8Molybdenummg/L11/5/2020 1007h11/9/2020 1901hE200.7Molybdenummg/L11/5/2020 1007h11/9/2020 1901hE200.8Seleniummg/L11/5/2020 1007h11/9/2020 1901hE200.8	CompoundUnitsPreparedAnalyzedUsedLimitAntimonymg/L11/5/20201007h11/9/20201901hE200.80.00400Arsenicmg/L11/5/20201007h11/9/20201901hE200.80.00200Bariummg/L11/5/20201007h11/9/20201901hE200.80.00200Berylliummg/L11/5/20201007h11/9/20201901hE200.80.00200Boronmg/L11/5/20201007h11/6/20201607hE200.70.500Cadmiummg/L11/5/20201007h11/9/20201901hE200.80.000500Calciummg/L11/5/20201007h11/9/20201901hE200.80.000200Cobaltmg/L11/5/20201007h11/9/20201901hE200.80.002200Leadmg/L11/5/20201007h11/9/20201901hE200.80.002200Lithiummg/L11/5/20201007h11/9/20201901hE200.80.002200Leadmg/L11/5/20201007h11/9/20201901hE200.80.002200Lithiummg/L11/5/20201007h11/9/20201901hE200.80.002200Molybdenummg/L11/5/20201007h11/9/20201901hE200.80.002200Molybdenummg/L11/5/20201007h11/9/20201901hE200.80.002200Molybdenummg/L11/5/20201007h<	CompoundUnitsPreparedAnalyzedUsedLimitResultAntimonymg/L11/5/2020 1007h11/9/2020 1901hE200.80.00400< 0.00400

Jose Rocha

QA Officer



PacifiCorp Hunter Power Plant - CCR / Group B **Project:** 2010965-011 Lab Sample ID: Client Sample ID: Duplicate **Collection Date:** 10/28/2020 **Received Date:** 10/29/2020 1519h

Analytical Results

Client:

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.00200	0.0102	
Dhamar (201) 262 2626	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1148h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	11/5/2020 1007h	11/9/2020 1405h	E200.7	0.500	0.719	
Toll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1409h	E200.7	20.0	423	
e-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.00400	0.00428	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/9/2020 1405h	E200.7	0.100	1.84	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 1001h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.00200	< 0.00200	
Laboratory Director	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1148h	E200.8	0.00200	< 0.00200	
a sector sector a barren e sec	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1905h	E200.8	0.00200	< 0.00200	
Jose Rocha								

QA Officer



Client: PacifiCorp **Project:** Lab Sample ID: 2010965-012 Client Sample ID: Field Blank **Collection Date:** 10/29/2020 1045h **Received Date:**

Hunter Power Plant - CCR / Group B 10/29/2020 1519h

Analytical Results

Contact: Jeff Tucker

TOTAL METALS

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Antimony	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.00400	< 0.00400	
	Arsenic	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.00200	< 0.00200	
	Barium	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.00200	< 0.00200	
Dhoma: (201) 262 2626	Beryllium	mg/L	11/5/2020 1007h	11/12/2020 1152h	E200.8	0.00200	< 0.00200	
Phone: (801) 263-8686	Boron	mg/L	11/5/2020 1007h	11/6/2020 1412h	E200.7	0.500	< 0.500	
Toll Free: (888) 263-8686	Cadmium	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.000500	< 0.000500	
Fax: (801) 263-8687	Calcium	mg/L	11/5/2020 1007h	11/6/2020 1412h	E200.7	1.00	< 1.00	
e-mail: awal@awal-labs.com	Chromium	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.00200	< 0.00200	
	Cobalt	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.00400	< 0.00400	
web: www.awal-labs.com	Lead	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.00200	< 0.00200	
	Lithium	mg/L	11/5/2020 1007h	11/6/2020 1412h	E200.7	0.100	< 0.100	
	Mercury	mg/L	11/9/2020 1206h	11/10/2020 1003h	E245.1	0.0000900	< 0.0000900	
Kyle F. Gross	Molybdenum	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.00200	< 0.00200	
Laboratory Director	Selenium	mg/L	11/5/2020 1007h	11/12/2020 1152h	E200.8	0.00200	< 0.00200	
and the second	Thallium	mg/L	11/5/2020 1007h	11/9/2020 1909h	E200.8	0.00200	< 0.00200	

Jose Rocha

QA Officer

Report Date: 11/17/2020 Page 13 of 36



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B Lab Sample ID: 2010965-001 Client Sample ID: ELF-10 **Collection Date:** 10/28/2020 1750h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1059h	E300.0	200	12,100	
	Fluoride	mg/L		11/13/2020 1233h	E300.0	0.100	< 0.100	
	рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	7.79	Н
Dhamar (201) 262 2626	Sulfate	mg/L		11/10/2020 1059h	E300.0	1,500	8,610	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	32,900	
Toll Free: (888) 263-8686			<i>.</i> .					

H - Sample was received outside of the holding time. Fax: (801) 263-8687

web: www.awal-labs.com

e-mail: awal@awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B 2010965-002 Lab Sample ID: Client Sample ID: ELF-11 **Collection Date:** 10/28/2020 1055h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 Salt Lake City, UT 8

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
alt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1116h	E300.0	100	1,040	
	Fluoride	mg/L		11/13/2020 1250h	E300.0	0.100	< 0.100	
	pH @ 25° C	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	7.89	Н
Dhanay (201) 262 2626	Sulfate	mg/L		11/10/2020 1116h	E300.0	750	10,800	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	17,800	

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H - Sample was received outside of the holding time.

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e-mail: awal@awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B 2010965-003 Lab Sample ID: Client Sample ID: ELF-12 **Collection Date:** 10/28/2020 1600h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 Salt Lake City, UT 8

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
alt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1133h	E300.0	100	392	
	Fluoride	mg/L		11/13/2020 1307h	E300.0	0.100	< 0.100	
	рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	8.05	Н
Dhono: (201) 262 2626	Sulfate	mg/L		11/10/2020 1133h	E300.0	750	11,900	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	18,600	

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Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B Lab Sample ID: 2010965-004 Client Sample ID: ELF-13 **Collection Date:** 10/28/2020 1305h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1150h	E300.0	100	2,720	
	Fluoride	mg/L		11/13/2020 1324h	E300.0	0.100	< 0.100	
	рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	7.75	Н
Dhamas (201) 262 2626	Sulfate	mg/L		11/10/2020 1150h	E300.0	750	8,870	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	16,800	
Toll Free: (888) 263-8686								

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e-mail: awal@awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B Lab Sample ID: 2010965-005 Client Sample ID: ELF-14 **Collection Date:** 10/28/2020 1225h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 Salt Lake City, UT 84

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
alt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1208h	E300.0	100	3,880	
	Fluoride	mg/L		11/13/2020 1341h	E300.0	0.100	< 0.100	
	рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	7.67	Н
Dhamar (201) 262 2626	Sulfate	mg/L		11/10/2020 1208h	E300.0	750	8,730	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	18,800	

Toll Free: (888) 263-8686 Fax: (801) 263-8687

H - Sample was received outside of the holding time.

