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31 January 2018 File No. 129778-002

Westar Energy, Inc. 818 South Kansas Avenue Topeka, Kansas 66612

Attention: Jared Morrison

Manager, Water and Waste Programs

Subject: 2017 Annual Groundwater Monitoring and Corrective Action Report for the

Fly Ash Area 1 Landfill Jeffrey Energy Center St. Marys, Kansas

Dear Mr. Morrison:

Haley & Aldrich, Inc. is pleased to submit this Annual Groundwater Monitoring and Corrective Action Report (Annual Report) for the Fly Ash Area 1 Landfill at the Jeffrey Energy Center. This Annual Report was developed in accordance with the United States Environmental Protection Agency CCR Rule effective 19 October 2015 (Rule), specifically Code of Federal Regulations Title 40, subsection § 257.90(e). The Annual Report documents the design and construction of the groundwater monitoring system for the Fly Ash Area 1 Landfill consistent with applicable sections of § 257.90 through 257.98.

This Annual Report describes activities conducted in the prior calendar year and documents compliance with the Rule. The specific requirements listed in Sections § 257.90(e)(1)-(5) of the Rule are provided in bold/italic type, followed by a short narrative describing how the Rule has been met.

Sincerely yours, HALEY & ALDRICH, INC.

Steve Putrich, P.E. Project Principal

Mark Nicholls, P.G. Lead Hydrogeologist

M.D. N.



# 2017 ANNUAL GROUNDWATER MONITORING REPORT FLY ASH AREA 1 LANDFILL JEFFREY ENERGY CENTER ST. MARYS, KANSAS

by Haley & Aldrich, Inc. Cleveland, Ohio

for Westar Energy, Inc. Topeka, Kansas

File No. 129778-002 January 2018

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1 Fly Ash Area 1 Landfill Monitoring Well Location Map



# 1. 40 CFR § 257.90 Applicability

#### 1.1 40 CFR § 257.90(a)

Except as provided for in §257.100 for inactive CCR surface impoundments, all CCR landfills, CCR surface impoundments, and lateral expansions of CCR units are subject to the groundwater monitoring and corrective action requirements under §257.90 through 257.98.

The Fly Ash Area 1 Landfill at the Jeffrey Energy Center (JEC), which is the coal combustion residuals (CCR) management unit addressed in this Annual Groundwater Monitoring and Corrective Action Report (Annual Report), is subject to the groundwater monitoring and corrective action requirements described under Code of Federal Regulations Title 40 (40 CFR) § 257.90 through 257.98. In particular, this document addresses the requirement for the Owner/Operator to prepare an Annual Report per § 257.90(e) (Rule).

#### 1.2 40 CFR § 257.90(e)

Annual groundwater monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by §257.105(h)(1).

This Annual Report is the initial report for the JEC Fly Ash Area 1 Landfill as required by the Rule as the groundwater monitoring system was established and certified by 17 October 2017. Prior to 17 October 2017, Westar installed a groundwater monitoring system at the Fly Ash Area 1 Landfill consistent with § 257.91. Groundwater sampling and analysis was conducted per the requirements described in § 257.93, and the status of the groundwater monitoring program described in § 257.94 is provided in this report. This Annual Report documents the activities completed in the calendar year 2017.

At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

As required by § 257.90(e)(1), a map showing the locations of the CCR unit and associated upgradient and downgradient monitoring wells for the Fly Ash Area 1 Landfill is included in this report as Figure 1. In addition, this information is presented in the CCR Groundwater Monitoring Network Description Report prepared for Westar, which was placed in the facility's operating record by 17 October 2017 as required by § 257.105(h)(2).



(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

The design and construction of the monitoring well network for the Fly Ash Area 1 Landfill at JEC are described in the CCR Groundwater Monitoring Network Description Report dated 17 October 2017. This report was placed in the facility's operating record by 17 October 2017, as required by § 257.105(h)(2). Since the groundwater monitoring system was certified, no new monitoring wells were installed or decommissioned.

(3) In addition to all the monitoring data obtained under §257.90 through §257.98, 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 by the detection monitoring or assessment monitoring programs;

In accordance with § 257.94(b), eight independent samples from each background and downgradient monitoring well were collected prior to 17 October 2017. A summary table including the sample names, dates of sample collection, reason for sample collection (detection or assessment), and monitoring data obtained for the groundwater monitoring program for the Fly Ash Area 1 Landfill is presented in Table I of this report. In 2017, the groundwater monitoring sampling and laboratory analyses were completed under the detection monitoring program.

(4) A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

Detection monitoring was conducted in accordance with § 257.94(b), and no transitions between monitoring programs occurred for the Fly Ash Area 1 Landfill in calendar year 2017.

(5) Other information required to be included in the annual report as specified in §257.90 through §257.98.

This initial Annual Report documents activities conducted to comply with § 257.90 through § 257.94 of the Rule. It is understood that there are supplemental references in § 257.90 through § 257.98 to information that must be placed in the Annual Report; however, none of the activities referenced as required in the Annual Report are relevant to the groundwater monitoring program for activities completed in calendar year 2017.



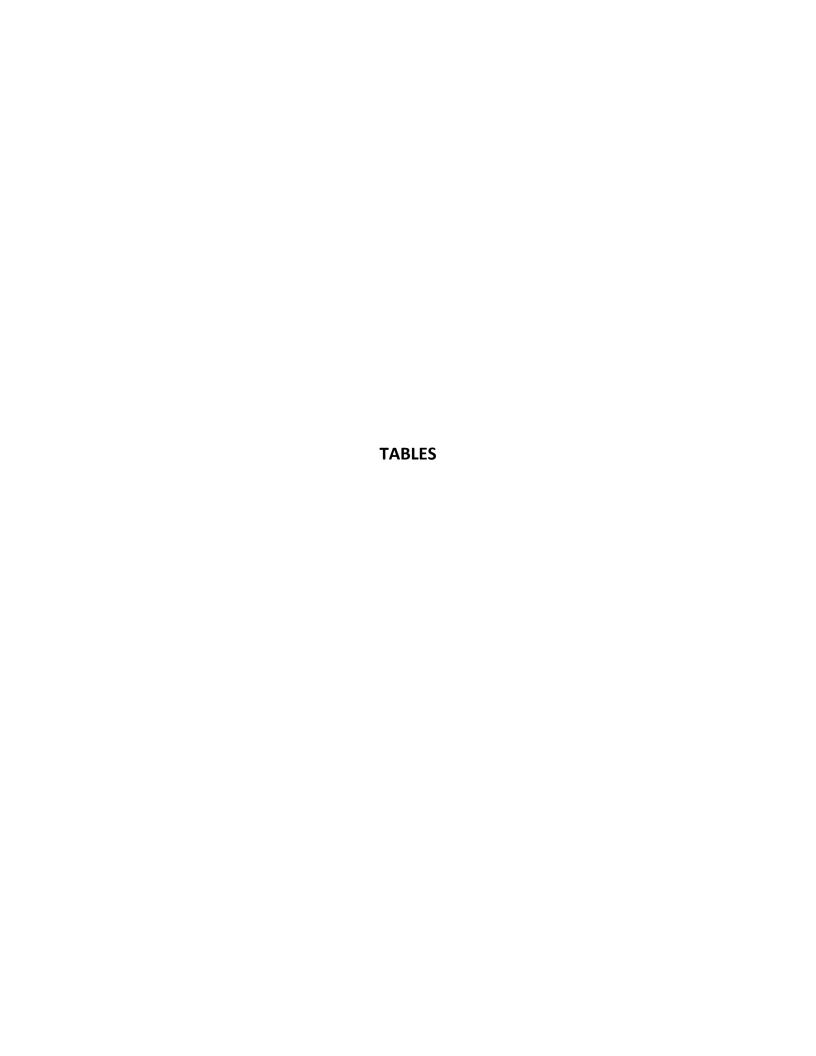
# 1.3 40 CFR § 257.90(f)

The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the internet requirements specified in § 257.107(h).

To comply with the Rule recordkeeping requirements:

- Pursuant to § 257.105(h)(1), this Annual Report must be placed in the facility's operating record.
- Pursuant to § 257.106(h)(1), notification must be sent to the relevant State Director and/or Tribal authority within 30 days of this Annual Report being placed on the facility's operating record [§ 257.106(d)].
- Pursuant to § 257.107(h)(1), this Annual Report must be posted to the Westar CCR Website within 30 days of this Annual Report being placed on the facility's operating record [§ 257.107(d)].