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e-mail: awal@awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp Hunter Power Plant - CCR / Group B **Project:** Lab Sample ID: 2010965-006 **Client Sample ID: ELF-2 Collection Date:** 10/28/2020 1042h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Date Method Reporting Date Analytical Compound Prepared Units Analyzed Used Limit Result Oual Chloride mg/L 11/10/2020 1225h E300.0 100 199 Fluoride 0.100 < 0.100mg/L 11/13/2020 1358h E300.0 pH @ 25° C SM4500-H+B 1.00 7.51 pH Units 10/29/2020 1745h Η Sulfate mg/L 11/10/2020 1225h E300.0 750 7,900 Phone: (801) 263-8686 Total Dissolved Solids mg/L 11/2/2020 1420h SM2540C 100 12,200 Toll Free: (888) 263-8686

H - Sample was received outside of the holding time.

web: www.awal-labs.com

e-mail: awal@awal-labs.com

Fax: (801) 263-8687

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B Lab Sample ID: 2010965-007 **Client Sample ID: ELF-3 Collection Date:** 10/28/2020 1700h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Salt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1242h	E300.0	500	545	
	Fluoride	mg/L		11/13/2020 1416h	E300.0	0.100	< 0.100	
	рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	7.66	Н
Dhamar (201) 262 2626	Sulfate	mg/L		11/10/2020 1242h	E300.0	3,750	28,800	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	48,600	
Toll Free: (888) 263-8686								

H - Sample was received outside of the holding time. Fax: (801) 263-8687

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e-mail: awal@awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B Lab Sample ID: 2010965-008 **Client Sample ID: ELF-4 Collection Date:** 10/28/2020 1452h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 Salt Lake City, UT 8

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
alt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1334h	E300.0	100	2,170	
	Fluoride	mg/L		11/13/2020 1433h	E300.0	0.200	0.212	
	рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	7.40	Н
Dhanay (201) 262 2626	Sulfate	mg/L		11/10/2020 1334h	E300.0	750	5,860	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	12,900	

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H - Sample was received outside of the holding time.

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Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B Lab Sample ID: 2010965-009 **Client Sample ID: ELF-8 Collection Date:** 10/28/2020 1140h **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 V Salt Lake City, UT 84

3440 South 700 West	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
alt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1425h	E300.0	100	1,910	
	Fluoride	mg/L		11/13/2020 1450h	E300.0	0.200	0.957	
	рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	7.74	Н
DI (001) 2/2 0/0/	Sulfate	mg/L		11/10/2020 1425h	E300.0	750	3,220	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	8,380	

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H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-010Client Sample ID:ELF-9Collection Date:10/29/2020 948hReceived Date:10/29/2020 1519h

Analytical Results

3440 South 700 West Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		11/10/2020 1442h	E300.0	100	442	
Fluoride	mg/L		11/13/2020 1507h	E300.0	0.200	0.708	
рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	8.05	
Sulfate	mg/L		11/10/2020 1442h	E300.0	750	6,530	
Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	10,900	

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web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client: PacifiCorp **Project:** Hunter Power Plant - CCR / Group B 2010965-011 Lab Sample ID: Client Sample ID: Duplicate **Collection Date:** 10/28/2020 **Received Date:** 10/29/2020 1519h

Analytical Results

3440 South 700 Salt Lake City, UT

3440 South 700 Wes alt Lake City, UT 84119	Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
alt Lake City, UT 84119	Chloride	mg/L		11/10/2020 1459h	E300.0	100	2,690	
	Fluoride	mg/L		11/13/2020 1559h	E300.0	0.100	< 0.100	
	рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	7.47	Н
Dhanay (201) 262 2626	Sulfate	mg/L		11/10/2020 1459h	E300.0	750	8,600	
Phone: (801) 263-8686	Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	100	17,300	

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H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Contact: Jeff Tucker

Client:PacifiCorpProject:Hunter Power Plant - CCR / Group BLab Sample ID:2010965-012Client Sample ID:Field BlankCollection Date:10/29/2020 1045hReceived Date:10/29/2020 1519h

Analytical Results

3440 South 700 Wes Salt Lake City, UT 84119

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/L		11/10/2020 1517h	E300.0	0.100	< 0.100	
Fluoride	mg/L		11/10/2020 1517h	E300.0	0.100	< 0.100	
рН @ 25° С	pH Units		10/29/2020 1745h	SM4500-H+B	1.00	8.16	
Sulfate	mg/L		11/10/2020 1517h	E300.0	0.750	< 0.750	
Total Dissolved Solids	mg/L		11/2/2020 1420h	SM2540C	10.0	40.0	

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web: www.awal-labs.com

Kyle F. Gross Laboratory Director

> Jose Rocha QA Officer



Client: PacifiCorp Lał

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QC SUMMARY REPORT

Jeff Tucker

Contact:

Jose Rocha QA Officer

Lab Set ID: 2	010965			Dept:	ME									
Project: H	Hunter Power Plant - CO	CR / Group B					QC Type:	LCS						
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: Test Code:	LCS-73521 200.7-W	Date Analyzed: Date Prepared:	11/06/2020 11/05/2020											
Boron Calcium Lithium		0.963 9.09 0.992	mg/L mg/L mg/L	E200.7 E200.7 E200.7	0.0449 0.211 0.0207	0.500 1.00 0.100	1.000 10.00 1.000	0 0 0	96.3 90.9 99.2	85 - 115 85 - 115 80 - 120				
Lab Sample ID: Test Code:	LCS-73520 200.8-W	Date Analyzed: Date Prepared:	11/09/2020 11/05/2020											
Antimony Arsenic Barium Cadmium Chromium Cobalt		0.198 0.195 0.190 0.187 0.192 0.193	mg/L mg/L mg/L mg/L mg/L mg/L	E200.8 E200.8 E200.8 E200.8 E200.8 E200.8	0.000734 0.000298 0.000544 0.0000742 0.00191 0.000300	0.00400 0.00200 0.00200 0.000500 0.00200 0.00400	0.2000 0.2000 0.2000 0.2000 0.2000 0.2000	0 0 0 0 0 0	99.0 97.4 95.1 93.4 95.9 96.4	85 - 115 85 - 115 85 - 115 85 - 115 85 - 115 85 - 115				
Lead Molybdenum Selenium Thallium		0.193 0.191 0.184 0.193	mg/L mg/L mg/L mg/L	E200.8 E200.8 E200.8 E200.8	0.000448 0.000652 0.000508 0.000390	0.00200 0.00200 0.00200 0.00200	0.2000 0.2000 0.2000 0.2000	0 0 0 0	96.5 95.6 92.1 96.6	85 - 115 85 - 115 85 - 115 85 - 115				
Lab Sample ID: Test Code: Beryllium	LCS-73520 200.8-W	Date Analyzed: Date Prepared: 0.205	11/12/2020 11/05/2020 mg/L		0.000198	0.00200	0.2000	0	102	85 - 115				
Lab Sample ID: Test Code: Mercury	LCS-73605 HG-DW-245.1	Date Analyzed: Date Prepared: 0.00351	11/10/2020 11/09/2020 mg/L		0.0000396	0.0000900	0.003330	0	105	85 - 115				

Report Date: 11/17/2020 Page 26 of 36



Client: Lab Set II

Project:

3440 South 700 West

Salt Lake City, UT 84119

Phone: (801) 263-8686, Toll Free: (888) 263-8686, Fax: (801) 263-8687

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QC SUMMARY REPORT

Kyle F. Gross
Laboratory Director

Jose Rocha QA Officer

	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
	Hunter Power Plant - CCR / Group B					QC Type:	MBLK						
D:	2010965					Dept:	ME						
	PacifiCorp					Contact:	Jeff Tucke	er					

Analyte		Result	Units	Method	MDL	Limit	Amount Spikeu	Amount	%REC	Limits	Amt	% RPD	Limit	Qual
Lab Sample ID:	MB-73521	Date Analyzed:	11/06/202	0 1249h										
Test Code:	200.7-W	Date Prepared:	11/05/202	0 1007h										
Boron		< 0.500	mg/L	E200.7	0.0449	0.500								
Calcium		< 1.00	mg/L	E200.7	0.211	1.00								
Lithium		< 0.100	mg/L	E200.7	0.0207	0.100								
Lab Sample ID:	MB-73520	Date Analyzed:	11/09/202	0 1705h										
Test Code:	200.8-W	Date Prepared:	11/05/202	0 1007h										
Antimony		< 0.00400	mg/L	E200.8	0.000734	0.00400								
Arsenic		< 0.00200	mg/L	E200.8	0.000298	0.00200								
Barium		< 0.00200	mg/L	E200.8	0.000544	0.00200								
Cadmium		< 0.000500	mg/L	E200.8	0.0000742	0.000500								
Chromium		< 0.00200	mg/L	E200.8	0.00191	0.00200								
Cobalt		< 0.00400	mg/L	E200.8	0.000300	0.00400								
Lead		< 0.00200	mg/L	E200.8	0.000448	0.00200								
Molybdenum		< 0.00200	mg/L	E200.8	0.000652	0.00200								
Selenium		< 0.00200	mg/L	E200.8	0.000508	0.00200								
Thallium		< 0.00200	mg/L	E200.8	0.000390	0.00200								
Lab Sample ID:	MB-73520	Date Analyzed:	11/12/202	0 1025h										
Test Code:	200.8-W	Date Prepared:	11/05/202	0 1007h										
Beryllium		< 0.00200	mg/L	E200.8	0.000198	0.00200								
Lab Sample ID:	MB-73605	Date Analyzed:	11/10/202	0 923h										
Test Code:	HG-DW-245.1	Date Prepared:	11/09/202	0 1206h										
Mercury		< 0.0000900	mg/L	E245.1	0.0000396	0.0000900								

Report Date: 11/17/2020 Page 27 of 36


Client: PacifiCorp Lab Set ID: 2010965

3440 South 700 West

Salt Lake City, UT 84119

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QC SUMMARY REPORT

Jeff Tucker

ME

Contact:

Dept:

Kyle F. Gross
Laboratory Director

Jose Rocha QA Officer

Project: H	unter Power Plant - C	CCR / Group B					QC Type:	MS						
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: Test Code:	2010965-002BMS 200.7-W	Date Analyzed: Date Prepared:	11/06/202 11/05/202											
Calcium		411	mg/L	E200.7	4.22	20.0	20.00	384	138	70 - 130				2
Lab Sample ID: Test Code:	2010965-006BMS 200.7-W	Date Analyzed: Date Prepared:	11/06/202 11/05/202											
Calcium		370	mg/L	E200.7	2.11	10.0	10.00	356	137	70 - 130				2
Lab Sample ID: Test Code:	2010965-002BMS 200.7-W	Date Analyzed: Date Prepared:	11/09/202 11/05/202											
Boron Lithium		17.8 5.00	mg/L mg/L	E200.7 E200.7	0.0898 0.0414	1.00 0.200	2.000 2.000	15.6 3.15	108 92.4	70 - 130 75 - 125				
Lab Sample ID: Test Code:	2010965-006BMS 200.7-W	Date Analyzed: Date Prepared:	11/09/202 11/05/202											
Boron Lithium		4.30 2.45	mg/L mg/L	E200.7 E200.7	0.0449 0.0207	0.500 0.100	1.000 1.000	3.18 1.42	112 103	70 - 130 75 - 125				
Lab Sample ID: Test Code:	2010965-006BMS 200.8-W	Date Analyzed: Date Prepared:	11/09/202 11/05/202											
Antimony		0.209	mg/L	E200.8	0.000734	0.00400	0.2000	0	105	75 - 125				
Arsenic Cadmium		0.219 0.187	mg/L mg/L	E200.8 E200.8	0.000298 0.0000742	0.00200 0.000500	0.2000 0.2000	0 0	109 93.6	75 - 125 75 - 125				
Chromium		0.193	mg/L	E200.8	0.00191	0.00200	0.2000	0	96.5	75 - 125				
Lead Molybdenum		0.183 0.217	mg/L mg/L	E200.8 E200.8	0.000448 0.000652	0.00200 0.00200	0.2000 0.2000	0 0.00133	91.4 108	75 - 125 75 - 125				
-	2010965-002BMS	Date Analyzed:												
Test Code:	200.8-W	Date Prepared:	11/05/202		0.00105	0.00400	0.4000	0.0770	00.6					
Selenium		0.461	mg/L	E200.8	0.00102	0.00400	0.4000	0.0669	98.6	75 - 125				

Report Date: 11/17/2020 Page 28 of 36



Client: PacifiCorp

Lab Set ID: 2010965

3440 South 700 West

Salt Lake City, UT 84119

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OC SUMMARY REPORT

Jeff Tucker

ME

Contact:

Dept:

Jose Rocha QA Officer

Project: H	unter Power Plant - C	CCR / Group B					QC Type:	: MS						
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: Test Code:	2010965-002BMS 200.8-W	Date Analyzed: Date Prepared:	11/09/202 11/05/202											
Antimony Arsenic Barium Cadmium Chromium Cobalt Lead		0.420 0.437 0.401 0.378 0.382 0.399 0.373	mg/L mg/L mg/L mg/L mg/L mg/L mg/L	E200.8 E200.8 E200.8 E200.8 E200.8 E200.8 E200.8 E200.8 E200.8	0.00147 0.000596 0.00109 0.000148 0.00382 0.000600 0.000896	0.00800 0.00400 0.00400 0.00100 0.00400 0.00800 0.00400	0.4000 0.4000 0.4000 0.4000 0.4000 0.4000 0.4000	0 0.000506 0.0108 0.000163 0 0.0197 0.000931	105 109 97.6 94.4 95.6 94.9 92.9	75 - 125 75 - 125				
Molybdenum Thallium		0.444 0.376	mg/L mg/L	E200.8	0.00130 0.000780	0.00400 0.00400	0.4000 0.4000	0.0183 0	106 94.0	75 - 125 75 - 125				
Lab Sample ID: Test Code: Beryllium	2010965-002BMS 200.8-W	Date Analyzed: Date Prepared: 0.374	11/12/202 11/05/202 mg/L		0.000396	0.00400	0.4000	0	93.5	75 - 125				
Lab Sample ID: Test Code: Beryllium	2010965-006BMS 200.8-W	Date Analyzed: Date Prepared: 0.176	11/12/202 11/05/202 mg/L	0 1126h	0.000198	0.00200	0.2000	0	87.9	75 - 125				
Selenium Lab Sample ID:	2010965-001BMS	0.202 Date Analyzed:	mg/L 11/10/202	E200.8 0 935h	0.000508	0.00200	0.2000	0.00423	98.9	75 - 125				
Test Code: Mercury	HG-DW-245.1	Date Prepared: 0.000205	11/09/202 mg/L	0 1206h E245.1	0.0000396	0.0000900	0.003330	0	6.16	80 - 120				1

¹ - Matrix spike recovery indicates matrix interference. The method is in control as indicated by the LCS.

² - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

2010965-002BMS: Insufficient sample amount was provided to allow for a full amount analysis of the MS/MSD. Reduced sample volume for the MS/MSD was used as a result.