# **TABLE I SUMMARY OF ANALYTICAL RESULTS**

Westar Jeffrey Energy Center Fly Ash Area 1 Landfill St. Marys, Kansas

	Measure Point				Depth to Water	Groundwater		Field Paramete	ers			U	SEPA Appen	ndix III Constit	uents (mg/L)								USEPA	A Appendix IV	Constituent	ts (mg/L)						USEPA Appendix IV Constituents (pCi/L)
	Location	Elevation (TOC)	Sample Name	Sample Date	(btoc)	Elevation (ft AMSL)	Temperature (Deg C)	Conductivity (μS/cm)	Turbidity (NTU)	pH (su)	Boron, Total	Calcium, Total	Chloride	Fluoride	Sulfate	pH (su)	TDS	Antimony, Total	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Chromium, Total	Cobalt, Total	Lead, Total	Lithium, Total	Molybdenum, Total	Selenium, Total	Thallium, Total	Mercury, Total	Fluoride	Radium-226 & 228 Combined
			FAA5-081916	8/19/2016	86.65	1164.25	19.05	3280	32.3	7.14	1.2	290	96.8	0.64	1010	7.0	2410	<0.0010	0.0012	<0.010	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.089	0.025	0.0030	<0.0010	<0.00020	0.64	1.77
			FAA5-092316	9/23/2016	86.74	1164.25	18.06	3620	2.6	6.99	1.7	493	91.8	1.0	2010	7.0	3210	<0.0010	0.0035	<0.010	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.16	0.047	<0.0010	<0.0010	<0.00020	1.0	1.44
i i			FAA-5-110416	11/4/2016	86.61	1164.38	14.40	2020	3.5	6.87	1.0	220	99.6	0.54	834	7.1	1470	<0.0010	0.0010	0.011	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.075	0.0093	0.0039	<0.0010	<0.00020	0.54	0.956
adie	MW-FAA-5	1250.99	FAA-5-121616	12/16/2016	86.98	1164.01	11.99	2810	7.7	6.75	1.2	343	101	0.61	1300	7.2	2400	<0.0010	0.0012	0.0074	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.12	0.023	0.0018	<0.0010	<0.00020	0.61	1.12
5	WW-I AA-5	1230.33	FAA-5-021017	2/10/2017	87.14	1163.85	12.58	3620	5.7	6.56	1.6	509	87.2	0.86	2150	7.2	3700	<0.0010	0.0034	<0.0050	<0.0010	<0.00050	<0.0050	0.0031	<0.0050	0.15	0.057	<0.0010	<0.0010	<0.00020	0.86	1.56
2			FAA-5-041017	4/10/2017	86.91	1164.08	15.07	3650	5.0	6.78	1.7	526	88.9	1.0	2130	6.9	3730	<0.0010	0.0024	<0.0050	<0.0010	<0.00050	<0.0050	0.0036	<0.0050	0.15	0.067	<0.0010	<0.0010	<0.00020	1.0	1.62
			FAA-5-053017	5/13/2017	86.21	1164.78	14.59	2570	5.1	6.58	0.85	261	178	0.68	912	7.3	1810	0.00022	0.00081	0.013	0.00081	0.000045	< 0.00072	0.00048	<0.0024	0.061	0.012	0.0020	0.00014	<0.000083	0.68	1.85
			FAA-5-063017	6/30/2017	86.46	1164.53	17.02	3580	2.7	6.79	1.6	446	94.0	0.83	1970	7.0	3360	<0.0010	0.0018	<0.0050	0.0018	<0.00050	<0.0050	0.0012	<0.0050	0.14	0.041	<0.0010	<0.0010	<0.00020	0.83	1.91
			FAA3-081916	8/19/2016	12.60	1153.06	19.98	1920	18.2	7.30	0.76	213	87.7	0.28	762	7.1	1470	<0.0010	<0.0010	0.047	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.015	0.0095	<0.0010	<0.0010	<0.00020	0.28	1.79
			FAA3-092616	9/26/2016	12.34	1153.32	15.60	1880	13.5	6.91	0.85	218	88.2	0.31	706	7.1	1490	<0.0010	<0.0010	0.038	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.017	0.011	<0.0010	<0.0010	<0.00020	0.31	0.0647
			FAA-3-110416	11/4/2016	12.48	1153.18	15.90	1970	4.6	6.90	0.95	214	89.5	0.31	896	6.9	1490	<0.0010	<0.0010	0.034	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.017	0.014	< 0.0010	<0.0010	<0.00020	0.31	0.118
	MW-FAA-3	1165.66	FAA-3-121916	12/19/2016	13.05	1152.61	12.59	1880	8.7	6.47	0.79	225	86.6	0.29	651	7.3	1390	<0.0010	<0.0010	0.036	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.019	0.011	<0.0010	<0.0010	<0.00020	0.29	0.484
	WW TAA 3	1105.00	FAA-3-021017	2/10/2017	13.13	1152.53	13.71	1850	8.1	7.01	0.68	210	84.7	0.32	702	7.3	1290	<0.0010	<0.0010	0.032	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.012	0.010	<0.0010	<0.0010	<0.00020	0.32	0.986
			FAA-3-041117	4/11/2017	11.87	1153.79	13.30	2040	7.0	6.82	0.93	242	82.9	0.33	818	7.4	1460	<0.0010	0.0011	0.034	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.014	0.012	< 0.0010	<0.0010	<0.00020	0.33	0.495
			FAA-3-053017	5/30/2017	12.08	1153.58	15.86	1990	6.3	6.78	0.91	208	82.7	0.35	778	7.2	1450	<0.0010	<0.0010	0.033	<0.0020	<0.00050	<0.0050	<0.0010	<0.0050	<0.020	0.013	<0.0010	<0.0010	<0.00020	0.35	1.21
			FAA-3-070317	7/3/2017	12.50	1153.16	18.18	1930	4.2	7.60	0.84	193	81.3	0.30	628	7.1	688	0.000077	0.00098	0.028	0.00079	<0.00018	<0.00072	0.00052	<0.0024	0.014	0.011	<0.0010	<0.000086	<0.000024	0.30	0.291
			FAA4-081916	8/19/2016	57.78	1156.03	17.06	1700	2.1	7.28	0.36	215	89.5	0.29	534	7.1	1270	<0.0010	<0.0010	0.048	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.015	0.0026	<0.0010	<0.0010	<0.00020	0.29	0.539
			FAA4-092316	9/23/2016	57.62	1156.19	17.01	1680	2.3	7.11	0.35	210	89.4	0.32	552	7.3	1190	< 0.0010	<0.0010	0.050	<0.0010	<0.00050	<0.0050	< 0.0010	<0.0050	0.016	0.0026	<0.0010	<0.0010	<0.00020	0.32	0.452
ë			FAA-4-110416	11/4/2016	57.51	1156.30	14.50	1580	3.2	6.89	0.36	205	85.6	0.32	579	7.3	1170	< 0.0010	<0.0010	0.053	<0.0010	<0.00050	<0.0050	< 0.0010	<0.0050	0.016	0.0030	<0.0010	<0.0010	<0.00020	0.32	0.472
irad	MW-FAA-4	1213.81	FAA-4-121916	12/19/2016	58.04	1155.77	11.84	1630	5.8	6.55	0.36	223	83.7	0.31	531	7.4	1150	<0.0010	<0.0010	0.053	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.016	0.0026	<0.0010	<0.0010	<0.00020	0.31	0.349
Ę	WW-1 AA-4	1213.01	FAA-4-021017	2/10/2017	58.20	1155.61	13.00	1650	4.0	6.86	0.35	212	84.6	0.32	524	7.4	1210	< 0.0010	<0.0010	0.049	<0.0010	<0.00050	<0.0050	< 0.0010	<0.0050	0.013	0.0026	< 0.0010	<0.0010	0.00023	0.32	0.233
ò			FAA-4-041117	4/11/2017	56.49	1157.32	13.11	1650	5.5	6.85	0.40	223	84.7	0.36	516	7.3	1190	<0.0010	<0.0010	0.051	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.012	0.0033	<0.0010	<0.0010	<0.00020	0.36	0.960
_			FAA-4-053017	5/30/2017	56.68	1157.13	14.43	1600	3.6	6.75	0.40	200	80.6	0.35	518	7.2	1140	< 0.0010	<0.0010	0.050	<0.0020	<0.00050	<0.0050	< 0.0010	<0.0050	<0.020	0.0031	< 0.0010	<0.0010	<0.00020	0.35	0.692
			FAA-4-063017	6/30/2017	57.53	1156.28	16.56	1630	3.3	7.04	0.39	199	78.5	0.32	486	7.0	1170	<0.0010	<0.0010	0.049	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	< 0.010	0.0027	<0.0010	<0.0010	<0.00020	0.32	1.03
			MW-FAA-6-061717	6/17/2017	13.08	1149.68	17.31	2710	141	7.29	2.2	145	65.7	0.81	1120	7.3 J	2020	<0.0010	0.0049	0.065	<0.0010	<0.00050	<0.0050	0.0018	<0.0050	< 0.010	0.31	<0.0010	<0.0010	<0.00020	0.81	0.647
			FAA-6-071817	7/18/2017	14.30	1148.46	16.92	2580	3.4	7.35	2.9	137	64.3	0.74	1360	7.4	2300	<0.0010	0.0056	0.067	<0.0010	<0.00050	<0.0050	0.0012	<0.0050	0.012	0.55	< 0.0010	<0.0010	<0.00020	0.74	0.192
			FAA-6-072717	7/27/2017	14.22	1148.54	18.75	2520	6.7	7.01	2.4	135	64.8	0.76	1320	7.4	2390	<0.0010	0.0055	0.059	<0.0010	<0.00050	<0.0050	0.0012	<0.0050	0.011	0.50	<0.0010	<0.0010	<0.00020	0.76	0.599
	MW-FAA-6	1162.76	FAA-6-080117	8/1/2017	14.26	1148.50	17.71	2860	5.2	7.07	3.0	141	63.6	0.81	1400	7.5	2370	<0.0010	0.0060	0.066	<0.0020	<0.00050	<0.0050	0.0012	<0.0050	<0.020	0.59	<0.0010	<0.0010	<0.00020	0.81	0.128
	IVIVV-I AA-O	1102.70	FAA-6-080717	8/7/2017	14.07	1148.69	18.21	2880	5.9	6.98	3.1	140	66.0	0.81	1380	7.4	2390	<0.0010	0.0060	0.067	<0.0010	<0.00050	<0.0050	0.0015	<0.0050	0.012	0.58	<0.0010	<0.0010	<0.00020	0.81	0.365
			FAA-6-081617	8/16/2017	14.40	1148.36	18.86	2900	6.3	6.87	2.9	141	69.0	0.80	1450	7.4	2330	<0.0010	0.0059	0.065	<0.0010	<0.00050	<0.0050	0.0011	<0.0050	0.016	0.57	<0.0010	<0.0010	<0.00020	0.80	0.930
			FAA-6-082317	8/23/2017	14.55	1148.21	18.13	2840	5.0	7.23	2.9	143	66.2	0.81	1350	7.5	2330	<0.0010	0.0054	0.065	<0.0010	<0.00050	<0.0050	0.0011	<0.0050	0.011	0.53	<0.0010	<0.0010	<0.00020	0.81	0.580
			FAA-6-082817	8/28/2017	14.72	1148.04	18.23	2790	5.4	7.03	2.6	136	66.8	0.80	1390	7.4	2340	<0.0010	0.0051	0.065	<0.0010	<0.00050	<0.0050	0.0012	<0.0050	0.012	0.48	0.0011	<0.0010	<0.00020	0.80	0.872