Report Date: 11/17/2020 Page 29 of 36



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QC SUMMARY REPORT

Jeff Tucker

Contact:

Qual

Jose Rocha QA Officer

Lab Set ID: 2	010965						Dept:	ME					
Project: H	Iunter Power Plant - C	CCR / Group B					QC Type:	MSD					
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit
Lab Sample ID:	2010965-002BMSD	Date Analyzed:	11/06/202	20 1444h									
Test Code:	200.7-W	Date Prepared:	11/05/202	20 1007h									
Calcium		406	mg/L	E200.7	4.22	20.0	20.00	384	113	70 - 130	411	1.26	20
Lab Sample ID:	2010965-006BMSD	Date Analyzed:	11/06/202	20 1459h									
Test Code:	200.7-W	Date Prepared:	11/05/202	20 1007h									
Calcium		368	mg/L	E200.7	2.11	10.0	10.00	356	118	70 - 130	370	0.513	20
Lab Sample ID:	2010965-002BMSD	Date Analyzed:	11/09/202	20 1330h									
Test Code:	200.7-W	Date Prepared:	11/05/202	20 1007h									
Boron		17.9	mg/L	E200.7	0.0898	1.00	2.000	15.6	111	70 - 130	17.8	0.334	20
Lithium		4.97	mg/L	E200.7	0.0414	0.200	2.000	3.15	90.7	75 - 125	5	0.677	20
Lab Sample ID:	2010965-006BMSD	Date Analyzed:	11/09/202	20 1346h									
Test Code:	200.7-W	Date Prepared:	11/05/202	20 1007h									
Boron		4.30	mg/L	E200.7	0.0449	0.500	1.000	3.18	112	70 - 130	4.3	0.0157	20
Lithium		2.45	mg/L	E200.7	0.0207	0.100	1.000	1.42	104	75 - 125	2.45	0.256	20
Lab Sample ID:	2010965-006BMSD	Date Analyzed:	11/09/202	20 1833h									
Test Code:	200.8-W	Date Prepared:	11/05/202	20 1007h									
Antimony		0.211	mg/L	E200.8	0.000734	0.00400	0.2000	0	106	75 - 125	0.209	0.913	20
Arsenic		0.221	mg/L	E200.8	0.000298	0.00200	0.2000	0	111	75 - 125	0.219	1.12	20
Cadmium		0.189	mg/L	E200.8	0.0000742	0.000500	0.2000	0	94.4	75 - 125	0.187	0.874	20
Chromium		0.193	mg/L	E200.8	0.00191	0.00200	0.2000	0	96.7	75 - 125	0.193	0.305	20
Lead		0.184	mg/L	E200.8	0.000448	0.00200	0.2000	0	92.0	75 - 125	0.183	0.680	20
Molybdenum		0.217	mg/L	E200.8	0.000652	0.00200	0.2000	0.00133	108	75 - 125	0.217	0.0185	20
Lab Sample ID:	2010965-002BMSD	Date Analyzed:	11/10/202	20 2024h									
Test Code:	200.8-W	Date Prepared:	11/05/202	20 1007h									
Selenium		0.461	mg/L	E200.8	0.00102	0.00400	0.4000	0.0669	98.4	75 - 125	0.461	0.128	20

Report Date: 11/17/2020 Page 30 of 36



Client: PacifiCorp

Lab Set ID: 2010965

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QC SUMMARY REPORT

Jeff Tucker

ME

Contact:

Dept:

Jose Rocha QA Officer

		CR / Group B					QC Type:	MSD						
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 2	2010965-002BMSD	Date Analyzed:	11/09/202	0 1802h										
Test Code: 2	200.8-W	Date Prepared:	11/05/202	0 1007h										
Antimony		0.422	mg/L	E200.8	0.00147	0.00800	0.4000	0	105	75 - 125	0.42	0.524	20	
Arsenic		0.437	mg/L	E200.8	0.000596	0.00400	0.4000	0.000506	109	75 - 125	0.437	0.0374	20	
Barium		0.402	mg/L	E200.8	0.00109	0.00400	0.4000	0.0108	97.8	75 - 125	0.401	0.154	20	
Cadmium		0.379	mg/L	E200.8	0.000148	0.00100	0.4000	0.000163	94.7	75 - 125	0.378	0.305	20	
Chromium		0.386	mg/L	E200.8	0.00382	0.00400	0.4000	0	96.6	75 - 125	0.382	1.05	20	
Cobalt		0.400	mg/L	E200.8	0.000600	0.00800	0.4000	0.0197	95.2	75 - 125	0.399	0.309	20	
Lead		0.372	mg/L	E200.8	0.000896	0.00400	0.4000	0.000931	92.8	75 - 125	0.373	0.136	20	
Molybdenum		0.449	mg/L	E200.8	0.00130	0.00400	0.4000	0.0183	108	75 - 125	0.444	1.20	20	
Thallium		0.377	mg/L	E200.8	0.000780	0.00400	0.4000	0	94.2	75 - 125	0.376	0.189	20	
Lab Sample ID: 2	2010965-002BMSD	Date Analyzed:	11/12/202	0 1046h										
Test Code:	200.8-W	Date Prepared:	11/05/202	0 1007h										
Beryllium		0.370	mg/L	E200.8	0.000396	0.00400	0.4000	0	92.4	75 - 125	0.374	1.18	20	
Lab Sample ID: 2	2010965-006BMSD	Date Analyzed:	11/12/202	0 1130h										
Test Code: 2	200.8-W	Date Prepared:	11/05/202	0 1007h										
Beryllium		0.171	mg/L	E200.8	0.000198	0.00200	0.2000	0	85.5	75 - 125	0.176	2.78	20	
Selenium		0.204	mg/L	E200.8	0.000508	0.00200	0.2000	0.00423	99.8	75 - 125	0.202	0.861	20	
Lab Sample ID: 2	2010965-001BMSD	Date Analyzed:	11/10/202	0 937h										
Test Code: I	HG-DW-245.1	Date Prepared:	11/09/202	0 1206h										
Mercury		0.000187	mg/L	E245.1	0.0000396	0.0000900	0.003330	0	5.61	80 - 120	0.000205	9.36	20	1

¹ - Matrix spike recovery indicates matrix interference. The method is in control as indicated by the LCS.

2010965-002BMSD: Insufficient sample amount was provided to allow for a full amount analysis of the MS/MSD. Reduced sample volume for the MS/MSD was used as a result.



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Jose Rocha QA Officer

QC SUMMARY REPORT

	Lab Sample II	D: 2010965-001ADUP	Date Analyzed:	10/29/202	0 1745h										
	Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
F	Project:	Hunter Power Plant - CC	R / Group B					QC Type:	DUP						
Ι	Lab Set ID:	2010965						Dept:	WC						
(Client:	PacifiCorp						Contact:	Jeff Tucke	er					

Test Code:	PH-4500H+B								
pH @ 25° C		7.77	pH Units	SM4500-H+B	1.00	1.00	7.79	0.257	5
Lab Sample ID: Test Code:	2010965-012ADUP PH-4500H+B	Date Analyze	:d: 10/29/20	20 1745h					
pH @ 25° C		8.14	pH Units	SM4500-H+B	1.00	1.00	8.16	0.245	5
Lab Sample ID: Test Code:	2010965-001ADUP TDS-W-2540C	Date Analyze	ed: 11/02/20	20 1420h					
Total Dissolved	Solids	32,800	mg/L	SM2540C	80.0	100	32900	0.365	5

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Total Dissolved Solids

184

mg/L

SM2540C

8.00

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QC SUMMARY REPORT

Client:	PacifiCorp	Contact:	Jeff Tucker
Lab Set ID:	2010965	Dept:	WC
Project:	Hunter Power Plant - CCR / Group B	QC Type:	LCS

Lab Set ID: 2	010965						Dept:	WC						
Project: H	Iunter Power Plant -	CCR / Group B					QC Type:	: LCS						
Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: Test Code:	LCS-R145454 300.0-W	Date Analyzed:	11/10/20	20 658h										
Chloride Fluoride		4.86 4.97	mg/L mg/L	E300.0 E300.0	0.0565 0.0240	0.100 0.100	5.000 5.000	0 0	97.2 99.5	90 - 110 90 - 110				
Sulfate		5.00	mg/L	E300.0	0.136	0.750	5.000	0	100	90 - 110				
Lab Sample ID: Test Code:	LCS-R145630 300.0-W	Date Analyzed:	11/13/20	20 958h										
Fluoride		5.16	mg/L	E300.0	0.0240	0.100	5.000	0	103	90 - 110				
Lab Sample ID: Test Code:	LCS-R144972 PH-4500H+B	Date Analyzed:	10/29/20	20 1745h										
рН @ 25° С		9.04	pH Units	SM4500-H+B	1.00	1.00	9.000	0	100	98 - 102				
Lab Sample ID: Test Code:	LCS-R145157 TDS-W-2540C	Date Analyzed:	11/02/20	20 1420h										