#### ABBREVIATIONS AND NOTES:

Bold value = Detection above laboratory reporting limit

USEPA. 2016. Final Rule: Disposal of Coal Combustion Residuals from Electric Utilities. July 26. 40 CFR Part 257. https://www.epa.gov/coalash/coal-ash-rule

μS/cm = microSiemen per centimeter

btoc = below top of casing

C = Celsius

CCR = coal combustion residuals

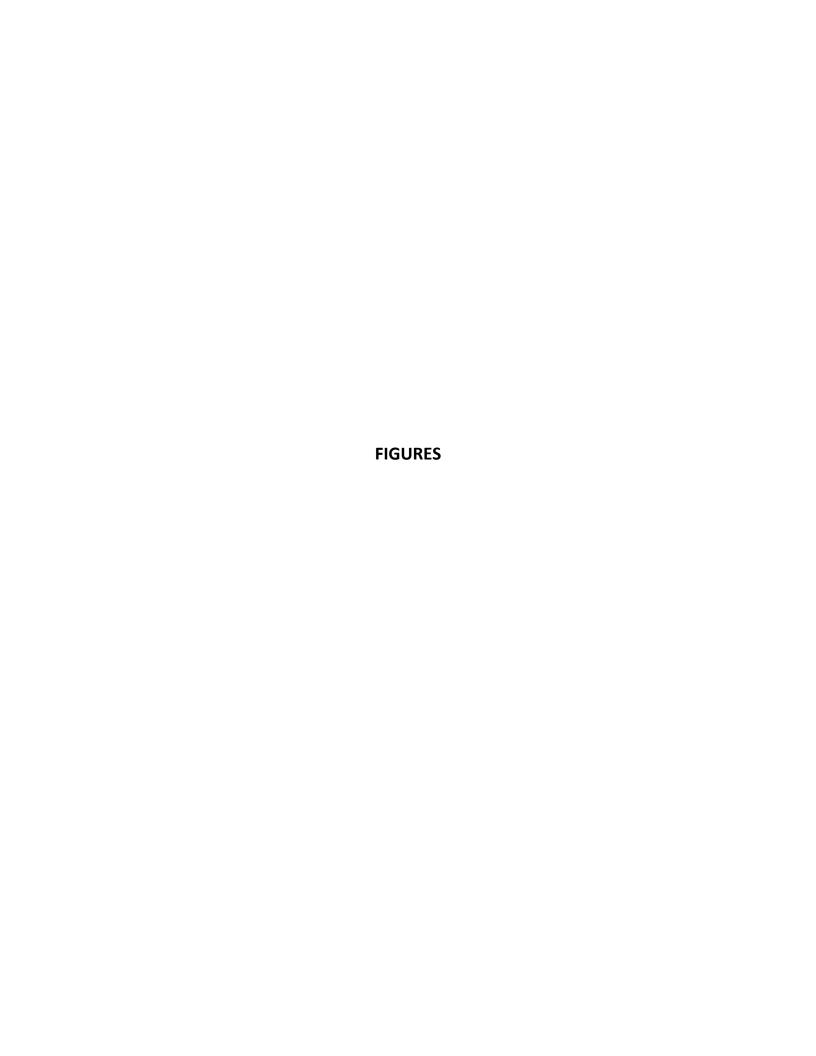
ft AMSL = feet above mean sea level MCL = maximum contaminant level

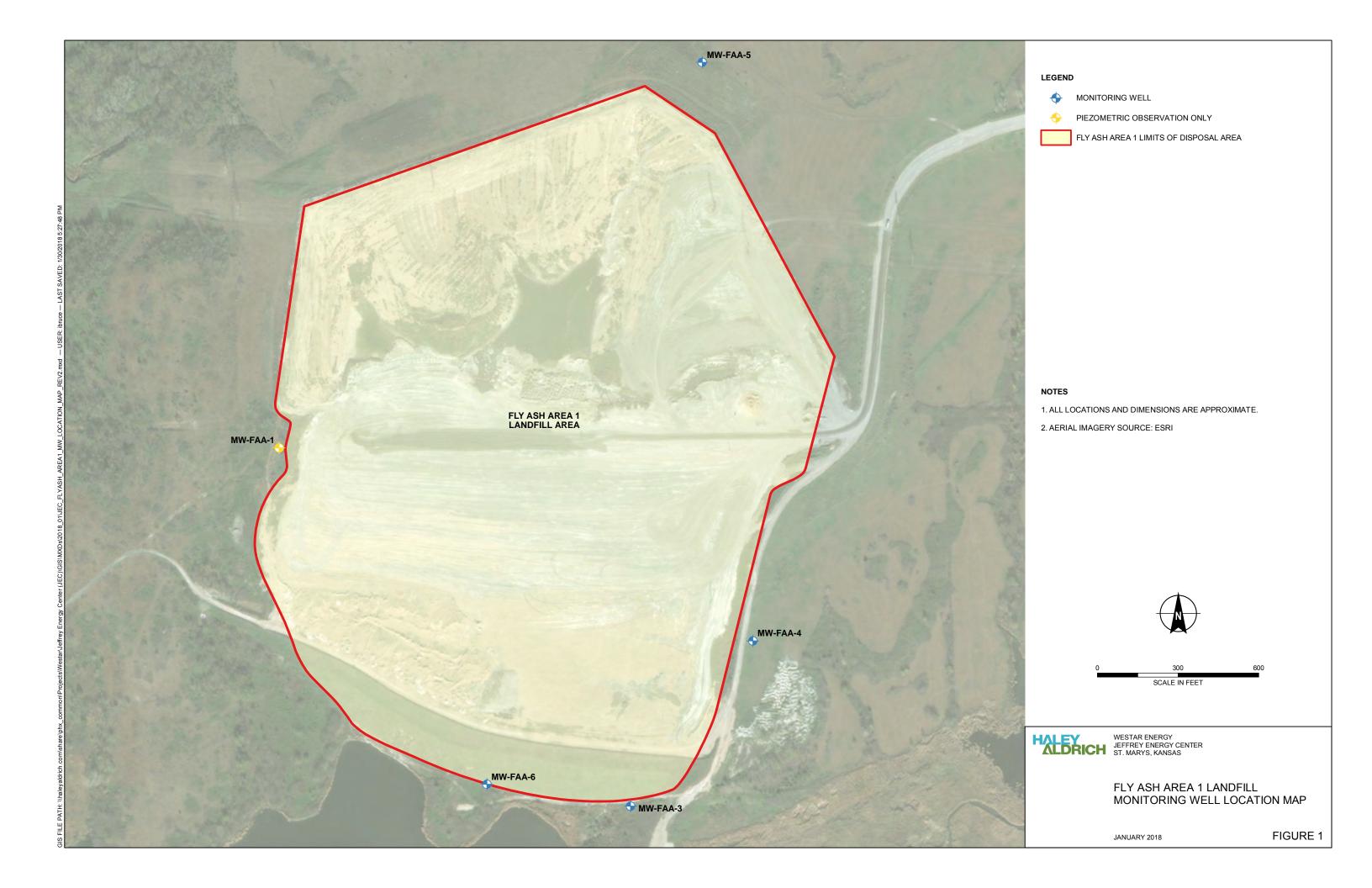
mg/L = milligrams per liter
NA = not applicable
NTU = Nephelometric Turbidity Units

pCi/L = picoCurie per liter su = standard units TDS = total dissolved solids

TOC = top of casing

USEPA = United States Environmental Protection Agency







HALEY & ALDRICH, INC. 6500 Rockside Road Suite 200 Cleveland, OH 44131 216.739.0555

November 4, 2022 Project No. 0204993-000



Jared Morrison – Director, Water and Waste Programs

FROM: Haley & Aldrich, Inc.

Steven F. Putrich, P.E., Principal Consultant – Engineering Principal Mark Nicholls, P.G., Senior Associate – Senior Hydrogeologist

SUBJECT: 2017 Annual Groundwater Monitoring and Corrective Action Report Addendum

Evergy Kansas Central, Inc. Jeffrey Energy Center Fly Ash Landfill

The Evergy Kansas Central, Inc. (Evergy) Fly Ash Landfill (FAL) at the Jeffrey Energy Center is subject to the groundwater monitoring and corrective action requirements described under Code of Federal Regulations Title 40 (40 CFR) §257.90 through §257.98 (Rule). An Annual Groundwater Monitoring and Corrective Action (GWMCA) Report documenting the activities completed in 2017 for FAL was completed and placed in the facility's operating record on January 31, 2018, as required by the Rule. The Annual GWMCA Report contained the specific information listed in 40 CFR §257.90(e).

This report addendum has been prepared to supplement the operating record in recognition of comments received by Evergy from the U.S. Environmental Protection Agency (USEPA) on January 11, 2022. In addition to the information listed in 40 CFR §257.90(e), the USEPA indicated in their comments that the GWMCA Report should contain:

- Results of laboratory analysis of groundwater or other environmental media samples for the
  presence of constituents of Appendices III and IV to 40 CFR Part 257 (or of other constituents,
  such as those supporting characterization of site conditions that may ultimately affect a
  remedy);
- Required statistical analyses performed on those (laboratory analysis) results;
- Measured groundwater elevations; and
- Calculated groundwater flow rate and direction.

While this information is not specifically referred to in 40 CFR §257.90(e) for inclusion in the GWMCA Reports, it has been routinely collected and maintained in Evergy's files and is being provided in the attachments to this addendum. The applicable laboratory analysis reports for baseline sampling events in 2016 and 2017 are included in Attachment 1. Since no statistical analyses were completed in 2017, there were no analyses to report in this addendum. For each of the 2017 sampling events, the measured groundwater elevations, with calculated groundwater flow rates and directions, have been included in Attachment 2.