10.0

205.0

0

89.8

80 - 120

Report Date: 11/17/2020 Page 33 of 36



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QC SUMMARY REPORT

Client:	PacifiCorp	Contact: Jeff Tucker	
Lab Set ID	: 2010965	Dept: WC	
Project:	Hunter Power Plant - CCR / Group B	QC Type: MBLK	

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: Test Code:	MB-R145454 300.0-W	Date Analyzed:	11/10/2020	641h										
Chloride Fluoride Sulfate		< 0.100 < 0.100 < 0.750	mg/L mg/L mg/L	E300.0 E300.0 E300.0	0.0565 0.0240 0.136	0.100 0.100 0.750								
Lab Sample ID: Test Code:	MB-R145630 300.0-W	Date Analyzed:	11/13/2020	941h										
-		Date Analyzed: < 0.100	11/13/2020 s mg/L	941h E300.0	0.0240	0.100								
Test Code:		•		E300.0	0.0240	0.100								

Report Date: 11/17/2020 Page 34 of 36

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QC SUMMARY REPORT

ANALITICAL			
Client:	PacifiCorp	Contact:	Jeff Tucker
Lab Set ID	2010965	Dept:	WC
Project:	Hunter Power Plant - CCR / Group B	QC Type:	MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 2010965-008AMS Test Code: 300.0-W	Date Analyzed:	11/10/202	0 1351h										
Chloride	7,040	mg/L	E300.0	56.5	100	5,000	2170	97.4	90 - 110				
Fluoride	5,010	mg/L	E300.0	24.0	100	5,000	0	100	90 - 110				
Sulfate	10,900	mg/L	E300.0	136	750	5,000	5860	99.9	90 - 110				

Report Date: 11/17/2020 Page 35 of 36

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QC SUMMARY REPORT

Client:	PacifiCorp	Contact	Jeff Tucker
Lab Set ID:		Dept:	WC
Project:	Hunter Power Plant - CCR / Group B	QC Type:	MSD

Jose Rocha QA Officer

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: Test Code:	2010965-008AMSD 300.0-W	Date Analyzed:	11/10/202	0 1408h										
Chloride		7,120	mg/L	E300.0	56.5	100	5,000	2170	98.9	90 - 110	7040	1.08	20	
Fluoride		5,070	mg/L	E300.0	24.0	100	5,000	0	101	90 - 110	5010	1.21	20	
Sulfate		10,900	mg/L	E300.0	136	750	5,000	5860	102	90 - 110	10900	0.742	20	

Report Date: 11/17/2020 Page 36 of 36

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America	n West Analytical Laborato	ries			Rpt EmailedOL:	•	Gene	HC ricEDD QC
WORK O	RDER Summary				Work C	rder: 20	10965	Page I of :
Client:	PacifiCorp					Date: 11/1		5
Client ID:	PAC900		Contact:	Jeff Tucker			1.2020	
roject:	Hunter Power Plant - CCR / Group B		QC Leve		WO	Type: Pro	iact	
Comments:	QC2+. Include EDD. RADS sent to ALS-F	t Collins	~					1
. on an extra .	Dave Erickson. Footnote: all received out of	f hold for pH exc	cept for sample #'s	a Blad Glies, cc. Rep 3 10 & 12;	ort to misinfley@waterenv	tecn.com,	Laura wais	on and V
ample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	V
)10965-001A	ELF-10	10/28/2020 1750h	10/29/2020 1519h	300.0-W	Water	~	DF-WC	
				3 SEL Analytes: CL F 2	SO4			
				PH-4500H+B			DF-WC	
				TDS-W-2540C			DF-WC	
10965-001B				200.7-W		V	DF-Metals	
	· · · · · · · · · · · · · · · ·		·····	3 SEL Analytes: B CA	LI			
	· ···· ·······························			200.7-W-PR	· · · · · · · · · · · · · · · · · · ·	Ľ.;	DF-Metals	
				200.8-W		\checkmark	DF-Metals	
	········ ··· ··· ··· ··· ··· ··· ··· ·				S BA BE CD CR CO PB MO SI	S TL		
				200.8-W-PR	·····	<u>j</u>	DF-Metals	-
	· · · · · · · · · · · · · · · · · · ·			HG-DW-245.1		<u> </u>	DF-Metals	
10075 0010	•••••••••••••••••••••••••••••••••••••••		<u> </u>	HG-DW-PR	· · · · · · · · · · · · · · · · ·	<u></u> .	DP-Metals	
)10965-001C				OUTSIDE LAB			ALS	
10965-002A	ELF-11	10/28/2020 1055h	10/29/2020 1519h	300.0-W	Water		DF-WC	
	·			3 SEL Analytes: CL F I	SO4			
	· ···· · · · · · · · · · · · · · · · ·			PH-4500H+B			DF-WC	
				TDS-W-2540C		· · .	DF-WC	• • • • • • • • • • • • • • • • • • • •
10965-002B				200.7-W			DF-Metals	
	·			3 SEL Analytes: B CA	LI		<u>.</u>	
	· · · · · · · · · · · · · · · · ·			200.7-W-PR			DF-Metals	
				200.8-W			DF-Metals	
	······································		··· · ·····		S BA BE CD CR CO PB MO SI	E TL		
		· ·· · · -·		200.8-W-PR			DF-Metals	
	· · · · · · · · · · · · · · · · · · ·			HG-DW-245.1	- · · · · · · · · · · · · · · · · · · ·	<u>_</u>	DF-Metals	
	· · · · · · · · · · · · · · · ·			HG-DW-PR			DF-Metals	····
10965-002C		-	<u> </u>	OUTSIDE LAB			ALS .	
010965-003A	ELF-12	10/28/2020 1600h	10/29/2020 1519h	300.0-W 3 SEL Analytes: CL F 3	Water SO4		DF-WC	
				PH-4500H+B	· · · · · · · · · · · · · · · · · · ·	 I	DF-WC	··
				TDS-W-2540C		··	DF-WC	
			·					·· · · · · · ·

WORK O	RDER Summary				Work Order:	201	10965	Page 2 of 5
Client:	PacifiCorp				Due Date:			0
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	·
2010965-003B	ELF-12	10/28/2020 1600h	10/29/2020 1519h	200.7-W	Water		DF-Metals	1
				3 SEL Analytes: B CA LI				
	· · ·			200.7-W-PR		! J	DF-Metals	
				200.8-W			DF-Metals	
					RF, CD CR CO PB MO SE TL			
	· · ·	· · ·		200.8-W-PR			DF-Metals	
				HG-DW-245.1			DF-Metals	
2010965-003C				HG-DW-PR OUTSIDE LAB	· .		DF-Metals	
	· · · · · · · · · · · · · · · · · · ·		· · · · · ·	OUTSIDE LAB		1 1	ALS	2
2010965-004A	ELF-13	10/28/2020 1305h	10/29/2020 1519h	300.0-W	Water		DF-WC	1
	· · · · <u>-</u> - ···			3 SEL Analytes: CL F SO4	.			
	· ····· · · ·			PH-4500H+B		<u> </u>]	DP-WC	
2010965-004B	· · · · · · · ·			TDS-W-2540C		i J	DF-WC	
2010903-004B				200.7-W 3 SEL Analytes: B CA LI			DF-Metals	
	· · · · ·			200.7-W-PR	··· •·•	i I	DF-Metals	
				200.8-W		· · ·	DF-Metals	
					BE CD CR CO PB MO SE TL	. ▼ 1	Di niciani	
				200.8-W-PR			OF-Metals	
			•	HG-DW-245.1			DF-Metals	
		-		IIG-DW-PR			DF-Metals	
2010965-004C		- ·		OUTSIDE LAB]	ALS	2
2010965-005A	ELF-14	10/28/2020 1225h	10/29/2020 1519h	300.0-W	Water	Vi	DF-WC	
				3 SEL Analytes: CL F SO4		1-)		
				PH-4500H+B			DF-WC	
				TDS-W-2540C		1.1	DF-WC	
2010965-005B				200.7-W		~	DF-Metals	
			.	3 SEL Analytes: B CA LI				
	• ·			200.7-W-PR		.	DF-Metals	
				200.8-W		\mathbf{V}	DF-Metals	
	· ·				BE CD CR CO PB MO SE TL		DU MARK	
				200.8-W-PR			DF-Metals	
				HG-DW-245.1		.[]	DF-Metals	
2010965-005C				HG-DW-PR			DF-Metals	
2010/02-0050		· · · · ·		OUTSIDE LAB	<u> </u>		ALS	2