Evergy Kansas Central, Inc. November 4, 2022 Page 2

The Attachments to this addendum are described below:

- Attachment 1 Laboratory Analytical Reports: Includes laboratory data packages with supporting information such as case narrative, sample and method summary, analytical results, quality control, and chain-of-custody documentation. The laboratory data packages for the baseline sampling events completed in August, September, November, and December 2016, and February, April, May, June, July, and August 2017 are provided.
  - Groundwater sampling and analysis was completed at monitoring well MW-FAA-2 during baseline groundwater monitoring; however, the monitoring well was not included in the final certified network design established in October 2017. Therefore, MW-FAA-2 laboratory analytical data is included in many of these laboratory analytical reports.
  - Since groundwater samples were collected from multiple units during each baseline sampling event, analytical data included in these laboratory analytical reports may include data from monitoring wells not associated with the FAL.
- Attachment 2 Groundwater Potentiometric Maps: Includes the measured groundwater elevations at each well and the generalized groundwater flow direction and calculated flow rate. Maps for the sampling events completed in August, September, November, and December 2016, and February, April, May, and June 2017 are provided.



# ATTACHMENT 1 Laboratory Analytical Reports

ATTACHMENT 1-1
August 2016 Sampling Event
Laboratory Analytical Report





September 14, 2016

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR Groundwater Pace Project No.: 60226141

#### Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on August 20, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Danton M. Wilson

Heather Wilson heather.wilson@pacelabs.com Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY Adam Kneeling, Haley & Aldrich, Inc. JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683

Georgia Certification #: C040

Guam Certification Hawaii Certification

Idaho Certification

Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0

Illinois Certification #: 003097 Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14

Nevada Certification #: PA014572015-1

New Hampshire/TNI Certification #: 2976

New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Oregon/TNI Certification #: PA200002

Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8

Utah/TNI Certification #: PA014572015-5

USDA Soil Permit #: P330-14-00213

Vermont Dept. of Health: ID# VT-0282

Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 460198

Washington Certification #: C868
West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587



# **SAMPLE SUMMARY**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60226141001	FAA5-081916	Water	08/19/16 13:16	08/20/16 09:25
60226141002	FAA4-081916	Water	08/19/16 14:35	08/20/16 09:25
60226141003	FAA3-081916	Water	08/19/16 15:53	08/20/16 09:25
60226141004	FAA5-081916 MS	Water	08/19/16 13:16	08/20/16 09:25
60226141005	FAA5-081916 MSD	Water	08/19/16 13:16	08/20/16 09:25



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

_ab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60226141001	FAA5-081916	EPA 200.7	 JGP	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	AB1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60226141002	FAA4-081916	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	AB1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0226141003	FAA3-081916	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	AB1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0226141004	FAA5-081916 MS	EPA 903.1	AB1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
0226141005	FAA5-081916 MSD	EPA 903.1	AB1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: September 14, 2016

#### **General Information:**

3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 443713

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60225865003,60226099002,60226141001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1814603)
  - Calcium
- MS (Lab ID: 1814605)
  - Calcium
- MSD (Lab ID: 1814606)
  - Calcium

# **Additional Comments:**



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: September 14, 2016

#### **General Information:**

3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: September 14, 2016

#### **General Information:**

3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 443695

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60226141001,60226141003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1814568)
  - Mercury



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Method: EPA 903.1

Description: 903.1 Radium 226
Client: WESTAR ENERGY
Date: September 14, 2016

#### **General Information:**

5 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Method: EPA 904.0

Description: 904.0 Radium 228
Client: WESTAR ENERGY
Date: September 14, 2016

#### **General Information:**

5 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY

Date: September 14, 2016

#### **General Information:**

3 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: September 14, 2016

#### **General Information:**

3 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

FAA3-081916 (Lab ID: 60226141003)
FAA4-081916 (Lab ID: 60226141002)
FAA5-081916 (Lab ID: 60226141001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: September 14, 2016

#### **General Information:**

3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

Sample: FAA5-081916	Lab ID: 602	226141001	Collected: 08/19/1	6 13:16	Received: 08	8/20/16 09:25 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	<0.010	mg/L	0.010	1	08/22/16 16:30	08/23/16 12:13	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/23/16 12:13	7440-41-7	
Boron, Total Recoverable	1.2	mg/L	0.10	1		08/23/16 12:13		
Calcium, Total Recoverable	290	mg/L	0.10	1		08/23/16 12:13		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1		08/23/16 12:13		
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		08/23/16 12:13		
Lithium	0.089	mg/L	0.010	1	08/22/16 16:30	08/23/16 12:13	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:24	7440-36-0	
Arsenic, Total Recoverable	0.0012	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:24	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/22/16 16:30	08/24/16 11:24	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:24	7440-48-4	
Molybdenum, Total Recoverable	0.025	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:24	7439-98-7	
Selenium, Total Recoverable	0.0030	mg/L	0.0010	1		08/24/16 11:24		
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:24	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.20	ug/L	0.20	1	08/23/16 08:40	08/23/16 12:26	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	2410	mg/L	5.0	1		08/25/16 10:49		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
pH at 25 Degrees C	7.0	Std. Units	0.10	1		08/24/16 10:40		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	96.8	mg/L	10.0	10		09/08/16 15:12	16887-00-6	
Fluoride	0.64	mg/L	0.20	1		09/07/16 10:34	16984-48-8	
Sulfate	1010	mg/L	100	100		09/08/16 15:40	1/202-70-8	



# **ANALYTICAL RESULTS**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

Sample: FAA4-081916	Lab ID: 60226141002 Collected: 08/19/16 14:35 Received: 08/20/16 09:25 Matrix: Water								
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua	
200.7 Metals, Total	Analytical Met	thod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7				
Barium, Total Recoverable	0.048	mg/L	0.010	1	08/22/16 16:30	08/23/16 12:25	7440-39-3		
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/23/16 12:25	7440-41-7		
Boron, Total Recoverable	0.36	mg/L	0.10	1	08/22/16 16:30	08/23/16 12:25	7440-42-8		
Calcium, Total Recoverable	215	mg/L	0.10	1	08/22/16 16:30	08/23/16 12:25	7440-70-2		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	08/22/16 16:30	08/23/16 12:25	7440-47-3		
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	08/22/16 16:30	08/23/16 12:25	7439-92-1		
Lithium	0.015	mg/L	0.010	1	08/22/16 16:30	08/23/16 12:25	7439-93-2		
200.8 MET ICPMS	Analytical Met	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8				
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:15	7440-36-0		
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:15	7440-38-2		
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/22/16 16:30	08/24/16 11:15	7440-43-9		
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:15	7440-48-4		
Molybdenum, Total Recoverable	0.0026	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:15	7439-98-7		
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:15	7782-49-2		
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:15	7440-28-0		
245.1 Mercury	Analytical Met	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1				
Mercury	<0.20	ug/L	0.20	1	08/23/16 08:40	08/23/16 12:37	7439-97-6		
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	oc						
Total Dissolved Solids	1270	mg/L	5.0	1		08/25/16 10:50			
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500	D-H+B						
oH at 25 Degrees C	7.1	Std. Units	0.10	1		08/24/16 10:40		H6	
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	0.0						
Chloride	89.5	mg/L	10.0	10		09/08/16 16:38	16887-00-6		
Fluoride	0.29	mg/L	0.20	1		09/07/16 11:17	16984-48-8		
Sulfate	534	mg/L	50.0	50		09/08/16 16:53	14808-79-8		



# **ANALYTICAL RESULTS**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

Sample: FAA3-081916	Lab ID: 602	226141003	Collected: 08/19/1	6 15:53	Received: 08	/20/16 09:25 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.047	mg/L	0.010	1	08/22/16 16:30	08/23/16 12:28	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/23/16 12:28	7440-41-7	
Boron, Total Recoverable	0.76	mg/L	0.10	1		08/23/16 12:28		
Calcium, Total Recoverable	213	mg/L	0.10	1		08/23/16 12:28		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1		08/23/16 12:28		
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		08/23/16 12:28		
_ithium	0.015	mg/L	0.010	1	08/22/16 16:30	08/23/16 12:28	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:20	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:20	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/22/16 16:30	08/24/16 11:20	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:20	7440-48-4	
Molybdenum, Total Recoverable	0.0095	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:20	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1		08/24/16 11:20		
Γhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/22/16 16:30	08/24/16 11:20	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.20	ug/L	0.20	1	08/23/16 08:40	08/23/16 12:40	7439-97-6	M1
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC					
Total Dissolved Solids	1470	mg/L	5.0	1		08/25/16 10:51		
1500H+ pH, Electrometric	Analytical Met	hod: SM 4500	)-H+B					
oH at 25 Degrees C	7.1	Std. Units	0.10	1		08/24/16 10:40		H6
800.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	87.7	mg/L	10.0	10		09/08/16 17:07	16887-00-6	
Fluoride	0.28	mg/L	0.20	1		09/07/16 14:15	16984-48-8	
Sulfate	762	mg/L	50.0	50		09/08/16 17:21	14808-79-8	



#### **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

QC Batch: 443695 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60226141001, 60226141002, 60226141003

METHOD BLANK: 1814564 Matrix: Water

Associated Lab Samples: 60226141001, 60226141002, 60226141003

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Mercury ug/L <0.20 0.20 08/23/16 11:44

LABORATORY CONTROL SAMPLE: 1814565

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury ug/L 5.2 104 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1814566 1814567

MS MSD 60226141001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 5 5 70-130 3 20 Mercury ug/L < 0.20 4.8 5.0 96 99

Parameter Units Result Conc. Result % Rec Limits Qualifiers

Mercury ug/L <0.20 5 3.4 67 70-130 M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

QC Batch: 443713 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60226141001, 60226141002, 60226141003