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WORK ORDER Summary

PacifiCorp

Client:

Work Order: 2010965 Page 3 of 5

Due Date: 11/12/2020

<u> </u>	Paemeorp				Due Date:			
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
2010965-006A	ELF-2	10/28/2020 1042h	10/ 2 9/2020 1519h	300.0-W 3 SEL Analytes: CL F SO4	Water	Υ.	DF-WC	1
			.	РН-4500Н+В		Ι.	DF-WC	
				TDS-W-2540C		l i	DF-WC	
2010965-006B				200.7-W		$\mathbf{M}_{\mathbf{r}}$	DF-Metals	
				3 SEL Analytes: B CA LI				
				200.7-W-PR		Ι.	DF-Metals	
				200.8-W		V	DF-Metals	
					BE CD CR CO PB MO SE TL			
				200.8-W-PR		. I .	DF-Metals	
				HG-DW-245.1	 .	İ	DF-Metals	
				HG-DW-PR	- · · ·	Ι.	DF-Metals	
2010965-006C		-		OUTSIDE LAB	<u>.</u>		ALS	2
2010965-007A	ELF-3	10/28/2020 1700h	10/29/2020 1519h	300.0-W	Water	K	DF-WC	1
				3 SEL Analytes: CL F SQ4				
				PH-4500H+B			DF-WC	
				TDS-W-2540C			DF-WC	
2010965-007B			•	200.7-W	·· · · ·		DF-Metals	
				3 SEL Analytes; B CA LI				
				200.7-W-PR			DF-Metals	
				200.8-W		\mathbf{V}	DF-Metals	
				11 SEL Analytes: SB AS BA	BE CD CR CO PB MO SE TL			
				200.8-W-PR		. 1.	DF-Metals	
				HG-DW-245,1		: ļ	DF-Metals	
				HG-DW-PR		i I,	DF-Metals	
2010965-007C	· · · · · · · · · · · · · · · · · · ·			OUTSIDE LAB	· · · · · · · · · · · · · · · · · · ·	Í I	ALS	2
2010965-008A	ELF-4	10/28/2020 1452h	10/29/2020 1519h	300.0-W	Water		DF-WC	1
				3 SEL Analytes: CL F SO4				
	· ·	•		PH-4500H+B	• ·	1	DF-WC	
				TDS-W-2540C		1	DF-WC	
2010965-008B		·		200.7-W			DF-Metals	
				3 SEL Analytes: B CA LI		. ,		
				200.7-W-PR	· ··· -		DF-Metals	
				200.8-W			DF-Metals	
					BE CD CR CO PB MO SE TL	. /		
	· · ·			200.8-W-PR			DF-Metals	
	· · · · · · · · · · · · · · · · · · ·			HG-DW-245.1	· .		DF-Metals	
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WORK O	RDER Summary				Work Order:	20	10965	Page 4 of 5
Client:	PacifiCorp				Due Date:	11/1	2/2020	
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
2010965-008B 2010965-008C	ELF-4	10/28/2020 1452h	10/29/2020 1519h	HG-DW-PR OUTSIDE LAB	Water		DF-Metals ALS	1
2010965-009A	ELF-8	10/28/2020 1140h	10/29/2020 1519h	300.0-W 3 SEL Analytes: CL F SO4	Water	[]	DF-WC	(
				PH-4500H+B		. <u>; </u>	DF-WC	
20100/6 0005				TDS-W-2540C			DF-WC	
2010965-009B	· · · · · ·			200.7-W 3 SEL Analytes: B CA LI		×.	DF-Metals	
				200.7-W-PR 200.8-W		 - 4.	DF-Metals DF-Metals	
					BE CD CR CO PB MO SE 11	l∕i	DE-INICIAIS	
				200.8-W-PR		I	DF-Metals	
				HG-DW-245.1		ł	DF-Metals	
		· · · · · · · · · · · · · · · · · · ·		HG-DW-PR		.	DF-Metals	
2010965-009C				OUTSIDE LAB	· · · · · · · · · · · · · · · · · · ·	1	ALS	2
2010965-010A	ELF-9	10/29/2020 0948h	10/29/2020 1519h	300.0-W	Water		DF-WC	ı
	-			3 SEL Analytes: CL F SO4				
	· · · · · ·			PH-4500H+B		11.	DF-WC	
				TDS-W-2540C	·	i	DF-WC	
2010965-010B				200.7-W		Υ.	DF-Metals	
	· · · · · · · · · · · · · · · · · · ·			3 SEL Analytes: B CA LI 200.7-W-PR			DF-Metals	
				200.74741 K			DF-Metals	
					BE CD CR CO PB MO SE TL	1.	21	
				200.8-W-PR			DF-Metals	
				HG-DW-245.1		- 1	DF-Metals	
				HG-DW-PR		_	DF-Metals	
2010965-010C				OUTSIDE LAB	· · ·	ίİ	ALS	2
2010965-011A	Duplicate	10/28/2020	10/29/2020 1519h	300.0-W 3 SEL Analytes: CL F SO4	Water	' ~ i	DF-WC	1
				PH-4500H+B		1.	DF-WC	
				TDS-W-2540C		· .	DF-WC	
2010965-011B				200.7-W			DF-Metals	
				3 SEL Analytes: B CA LI				
				200.7-W-PR		11	DF-Metals	

WORK ORDER Summary

Work Order: 2010965 Page 5 of 5

Client:	PacifiCorp				Due	Date: 11/1	2/2020	
Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
2010965-011B	Duplicate	10/28/2020	10/29/2020 1519h	200.8-W	Water	∀ i	DF-Metals	1
	· · · · · ·			11 SEL Analytes; SB	AS BA BE CD CR CO PB MO S	E TL		
	· · ·			200.8-W-PR		÷ 1	DF-Metals	
				HG-DW-245.1			DF-Metals	
				HG-DW-PR			DF-Metals	
2010965-011C				OUTSIDE LAB	······································	[]	ALS	2
2010965-012A	Field Blank	10/29/2020 1045h	10/29/2020 1519h	300.0-W	Water		DF-WC	1
	• ·		···· ·	3 SEL Analytes: CL F	7 SO4			
				PH-4500H+B	···· · · · · · · ·	.	DF-WC	
				TDS-W-2540C		<u>(</u>	DF-WC	
2010965-012B				200.7-W		V	DF-Metals	
				3 SEL Analytes: B CA	ŧ LI			
				200.7-W-PR		.	DF-Metals	
				200.8-W		· · · ·	DF-Metals	
				11 SEL Analytes: SB	AS BA BE CD CR CO PB MO S	ETL		
	· · ·			200.8-W-PR		· · 1	DF-Metals	
				HG-DW-245.1			DF-Metals	
				HG-DW-PR			DF-Metals	
2010965-012C	· · · · · ·	····· · ···		OUTSIDE LAB	· · · · · · · · · · · · · · · · · · ·		ALS	2