METHOD BLANK: 1814601 Matrix: Water

Associated Lab Samples: 60226141001, 60226141002, 60226141003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.010	0.010	08/23/16 10:28	
Beryllium	mg/L	< 0.0010	0.0010	08/23/16 10:28	
Boron	mg/L	<0.10	0.10	08/23/16 10:28	
Calcium	mg/L	<0.10	0.10	08/23/16 10:28	
Chromium	mg/L	< 0.0050	0.0050	08/23/16 10:28	
Lead	mg/L	< 0.0050	0.0050	08/23/16 10:28	
Lithium	mg/L	<0.010	0.010	08/23/16 10:28	

LABORATORY CONTROL SAMPLE:	1814602					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	102	85-115	
Beryllium	mg/L	1	1.0	101	85-115	
Boron	mg/L	1	0.99	99	85-115	
Calcium	mg/L	10	10.0	100	85-115	
Chromium	mg/L	1	1.0	104	85-115	
Lead	mg/L	1	1.1	106	85-115	
Lithium	mg/L	1	1.0	102	85-115	

MATRIX SPIKE & MATRIX SI	PIKE DUPLICA	TE: 181460	03		1814604							
			MS	MSD								
	6	0226099002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qua
Barium	mg/L	547 ug/L	1	1	1.6	1.6	104	103	70-130	1	20	
Beryllium	mg/L	<1.0 ug/L	1	1	1.0	1.0	102	101	70-130	1	20	
Boron	mg/L	658 ug/L	1	1	1.7	1.7	105	104	70-130	1	20	
Calcium	mg/L	288000 ug/L	10	10	304	298	152	96	70-130	2	20	M1
Chromium	mg/L	<5.0 ug/L	1	1	1.0	1.0	103	103	70-130	0	20	
Lead	mg/L	<5.0 ug/L	1	1	0.99	0.99	99	98	70-130	1	20	
Lithium	mg/L	57.8 ug/L	1	1	1.1	1.1	104	103	70-130	1	20	

MATRIX SPIKE & MATRIX SF	PIKE DUPLICA	TE: 18146	05		1814606						
			MS	MSD							
	60	0225865003	Spike	Spike	MS	MSD	MS	MSD	% Rec	Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD RPD	Qual
Barium	mg/L	0.18	1	1	1.2	1.2	100	100	70-130	0 20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 181460		1814606								
Parameter	6 Units	0225865003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Beryllium	mg/L	<0.0010	1	1	1.0	1.0	102	101	70-130	1	20	
Boron	mg/L	0.71	1	1	1.7	1.7	102	102	70-130	0	20	
Calcium	mg/L	214	10	10	216	216	21	19	70-130	0	20	M1
Chromium	mg/L	< 0.0050	1	1	1.0	1.0	105	104	70-130	1	20	
Lead	mg/L	< 0.0050	1	1	0.95	0.95	95	95	70-130	0	20	
Lithium	mg/L	0.12	1	1	1.2	1.2	106	105	70-130	1	20	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	TE: 18146	07		1814608							
			MS	MSD								
	6	0226141001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	<0.010	1	1	1.0	1.0	100	102	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	1.0	1.0	100	101	70-130	1	20	
Boron	mg/L	1.2	1	1	2.2	2.3	104	109	70-130	2	20	
Calcium	mg/L	290	10	10	300	303	92	129	70-130	1	20	
Chromium	mg/L	< 0.0050	1	1	1.0	1.0	104	104	70-130	0	20	
Lead	mg/L	< 0.0050	1	1	1.0	1.0	100	100	70-130	0	20	
Lithium	mg/L	0.089	1	1	1.1	1.1	103	105	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

QC Batch: 443719 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60226141001, 60226141002, 60226141003

METHOD BLANK: 1814621 Matrix: Water

Associated Lab Samples: 60226141001, 60226141002, 60226141003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	08/23/16 14:54	
Arsenic	mg/L	< 0.0010	0.0010	08/23/16 14:54	
Cadmium	mg/L	< 0.00050	0.00050	08/23/16 14:54	
Cobalt	mg/L	< 0.0010	0.0010	08/23/16 14:54	
Molybdenum	mg/L	< 0.0010	0.0010	08/23/16 14:54	
Selenium	mg/L	< 0.0010	0.0010	08/23/16 14:54	
Thallium	mg/L	<0.0010	0.0010	08/23/16 14:54	

LABORATORY CONTROL SAMPLE:	1814622					
_		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.042	105	85-115	
Arsenic	mg/L	.04	0.043	108	85-115	
Cadmium	mg/L	.04	0.042	105	85-115	
Cobalt	mg/L	.04	0.040	101	85-115	
Molybdenum	mg/L	.04	0.042	105	85-115	
Selenium	mg/L	.04	0.045	113	85-115	
Thallium	mg/L	.04	0.039	98	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 181462	MS	MSD	1814624							
	6	0226141001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	<0.0010	.04	.04	0.040	0.041	100	101	70-130	1	20	
Arsenic	mg/L	0.0012	.04	.04	0.041	0.042	100	103	70-130	3	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.038	0.038	95	94	70-130	1	20	
Cobalt	mg/L	< 0.0010	.04	.04	0.038	0.039	95	96	70-130	1	20	
Molybdenum	mg/L	0.025	.04	.04	0.068	0.068	107	106	70-130	1	20	
Selenium	mg/L	0.0030	.04	.04	0.045	0.045	104	105	70-130	1	20	
Thallium	mg/L	< 0.0010	.04	.04	0.042	0.042	104	105	70-130	1	20	

MATRIX SPIKE SAMPLE:	1814625						
		60226141002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	.04	0.042	104	70-130	
Arsenic	mg/L	< 0.0010	.04	0.042	104	70-130	
Cadmium	mg/L	< 0.00050	.04	0.039	98	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.





# **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

MATRIX SPIKE SAMPLE:	1814625						
Parameter	Units	60226141002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/L	<0.0010	.04	0.039	96	70-130	
Molybdenum	mg/L	0.0026	.04	0.045	106	70-130	
Selenium	mg/L	< 0.0010	.04	0.041	102	70-130	
Thallium	mg/L	< 0.0010	.04	0.041	104	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

QC Batch: 444157 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60226141001, 60226141002, 60226141003

METHOD BLANK: 1816260 Matrix: Water

Associated Lab Samples: 60226141001, 60226141002, 60226141003

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 08/25/16 10:45

LABORATORY CONTROL SAMPLE: 1816261

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 979 98 80-120

SAMPLE DUPLICATE: 1816262

Date: 09/14/2016 02:00 PM

60226141001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers **Total Dissolved Solids** 2410 2 2360 10 mg/L

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

QC Batch: 443953 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60226141001, 60226141002, 60226141003

SAMPLE DUPLICATE: 1815499

Date: 09/14/2016 02:00 PM

 Parameter
 Units
 60226141001 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.0
 7.1
 0
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

MATRIX SPIKE SAMPLE:

Date: 09/14/2016 02:00 PM

QC Batch: 445543 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60226141001, 60226141002, 60226141003

METHOD BLANK: 1821465 Matrix: Water

Associated Lab Samples: 60226141001, 60226141002, 60226141003

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 09/07/16 10:05

LABORATORY CONTROL SAMPLE: 1821466

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.6 103 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1821467 1821468

1821469

MS MSD 60226141001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Fluoride 80-120 2 mg/L 0.64 2.5 2.5 3.1 3.1 96 99 15

MS 60226141002 Spike MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers 0.29 2.7 80-120 Fluoride mg/L 2.5 95

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

QC Batch: 445717 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60226141001, 60226141002, 60226141003

METHOD BLANK: 1822153 Matrix: Water

Associated Lab Samples: 60226141001, 60226141002, 60226141003

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

mg/L <1.0 1.0 09/08/16 10:52

 Chloride
 mg/L
 <1.0</th>
 1.0
 09/08/16 10:52

 Sulfate
 mg/L
 <1.0</td>
 1.0
 09/08/16 10:52

LABORATORY CONTROL SAMPLE: 1822154

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Chloride 5 4.8 96 90-110 mg/L Sulfate 5 5.0 100 90-110 mg/L

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1822155 1822156 MSD MS 60226095001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Chloride mg/L 263 100 100 367 372 104 109 80-120 15 Sulfate mg/L 137 50 50 187 186 100 97 80-120 15

MATRIX SPIKE SAMPLE: 1822157 MS MS 60226141001 % Rec Spike Qualifiers Parameter Units Result Conc. Result % Rec Limits Chloride 96.8 146 98 80-120 mg/L 50 1010 1500 80-120 Sulfate mg/L 500 99

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Sample: FAA5-081916 Lab ID: 60226141001 Collected: 08/19/16 13:16 Received: 08/20/16 09:25 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.550 ± 0.431 (0.506) C:NA T:89%	pCi/L	09/13/16 22:19	13982-63-3	
Radium-228	EPA 904.0	1.22 ± 0.408 (0.550) C:77% T:87%	pCi/L	09/10/16 02:02	15262-20-1	



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Sample: FAA4-081916 Lab ID: 60226141002 Collected: 08/19/16 14:35 Received: 08/20/16 09:25 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0668 ± 0.493 (0.941) C:NA T:81%	pCi/L	09/13/16 22:50	13982-63-3	
Radium-228	EPA 904.0	0.472 ± 0.341 (0.644) C:75% T:79%	pCi/L	09/10/16 02:21	15262-20-1	



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# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Sample: FAA3-081916 Lab ID: 60226141003 Collected: 08/19/16 15:53 Received: 08/20/16 09:25 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.572 ± 0.596 (0.900) C:NA T:83%	pCi/L	09/13/16 22:20	13982-63-3	
Radium-228	EPA 904.0	1.22 ± 0.419 (0.576) C:73% T:84%	pCi/L	09/10/16 02:02	15262-20-1	



**ANALYTICAL RESULTS - RADIOCHEMISTRY** 

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Sample: FAA5-081916 MS Lab ID: 60226141004 Collected: 08/19/16 13:16 Received: 08/20/16 09:25 Matrix: Water

PWS: Site ID: Sample Type:

Method Act ± Unc (MDC) Carr Trac Units CAS No. **Parameters** Analyzed Qual EPA 903.1 103.5 %REC ± NA (NA) Radium-226 pCi/L 09/13/16 22:20 13982-63-3 C:NA T:NA EPA 904.0 86.7 %REC +/- NA (NA) Radium-228 pCi/L 09/10/16 02:03 15262-20-1 C:NA T:NA



**ANALYTICAL RESULTS - RADIOCHEMISTRY** 

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Sample: FAA5-081916 MSD Lab ID: 60226141005 Collected: 08/19/16 13:16 Received: 08/20/16 09:25 Matrix: Water

C:NA T:NA

PWS: Site ID: Sample Type:

Method Act ± Unc (MDC) Carr Trac Units **Parameters** Analyzed CAS No. Qual EPA 903.1 110.6 %REC 6.64 RPD ± Radium-226 pCi/L 09/13/16 22:20 13982-63-3 NA (NA) C:NA T:NA 88.9 %REC 2.49 RPD +/- NA EPA 904.0 pCi/L Radium-228 09/10/16 02:03 15262-20-1 (NA)



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

QC Batch: 231992 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60226141001, 60226141002, 60226141003, 60226141004, 60226141005

METHOD BLANK: 1136737 Matrix: Water

Associated Lab Samples: 60226141001, 60226141002, 60226141003, 60226141004, 60226141005

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.245 ± 0.341 (0.570) C:NA T:96%
 pCi/L
 09/13/16 22:43

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

 QC Batch:
 231993
 Analysis Method:
 EPA 904.0

 QC Batch Method:
 EPA 904.0
 Analysis Description:
 904.0 Radium 228

 Associated Lab Samples:
 60226141001, 60226141002, 60226141003, 60226141004, 60226141005

METHOD BLANK: 1136739 Matrix: Water

Associated Lab Samples: 60226141001, 60226141002, 60226141003, 60226141004, 60226141005

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.693 ± 0.333 (0.567) C:79% T:89%
 pCi/L
 09/10/16 02:02

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

### **ANALYTE QUALIFIERS**

Date: 09/14/2016 02:00 PM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR Groundwater

Pace Project No.: 60226141

Date: 09/14/2016 02:00 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60226141001	FAA5-081916	EPA 200.7	443713	EPA 200.7	443793
60226141002	FAA4-081916	EPA 200.7	443713	EPA 200.7	443793
60226141003	FAA3-081916	EPA 200.7	443713	EPA 200.7	443793
60226141001	FAA5-081916	EPA 200.8	443719	EPA 200.8	443796
60226141002	FAA4-081916	EPA 200.8	443719	EPA 200.8	443796
60226141003	FAA3-081916	EPA 200.8	443719	EPA 200.8	443796
60226141001	FAA5-081916	EPA 245.1	443695	EPA 245.1	443783
60226141002	FAA4-081916	EPA 245.1	443695	EPA 245.1	443783
60226141003	FAA3-081916	EPA 245.1	443695	EPA 245.1	443783
60226141001	FAA5-081916	EPA 903.1	231992		
60226141002	FAA4-081916	EPA 903.1	231992		
60226141003	FAA3-081916	EPA 903.1	231992		
60226141004	FAA5-081916 MS	EPA 903.1	231992		
0226141005	FAA5-081916 MSD	EPA 903.1	231992		
60226141001	FAA5-081916	EPA 904.0	231993		
60226141002	FAA4-081916	EPA 904.0	231993		
60226141003	FAA3-081916	EPA 904.0	231993		
60226141004	FAA5-081916 MS	EPA 904.0	231993		
60226141005	FAA5-081916 MSD	EPA 904.0	231993		
60226141001	FAA5-081916	SM 2540C	444157		
60226141002	FAA4-081916	SM 2540C	444157		
60226141003	FAA3-081916	SM 2540C	444157		
60226141001	FAA5-081916	SM 4500-H+B	443953		
60226141002	FAA4-081916	SM 4500-H+B	443953		
60226141003	FAA3-081916	SM 4500-H+B	443953		
60226141001	FAA5-081916	EPA 300.0	445543		
60226141001	FAA5-081916	EPA 300.0	445717		
60226141002	FAA4-081916	EPA 300.0	445543		
60226141002	FAA4-081916	EPA 300.0	445717		
60226141003	FAA3-081916	EPA 300.0	445543		
60226141003	FAA3-081916	EPA 300.0	445717		



# Sample Condition Upon Receipt



Client Name: Wester				Optional
Courier: FedEx UPS VIA Clay	PEX □	EC	CI 🗆	Pace □ Other □ Client  Proj Due Date:
Tracking #:	Pace Sh	ipping	Label U	Jsed? Yes □ No □ Proj Name:
Custody Seal on Cooler/Box Present: Yes □ No	Ø Se	eals in	tact: Y	′es □ No 🗗
Packing Material: Bubble Wrap □ Bubble Bag	gs 🗆		Foam [	□ None 🗓 Other 🗆
Thermometer Used: (CF+1.1) CF-0.1 T-239 Ty	pe of lo	e V		ue None   Samples received on ice, cooling process has begun.
Cooler Temperature: 13		6	(circle	Date and initials of person examining
Temperature should be above freezing to 6°C				contents: ) is the
Chain of Custody present:	<b>X</b> Yes	□No	□N/A	1.
Chain of Custody filled out:		□No	□N/A	2.
Chain of Custody relinquished:	Yes	□No	□N/A	3,
Sampler name & signature on COC:	Yes	□No	□N/A	4.
Samples arrived within holding time:	Yes	□No	□N/A	5.
Short Hold Time analyses (<72hr):	Yes	□No	□N/A	6. DH
Rush Turn Around Time requested:	□Yes	<b>K</b> INo	□n/a	7.
Sufficient volume:	Yes	□No	□n/a	8.
Correct containers used:	Yes	□No	□n/a	
Pace containers used:	<b>V</b> Yes	□No	□n/a	9.
Containers intact:	Yes	□No	□n/a	10.
Unpreserved 5035A soils frozen w/in 48hrs?	□Yes	□No	<b>K</b> □N/A	11.
Filtered volume received for dissolved tests?	□Yes	□No	<b>Æ</b> N/A	12.
Sample labels match COC:	<b>€</b> Yes	□No	□n/a	
Includes date/time/ID/analyses Matrix:	WT			13.
All containers needing preservation have been checked.	Yes	□No	□N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	Yes	□No	□N/A	14.
Exceptions: VOA, Coliform, O&G, WI-DRO (water)	□Yes	₽No		Initial when Lot # of added completed preservative
Trip Blank present:	□Yes	□No	<b>k</b> IN/A	
Pace Trip Blank lot # (if purchased):				15.
Headspace in VOA vials ( >6mm):	□Yes	□No	<b>€</b> N/A	
				16.
Project sampled in USDA Regulated Area:	□Yes	□No	<b></b> N/A	17. List State:
Additional labels attached to 5035A vials in the field?	□Yes	□No	ØN/A	18.
Client Notification/ Resolution: Copy CC	OC to Clie	ent?	Y	Field Data Required? Y / N
Person Contacted: Da	ate/Time		_	<u> </u>
Comments/ Resolution:				
-				
Project Manager Review:				Date: 8/22/10



# **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

Section Require	a A d Client Information:	Section B Required Proje	ct Inform	nation:						tion ice Inf	<b>C</b> formation	on:												P.	age:		of		- 11
Company	WESTAR ENERGY	Report To: Bra	ındon	Griffin			100		Atte	ntion:	J	ared l	Morri	son					7										
Address:	818 Kansas Ave	Copy To: Jar	ed Mo	rrison, H	eath Hor	nya			Com	pany	Name:	WE	STA	R EN	ERC	Ϋ́	T		RE	GUL	ATOR	YAC	SENCY	1	1	230 5			
	Topeka, KS 66612								Addı	ress:		SEI	ESE	CTIO	NΑ		100		-	NP		_	GROUI	_	VATE	R C	DRINKI	NG WAT	ER
Email To	brandon.l.griffin@westarenergy.com	Purchase Order	No.:							Quote	;	_						_	-1	US			RCRA		.,,,,_	- T	OTHER	10 11/1	LIV
Phone:	(785) 575-8135 Fax:	Project Name:	JEC	CCR Gr	oundwat	ег	-		Pace	rence: Projec	ct H	eathe	er Wi	son,	913-	563-	1407		-		cation	_	T C T C T	_	E	111111	7/////	111111	////////
Request	ed Due Date/TAT: 7 DAY	Project Number							Mana Pace	Profile		657,							- "		TATE:	-	KS		_				
			5 9										T			811	Requ	iestec	Ana	lysis	Filter	red (	Y/N)						
	Section D Valid Matrix C Required Client Information MATRIX	odes (2)	MP)		COLL	ECTED.	3.				Pr	esen	ative	s		× ×	7												
	WATER WASTEWATEN PRODUCT SOIUSOLID OIL WIPE AIR	CODE DW WT WW P SL OL WP AR OT  GOT  CODE DW WP AR AR OT  GOT  CODE DW WP AR AR OT  GOT  GOT  GOT  GOT  GOT  GOT  GOT	(G=GF	COMPC STAF		COMPO: END/GF	SITE RAB	AT COLLECTION	NERS							Total Matale*	Total Metals**	Mercury							orine (Y/N)	Cesi	226/	41	
ITEM #	Sample IDs MUST BE UNIQUE TISSUE	MATRIX COL	SAMPLE TYPE	DATE	TIME	DATE	TIME	SAMPLE TEMP	# OF CONTAINERS		H <sub>2</sub> SO <sub>4</sub>	HG.	Na <sub>0</sub> S <sub>2</sub> O <sub>3</sub>	Methanol		# Analysis	200.8 Total I	245.1 Total Merci	4500 H+B	2540C TDS	Radium 226 Radium 228				Residual Chlorine (Y/N)	Pace	Project	No./ L	ab I.D.
1	FAA5-0819/6 (1) BPW (4) BPW)	1)BPZN- WT	6	_		8/12/16			8	2	1		1									4				MS	MSI	1	001
2	FAA4-081916 884 (2) BIN "	P2N23 WI	6			8/12/6	1439	1	9		3		0			L								5					202
3	FAA3-081916 BPZU (1)BPIN	DPZN20	6			8/19/6	1553		4	1			11				4	100	0		1						ĝ	1	203
4				-			150						Ť.															i.e	
5				F 9	7.4	- P	T. 4									L		(A)				- 6	5			3 11			
6						49	liely :									L		**			1 5								
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11	1 15 Ac					-	725 6	E	3	1						1					1,52		5.0				8	1	
12			6-100	SAMES 1				L		Ш		Ш	3						L					Ш		v —		31	
*200.7 T	ADDITIONAL COMMENTS otal Metals: Ba, Be, B, Ca, Cr, Pb, Li	REI	INQUIS	SHED BY /	AFFILIATI	ON	DATE	_		TIME	_		A	CEPT	ED E	Y/A	FFILIA	TION		D.	ATE	1	IME.			SAME	PLE COND	ITIONS	
	Fotal Metals: Co, As, Se, Mo, Cd, Sb, Tl	14		1	2-		8/19/ 8/20	1/11		30	2	1	N	1	1/1	1		14	0	8/1	9/16	1	236	2	3	~	N		0
		10	1	/		16	2/20/	1/4	10		1	P	av	VP I	//	ĥ	1		9	00/	14	U	1-)	1	d	/		1	
	Ţ												34				1	-								172	Y	1	
	Page 35 of 37					ER NAME A PRINT Name SIGNATURI	e of SAMP	LER:	- 1	(3)	ada	2	6	A t	61	7	DATE (MM/D	Signed D/YY):	08	/1	9/	16		Temo in °C		Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)		Samples Intact (Y/N)

	an of	Custody
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WO#:30193885





Workorder: 60226141

Workorder Name: JEC CCR Groundwater

Owner Received Date: 8/20/2016 Results Requested By: 9/14/2016

Repo	rt To		Subcontrac		.01		aresia opii en	viiei ite	even los		are. O		ested A			169161	лыу. Essensia	9/14/2016
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	her Wilson : Analytical Kansas			nalytical Pittsb														
	Loiret Blvd.			oseytown Roa 2,3, & 4	u													
	xa, KS 66219			burg, PA 1560	1													
Phor	ne (913)599-5665			(724)850-5600														
				~						刃								
						Pre	served C	ontainers		Radium								
		l da en las <mark>greijest</mark> es en				5				3 2								
			Collect							66								
		Sample	Date/Tim			BP1N				Ω								
Item	Sample ID	Туре	e	Lab ID	Matrix	<del> </del>				28								LAB USE ONLY
1	FAA5-081916	RQS	8/19/2016 13:16	60226141001	Water	2			7	<del>(                                     </del>								201
2	FAA4-081916	PS	8/19/2016 14:35	60226141002	Water	2			7	<								coż
3	FAA3-081916	PS	8/19/2016 15:53	60226141003	Water	2			7	< │								003
4	FAA5-081916 MS	PS	8/19/2016 13:16	60226141004	Water	1			>	₹ <u></u>		***************************************						004
5	FAA5-081916 MSD	PS	8/19/2016 13:16	60226141005	Water	1				$\langle    $								005
														C	omme	ents		
Trans	sfers Released By		Date/Time	Receive	d			Date/	Time		-						***************************************	
1	Who Vi	- Iku	8/24/16	Pos Kivien	E. Hie		***************************************	81231	1160	je/m								
2	1/10/00	()-4	7-7						. 7									
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<u> </u>	ler Temperature on F	Receipt 101/3	<u> Cus</u>	tody Seal ()	or N		Re	eceived	on lo	e )	<u>or</u>	<u></u>		<u> </u>	amp	les In	tact()	or N

<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

Sample Condition Upon Re	ceipt Pi	ittsb	urgh	1		30	10	7	00	F
Face Analytical Client Name:	Pac	€_	Kai	nsas	Project#_	· ·	# W			
Courier: ☑ Fed Ex □ UPS □ USPS □ C Tracking #: <u>仮703 164 □ 936 9</u>	Client 🗆 C									
Custody Seal on Cooler/Box Present:	es 🛭 r	10	Seals	intact: 🗹 yes	□ no					
Thermometer Used NIA	Type o	of Ice:	Wet	Blue (None)					_	
Cooler Temperature Observed Temp	NIA_	.с	Corre	ection Factor: N	<u>∖A</u> °C Final	Temp <u>:</u>	NV	<u>4</u>	. ° C	
Temp should be above freezing to 6°C									ninina	
				•	Date and I contents	: Kar	81	<u> 23/</u>	16	
Comments:	Yes	No	N/A							$\dashv$
Chain of Custody Present:				1						$\dashv$
Chain of Custody Filled Out:				2.						$\dashv$
Chain of Custody Relinquished:				3,						_
Sampler Name & Signature on COC:				4.		<del></del> -	<u></u>			
Sample Labels match COC:	<b>'</b>			5.						
-Includes date/time/ID/Analysis Matrix:	Nt_									
Samples Arrived within Hold Time:	1			6	<u></u>					
Short Hold Time Analysis (<72hr remaining):		/		7.						
Rush Turn Around Time Requested:	1			8.						
Sufficient Volume:		/		9. 004,00	5 low vol					
Correct Containers Used:	V			10.						
-Pace Containers Used:	/							<u>-</u>		
Containers Intact:	1			11.						
Filtered volume received for Dissolved tests			/	12.						
All containers needing preservation have been checked.	1			13. pH 42						
All containers needing preservation are found to be in compliance with EPA recommendation.	' /									
·				Initial when completed	Date/time of preservation					
exceptions: VOA, coliform, TOC, O&G, Pheno	lics			Lot # of added	pieservation					_
				preservative						
Headspace in VOA Vials ( >6mm):			/	14						
Trip Blank Present:			/	15.						
Trip Blank Custody Seals Present			/							
Rad Aqueous Samples Screened > 0.5 mren	n/hr	1		Initial when completed:	Date: 8/2	3/14				
Client Notification/ Resolution:	1	F								
Person Contacted:			Date/	Time:	Conta	cted B <u>y:</u>				
Comments/ Resolution:					<u> </u>					
				<u> </u>		<del></del> -				

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ATTACHMENT 1-2
September 2016 Sampling Event
Laboratory Analytical Report



October 18, 2016

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

### Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on September 24, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Emily Webb for Heather Wilson heather.wilson@pacelabs.com Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification

Hawaii Certification

Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14

Oregon/TNI Certification #: R-190
Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 460198 Washington Certification #: C868 West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60228510001	FGD2-092316	Water	09/23/16 07:50	09/24/16 09:20
60228510002	FGD3-092316	Water	09/23/16 08:56	09/24/16 09:20
60228510003	FGD4-092316	Water	09/23/16 10:16	09/24/16 09:20
60228510004	FAA 5-092316	Water	09/23/16 11:53	09/24/16 09:20
60228510005	FAA 4-092316	Water	09/23/16 13:01	09/24/16 09:20
60228510006	DUP-092316	Water	09/23/16 17:00	09/24/16 09:20



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60228510001	FGD2-092316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0228510002	FGD3-092316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0228510003	FGD4-092316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0228510004	FAA 5-092316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0228510005	FAA 4-092316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA

# **REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
	_	SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60228510006	DUP-092316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: October 18, 2016

#### **General Information:**

6 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 448189

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60228378001,60228510003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1833593)
  - Calcium
- MSD (Lab ID: 1833594)
  - Calcium



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: October 18, 2016

#### **General Information:**

6 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: October 18, 2016

#### **General Information:**

6 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 447972

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60228265001,60228265002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1832814)
  - Mercury



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** October 18, 2016

#### **General Information:**

6 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Method: EPA 904.0

**Description:** 904.0 Radium 228 **Client:** WESTAR ENERGY **Date:** October 18, 2016

#### **General Information:**

6 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Method: SM 2540C

**Description:** 2540C Total Dissolved Solids

Client: WESTAR ENERGY
Date: October 18, 2016

#### **General Information:**

6 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: October 18, 2016

#### **General Information:**

6 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

- DUP-092316 (Lab ID: 60228510006)
- FAA 4-092316 (Lab ID: 60228510005)
- FAA 5-092316 (Lab ID: 60228510004)
- FGD2-092316 (Lab ID: 60228510001)
- FGD3-092316 (Lab ID: 60228510002)
- FGD4-092316 (Lab ID: 60228510003)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: October 18, 2016

#### **General Information:**

6 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

Sample: FGD2-092316	Lab ID: 602	228510001	Collected: 09/23/1	6 07:50	Received: 09	/24/16 09:20 <b>N</b>	4/16 09:20 Matrix: Water					
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua				
200.7 Metals, Total	Analytical Me	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7										
Barium, Total Recoverable	0.072	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:24	7440-39-3					
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	09/30/16 16:24	7440-41-7					
Boron, Total Recoverable	0.26	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:24	7440-42-8					
Calcium, Total Recoverable	111	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:24	7440-70-2					
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:24	7440-47-3					
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20							
ithium	<0.010	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:24	7439-93-2					
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8							
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:37	7440-36-0					
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:37	7440-38-2					
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	09/27/16 15:20	10/12/16 22:37	7440-43-9					
Cobalt, Total Recoverable	0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:37	7440-48-4					
Molybdenum, Total Recoverable	0.0044	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:37	7439-98-7					
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:37	7782-49-2					
Гhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:37	7440-28-0					
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1							
Mercury	<0.00020	mg/L	0.00020	1	09/26/16 13:00	09/27/16 09:40	7439-97-6					
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC									
Total Dissolved Solids	573	mg/L	5.0	1		09/28/16 11:01						
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	O-H+B									
oH at 25 Degrees C	7.8	Std. Units	0.10	1		10/11/16 10:50		H6				
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0									
Chloride	31.9	mg/L	2.0	2		10/15/16 22:23	16887-00-6					
Fluoride	0.38	mg/L	0.20	1		10/14/16 15:47	16984-48-8					
Sulfate	177	mg/L	20.0	20		10/15/16 22:37	14808-79-8					