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Test Code PH-4500H+B

Analytical Labora 3440 S. 700 W. Sali Lake City, U	American West Analytical Laboratories 34405.700 W. Salı Lake City, UT 84119 Phone # (801) 263 8686 Toll Free # (868) 263-8686 Fax # (801) 263 8687 formil aver/#aver/ablabs.com									ethods and	¢ا[د⊥	ata will	be rep	ODY orfed using AWAL's standard analyte lists and reporting ustody and/or atlached documentation.	20109465 AWAL Lab Sample Set # Page 1 of 2
Fax # (\$01) 263-8687 Email awake www.awal-labs.com					QC L 2		<u></u>		Tur	a Arour Standa		ime:		Rush sets received after 4:00 pm are considered received on the next business day.	Due Date:
Client: PacifiCorp Environmental Remediation Address: 1407 West North Temple Ste 270 City, State, Zip: Salt Lake City, UT 84140 Contact: Jeff Tucker Ptone #: (801) 220-267 Contact: ieff.tucker@pacificorp.com; dennis.vanderbeek@pacificorp. Project Name: Hunter Power Plant - CCR Project #: PO #: Sampler Name: Description	o.com; brad.giles@ Date	Ppacificorp.com	Containers	Sanple Matrix	\$ A2540C	A4500-H B	Chloride / Sulfate - E300.0	Fluoride AssortC 3b0.0	As, Ba, Be, Bo, Cd, Ca, Cr, Co, Pb, Li, Mo, Se, Tl, E200.7 / F200.8 / E245.1			AF500-RA- 2-260 4	(separate & combined)	Report down to the MDL Include EDD: x Lab Filter for: Metals For Compliance With: RCRA CWA CWA SDWA ELAP/A2LA NLLAP NLLAP NLLAP Known Hazards &	Unless other arrangements have been made, signed reports will be emailed by 5:00 pm on the day they are due. Laboratory Use Only COC Tape Was: 1 Present on Outer Package Y N NA 2 Unbroken on Outer Package Y N NA 3 Present on Sampte Y N NA
Sample Site ID:	Sampled	Sampled	jo.⊭ 4	A Sam	× TDS	Ηq ×	X Chic	× Fluo	× Sb, J		_	× Radium		Sample Comments	Samples Were: Shipped of hand delivered
$2 ELF-11$ $3 ELF-12$ $4 ELF-13$ $5 ELF-14$ $6 ELF-20 \qquad No Sample 7 ELF-2 8 ELF-3 9 ELF-4 10 ELF-5 \qquad No Sample 10 ELF-5 \qquad No Sample 10 ELF-5 \qquad No Sample$	10/2 8/ 70 10-28-20 10-28-20 10-28-20 10-28-20 10-28-20 10-28-20 10-28-20 10-28-20 10-28-20	10:55 16:00 13:05 12:25 12:25 10:42 17:00 14:52		**************************************	x x x x x x x x x x x x x x x x x x x	x x x x x x x x x x x x x x x x x x x	x x x x x x x x x x x x x x x x x x x	x x x x x x x x x x x x x x x x x x x	x x x x x x x x x x x x x x x x x x x			x x x x x x x x x x x x x x x x x x x			2 Ambien or Challed 3 Temperature Q.3 °C 4 Projectly Preserved 7 N Checked at bench 7 N Checked at bench 8 N Checked at bench
publicad by: De units Vander beek publicad by: De units Vander beek publicad by: ture Name: Print Name: Print Name:				21/ ex		2			in N	ם: היי בי	inte Ente: inte: inte: inte: inte:	9 [2 इ.२1	0 9	Special Instructions: GROU	РВ

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Λ	American West Analytical Laboratories 34405, 200 W. Salt Lake City, UT 84119 Phone = (801) 203-8696 Tridl Free = (883) 263-8686 Fax = (801) 263-8687 Email avai/2avai/Jabs.com										elliods and	all data w	il] be rep	ODY onted using AWAL's standard analyte lists and reporting sslody ned/or allacted documentation.	ZO 10965 AWAL Lab Sample Set 4 Page 2 of 2
					(QC Le 2+				Tur	n Aroun Standa		:	Rush sets received after 4:00 pm are considered received on the next business day.	Due Date: [1]220
Address: 1407 We City, State, Zip: Salt La Contact: Jeff Tuu Phone 7: (801) 22 E-mail: joff.tucke	:ker 0-267 Coll *: Espacificarp.com; dennis.vanderbeek@pacificorp Power Plant - CCR Sample Site ID:		Time Sampled	+ + of Containers	2			× × Chloride / Sulfate ±300.0	× × Fluoride Adentice 300.0	× × Bb, As, Ba, Bc, Bo, Cd, Ca, Cr, Co, Pb, Li, Mo, Se, Tl, Hg E200.7 / £200.8 / £245.1	Standa	x x Radium 19300 Un 226 & ZZB 1	(Separate & Compuned)	ensidered recoved on the next business day.	Linkess other arcangements have been made, signed reports will be emailed by 5:00 ptm on the day they are due. Laboratory Use Only COC Tape Was. 1 Present on Outer Package Y N NA 2 Unbroken an Outer Package Y N NA 3 Present on Surple Y N NA 3 Present on Surple Y N NA 3 Present on Surple Y N NA 5 Samples Were: 1 Shapped Chard delivered 2 Ambient or fulled 3 Temperature 3 arc
															A Converted Interest S Convertige Preserved N Classified at Derech N Classified at Derech PH OUT OF NOID EX Holding Timus N #15 10 d Same N abouts and COC Record Match? N
Celler guighert by: Celler guighert by: Celler Wangel Celler guighert by: Signalare Celler guighert by: Signalare 2/101 Name;		Tiper 5.19 Date: Time, Date: Time,	Servined by: Signature Mercified by: Signature frint Nonne: Received by: Signature Print Nonne:		 	έΔ' ν	2 E	B	22	n) my	די ס זינ ס	20/27/ 15: 15: 16: 16: 16:	22c	Special Instructions: GROU	

milt AWAL to subcontract any analyses not normally performed at AWAL. of Custody yo agreeing to per

Lab Set ID: <u>2010965</u> pH Lot #: <u>10506</u>

Preservation Check Sheet

Sample Set Extension and pH

		-	, ,			0um	<u> </u>	Extensio											
Analysis	Preservative	1-	2-	3-	4-	5.	6-	7-	8-	9-	10-	-	12-						
Ammonia	pH <2 H ₂ SO ₄						•									1			
COD	pH <2 H ₂ SO ₄																		
Cyanide	pH >12 NaOH																		
Metals	pII <2 HNO3	485	Nº5	yes	Nes	Yes	Ves	Ves	NC5	Nes	NPS	Nes	Ves		[
NO ₂ /NO ₃	pH <2 H₂SO₄	1	1	1	1		1		1	1	1-		1.		ļ				
O & G	pH <2 HCL														1				
Phenois	pH <2 H ₂ SO ₄																		
Sulfide	pH >9 NaOH,												1					Γ	
Sunde	Zn Acetate																		
TKN	PH <2 H₂SO₄																		
T PO4	pH <2 H ₂ SO ₄																		
Cr VI+	pH >9 (NH4)2SO4																		
	$(1NII_4)_2 = 50_4$				- · · ·	•••••••••													
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Procedure: 1) Pour a small amount of sample in the sample lid

- 2) Pour sample from lid gently over wide range pH paper
- 3) Do Not dip the pH paper in the sample bottle or lid
- 4) If sample is not preserved, properly list its extension and receiving pH in the appropriate column above
- 5) Flag COC, notify client if requested
- 6) Place client conversation on COC
- 7) Samples may be adjusted

Frequency: All samples requiring preservation

- * The sample required additional preservative upon receipt.
- + The sample was received unpreserved.
- ▲ The sample was received unpreserved and therefore preserved upon receipt.
- # The sample pH was unadjustable to a pH ≤ 2 due to the sample matrix.
- The sample pH was unadjustable to a pH > _____ due to the sample matrix interference.

	American W Analytical Labor 3440 S. 700 W. Salt Lake City, D Phone # (801) 263-8686 Toll Free #		,					ELAP &	teredite	d meth	oods and	d all data	a will b	ODY e reported using AWAL's standard analyte lists and of Cusindy and/or attached documentation.	AWAL Lab Sample Set # Page 1 of 2	
	Fax 7 (801) 263-8687 Email awals	awal-labs.com		<u> </u>		QC Le	vel:			Turr	ı Aro	und T	lime:		Unless other arrangements have been made, signed	Due Date:
	www.awal-labs.co	m				2+					Stan	dard			reports will be emailed by 5:00 pm on the day they are due.	
Client:	American West Analytical Laboratories					Ï						Ï			☐ Report down to the MDL	Laboratory Use Only
						,									 Include EDD: Lab Filter for: 	Earbinitity Ost Only
	Salt Lake City, UT 84119					combined)									□ Field Filtered For:	COC Tape Was: 1 Present on Outer Package
-	Elona Hayward					E CO			1							Y N NA
Phone #:	(801) 263-8686 Cell #:					-35	-								For Compliance With:	2 Unbroken on Outer Package Y N NA
E-mail:	elona@awal-labs.com; denise@awal-labs.com	; jose@awal-la	ibs.com			(separate			Ì						□ NELAP □ RCRA	3 Present on Sample
Project Name:	Hunter Power Plant - CCR					(sef									□ CWA □ SDWA	Y N
Project #:		••••				1 2 2 8									□ ELAP/A2LA □ NLLAP	4 Unbroken on Sample Y N NA
PO #:	2010965			55		and									Non-Compliance Other:	
Sampler Name:				Container	áatrix	1 226										Samples Were: 1 Shipped or hand delivered
<u> </u>	· · · · · · · · · · · · · · · · · · ·	Date	Time	5	Sample Matrix	Radium									Known Hazards ه	2 Amblent or Chilled
	Sample ID:	Sampled	Sampled	‡o‡	Sart	Rae									Sample Comments	3 Temperature•C
1 ELF-10	- <u> </u>	10/28/2020	17:50	2	W	×						<u> </u>				4 Received Infact
2 ELF-11		10/28/2020	10:55	2	W	x										Y N
3 ELF-12		10/28/2020	16:00	2	w	x										
4 ELF-13		10/28/2020	13:05	2	W	×		_							· · · · · · · · · · · · · · · · · · ·	5 Properly Preserved Y N Checked at bench
5 ELF-14		10/28/2020	12:25	2	W.	×										
6 ELF-2		10/28/2020	10:42	2	w	x			ļ							6 Received Within
7 ELF-3		10/28/2020	17:00	2	w	x										N Holding Times
8 ELF-4		10/28/2020	14:52	2.	W	x		-								YN
9 ELF-8		10/28/2020	11:40	2	w	x		+								
10 ELF-9		10/29/2020	9:48	2	W	X										· · · · · ·
11 Duplicate		10/28/2020		2	w	X	_									Sample Labels and COC Record Match? Y N
12 Field Blank		10/29/2020	10:45	2	w	x			 							
13			·				_		<u> </u>							
l* 15		····														
Signature	Com Aug of	04/34/24	Received by: Signature		,							Date:			Special Instructions:	
Print Nome: Elm. Relinquished by:	n Hayward	Time. 1606 Date:	Print Name: Received by:									Time:			QC 2+ = Final Report, COC, surrogat	
Signature												Date.			MS/MSD performed on customer sa	mple
Print Name. Pelinewished by:												Time:				
Keingushed by: Signature	Signature											Darte:			Samples sent to ALS - Ft. Collins.	
Print Name	Time: Print Name:											Time:				



ATTACHMENT C:

Remedy Selection - Progress Reports



Date:October 10, 2019To:Jeff TuckerFrom:Dave EricksonSubject:Semi-Annual Progress Report for Selecting and Designing Remedy
Hunter Power Plant – CCR Landfill

In compliance with the requirements of the Coal Combustion Residuals (CCR) *Final Rule*, § 257.97(a), included herein is semi-annual progress report for remedy selection.

The Corrective Measures Assessment for the Hunter CCR Landfill was completed and posted to the plant operating record on 4/15/2019. The preferred alternative in the assessment was redesign and/or optimization of the existing horizontal well capture system, to address localized groundwater impacts. To date, the following activities have been completed in the selecting and designing a remedy:

- 6/28/2019: Contract was initiated to complete an inspection of existing horizontal well system and to scope the work needed to evaluate the remedy.
- 7/23/2019: Conducted a public meeting to discuss the results of the corrective measures assessment.
- 8/20/2019: A site visit was completed by the project engineer to inspect and document the current condition of the existing horizontal well system. Research began on inspection, cleaning, and upgrade methods for the existing system.
- **8/26/2019:** Received comments from Heal Utah, Utah Clean Energy, and the Sierra Club. Comments were reviewed and will be addressed in Remedy Selection Report.
- 9/23/2019: Contract finalized to inspect each horizontal well using a mobile camera. Equipment will be on site during the inspection to clean the wells if warranted.

Upcoming tasks relative to the CCR Landfill will include the following:

- Completion of a Remedy Selection Report;
- Completion of a remedy optimization plan; and
- Initiate remedy optimization.



Date:April 13, 2020To:Jeff TuckerFrom:Dave EricksonSubject:Semi-Annual Progress Report for Selecting and Designing Remedy
Hunter Power Plant – CCR Landfill

In compliance with the requirements of the Coal Combustion Residuals (CCR) *Final Rule*, § 257.97(a), included herein is a semi-annual progress report for remedy selection and design.

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- **8/26/2019:** Received comments from Heal Utah, Utah Clean Energy, and the Sierra Club. Comments were reviewed and will be addressed in Remedy Selection Report.
- 9/23/2019: Contract finalized to inspect each horizontal well using a mobile camera. Equipment will be on site during the inspection to clean the wells if warranted.
- **11/12/2019:** Inspection caps were removed from the horizontal capture wells in an attempt to inspect well integrity. Well construction prevented the camera from entering the wells to perform the inspections, due to the size of the openings.

Upcoming tasks relative to the CCR Landfill will include the following:

- Complete horizontal well inspections using a smaller remote camera system;
- Completion of a Remedy Selection Report;
- Completion of a well optimization plan; and
- Initiate well optimization.



Date:October 8, 2020To:Jeff TuckerFrom:Dave EricksonSubject:Semi-Annual Progress Report for Selecting and Designing Remedy
Hunter Power Plant – CCR Landfill

In compliance with the requirements of the Coal Combustion Residuals (CCR) *Final Rule*, § 257.97(a), included herein is a semi-annual progress report for remedy selection and design. The Corrective Measures Assessment for the Hunter CCR Landfill was completed and posted to the plant operating record on 4/15/2019. The preferred alternative in the assessment was re-design and/or optimization of the existing horizontal well capture system, to address localized groundwater impacts. To date, the following activities have been completed in the selecting and designing a remedy:

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- 9/23/2019: Contract finalized to inspect each horizontal well using a mobile camera. Equipment will be on site during the inspection to clean the wells if warranted.
- **11/12/2019:** Inspection caps were removed from the horizontal capture wells in an attempt to inspect well integrity. Well construction prevented the camera from entering the wells to perform the inspections, due to the size of the openings.
- June 2020: The initial vendor tasked with performing inspections was unable to successfully retrofit their camera equipment to fit the well openings. Additional vendor sources to perform the well inspections are being sought for procurement.
- October 2020: Remedy selection report, nature and extent report, and corrective measures sampling and analysis plan were placed in the plant operating record. The remedy selection report was also placed on the CCR website.

Upcoming tasks relative to the CCR Landfill will include the following:

- Complete horizontal well inspections using a smaller remote camera system;
- Completion of a well optimization plan; and
- Initiate well optimization.