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

Sample: FGD3-092316	Lab ID: 602	228510002	Collected: 09/23/1	6 08:56	Received: 09	0/24/16 09:20 N	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua	
200.7 Metals, Total	Analytical Met	hod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7				
Barium, Total Recoverable	0.20	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:26	7440-39-3		
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	09/30/16 16:26	7440-41-7		
Boron, Total Recoverable	0.15	mg/L	0.10	1		09/30/16 16:26			
Calcium, Total Recoverable	146	mg/L	0.10	1		09/30/16 16:26			
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1		09/30/16 16:26			
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		09/30/16 16:26			
Lithium	0.015	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:26	7439-93-2		
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8				
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:42	7440-36-0		
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:42	7440-38-2		
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	09/27/16 15:20	10/12/16 22:42	7440-43-9		
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:42	7440-48-4		
Molybdenum, Total Recoverable	0.0064	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:42	7439-98-7		
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1		10/12/16 22:42			
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:42	7440-28-0		
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1				
Mercury	<0.00020	mg/L	0.00020	1	09/26/16 13:00	09/27/16 09:42	7439-97-6		
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	0C						
Total Dissolved Solids	820	mg/L	5.0	1		09/28/16 11:03			
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B						
oH at 25 Degrees C	7.3	Std. Units	0.10	1		10/11/16 10:50		H6	
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0						
Chloride	49.9	mg/L	5.0	5		10/15/16 22:52	16887-00-6		
Fluoride	0.28	mg/L	0.20	1		10/14/16 16:30	16984-48-8		
Sulfate	281	mg/L	20.0	20		10/15/16 23:34	14808-70-8		



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

Sample: FGD4-092316	Lab ID: 602	228510003	Collected: 09/23/1	6 10:16	Received: 09	/24/16 09:20 N	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua	
200.7 Metals, Total	Analytical Me	thod: EPA 200	).7 Preparation Met	hod: EP	A 200.7				
Barium, Total Recoverable	0.057	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:29	7440-39-3		
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	09/30/16 16:29	7440-41-7		
Boron, Total Recoverable	0.29	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:29	7440-42-8		
Calcium, Total Recoverable	160	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:29	7440-70-2		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:29	7440-47-3		
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		09/30/16 16:29			
_ithium	0.014	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:29	7439-93-2		
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8				
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:46	7440-36-0		
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:46	7440-38-2		
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	09/27/16 15:20	10/12/16 22:46	7440-43-9		
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:46	7440-48-4		
Molybdenum, Total Recoverable	0.0041	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:46	7439-98-7		
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:46	7782-49-2		
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:46	7440-28-0		
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1				
Mercury	<0.00020	mg/L	0.00020	1	09/26/16 13:00	09/27/16 09:45	7439-97-6		
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	OC						
Total Dissolved Solids	927	mg/L	5.0	1		09/28/16 11:04			
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	O-H+B						
pH at 25 Degrees C	7.3	Std. Units	0.10	1		10/11/16 10:50		H6	
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0						
Chloride	74.5	mg/L	5.0	5		10/15/16 23:48	16887-00-6		
Fluoride	0.32	mg/L	0.20	1		10/14/16 16:44	16984-48-8		
Sulfate	371	mg/L	50.0	50		10/16/16 00:02	14808-79-8		



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

Sample: FAA 5-092316	Lab ID: 602	28510004	Collected: 09/23/1	6 11:53	Received: 09	/24/16 09:20 <b>N</b>	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	<0.010	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:33	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	09/30/16 16:33	7440-41-7	
Boron, Total Recoverable	1.7	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:33	7440-42-8	
Calcium, Total Recoverable	493	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:33	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:33	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:33	7439-92-1	
Lithium	0.16	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:33	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:51	7440-36-0	
Arsenic, Total Recoverable	0.0035	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:51	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	09/27/16 15:20	10/12/16 22:51	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:51	7440-48-4	
Molybdenum, Total Recoverable	0.047	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:51	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:51	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:51	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	09/26/16 13:00	09/27/16 09:47	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC					
Total Dissolved Solids	3210	mg/L	5.0	1		09/28/16 11:04		
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	)-H+B					
oH at 25 Degrees C	7.0	Std. Units	0.10	1		10/11/16 10:50		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	91.8	mg/L	10.0	10		10/16/16 00:16	16887-00-6	
Fluoride	1.0	mg/L	0.20	1		10/14/16 16:58	16984-48-8	
Sulfate	2010	mg/L	200	200		10/16/16 00:31	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

Sample: FAA 4-092316	Lab ID: 602	28510005	Collected: 09/23/1	6 13:01	Received: 09	)/24/16 09:20 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.050	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:35	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	09/30/16 16:35	7440-41-7	
Boron, Total Recoverable	0.35	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:35	7440-42-8	
Calcium, Total Recoverable	210	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:35	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:35	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:35	7439-92-1	
Lithium	0.016	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:35	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:59	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:59	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	09/27/16 15:20	10/12/16 22:59	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:59	7440-48-4	
Molybdenum, Total Recoverable	0.0026	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:59	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:59	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 22:59	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	09/26/16 13:00	09/27/16 09:49	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	OC					
Total Dissolved Solids	1190	mg/L	5.0	1		09/28/16 11:04		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B					
pH at 25 Degrees C	7.3	Std. Units	0.10	1		10/11/16 10:50		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	89.4	mg/L	10.0	10		10/16/16 00:45	16887-00-6	
Fluoride	0.32	mg/L	0.20	1		10/14/16 17:13	16984-48-8	
Sulfate	552	mg/L	50.0	50		10/16/16 00:59	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

Sample: DUP-092316	Lab ID: 602	228510006	Collected: 09/23/1	6 17:00	Received: 09	/24/16 09:20 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.072	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:42	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	09/30/16 16:42	2 7440-41-7	
Boron, Total Recoverable	0.25	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:42	2 7440-42-8	
Calcium, Total Recoverable	112	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:42	2 7440-70-2	
Chromium, Total Recoverable	< 0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:42	2 7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:42	7439-92-1	
Lithium	<0.010	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:42	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:03	3 7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:03	3 7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	09/27/16 15:20	10/12/16 23:03	3 7440-43-9	
Cobalt, Total Recoverable	0.0011	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:03	3 7440-48-4	
Molybdenum, Total Recoverable	0.0047	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:03	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:03	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:03	3 7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	09/26/16 13:00	09/27/16 09:51	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	0C					
Total Dissolved Solids	560	mg/L	5.0	1		09/28/16 11:05	;	
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B					
pH at 25 Degrees C	7.4	Std. Units	0.10	1		10/11/16 10:50	)	H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	31.9	mg/L	2.0	2		10/16/16 01:13	3 16887-00-6	
Fluoride	0.38	mg/L	0.20	1		10/14/16 17:27		
Sulfate	179	mg/L	20.0	20		10/16/16 01:27		



#### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

QC Batch: 447972 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

METHOD BLANK: 1832810 Matrix: Water

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 09/27/16 08:48

LABORATORY CONTROL SAMPLE: 1832811

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0056 112 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1832812 1832813

MS MSD 60228265001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0058 70-130 20 Mercury mg/L < 0.00020 .005 .005 0.0056 111 116

MATRIX SPIKE SAMPLE: 1832814

60228265002 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers < 0.00020 70-130 M1 Mercury mg/L .005 0.0033 67

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

QC Batch: 448189 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

METHOD BLANK: 1833591 Matrix: Water

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	09/30/16 15:57	
Beryllium	mg/L	< 0.0010	0.0010	09/30/16 15:57	
Boron	mg/L	<0.10	0.10	09/30/16 15:57	
Calcium	mg/L	< 0.10	0.10	09/30/16 15:57	
Chromium	mg/L	< 0.0050	0.0050	09/30/16 15:57	
Lead	mg/L	< 0.0050	0.0050	09/30/16 15:57	
Lithium	mg/L	< 0.010	0.010	09/30/16 15:57	

LABORATORY CONTROL SAMPLE:	1833592	Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	102	85-115	
Beryllium	mg/L	1	1.0	101	85-115	
Boron	mg/L	1	0.98	98	85-115	
Calcium	mg/L	10	9.6	96	85-115	
Chromium	mg/L	1	0.99	99	85-115	
ead	mg/L	1	1.0	103	85-115	
ithium	mg/L	1	1.0	103	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	ATE: 183359	93		1833594							
Parameter	6 Units	0228378001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.022	1	1	1.1	1.1	106	106	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	1.0	1.0	100	101	70-130	1	20	
Boron	mg/L	4.0	1	1	5.2	5.2	116	117	70-130	0	20	
Calcium	mg/L	478	10	10	509	506	312	279	70-130	1	20	M1
Chromium	mg/L	< 0.0050	1	1	0.98	1.0	98	100	70-130	1	20	
Lead	mg/L	< 0.0050	1	1	0.98	0.99	98	99	70-130	1	20	
Lithium	mg/L	0.10	1	1	1.2	1.2	114	115	70-130	0	20	

MATRIX SPIKE SAMPLE:	1833595						
		60228510003	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.057	1	1.1	102	70-130	
Beryllium	mg/L	< 0.0010	1	1.0	100	70-130	
Boron	mg/L	0.29	1	1.3	101	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

MATRIX SPIKE SAMPLE:	1833595						
Parameter	Units	60228510003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	160	10	170	92	70-130	
Chromium	mg/L	< 0.0050	1	0.98	98	70-130	
Lead	mg/L	< 0.0050	1	1.0	100	70-130	
Lithium	mg/L	0.014	1	1.1	106	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

QC Batch: 448190 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

METHOD BLANK: 1833596 Matrix: Water

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	10/12/16 21:41	
Arsenic	mg/L	< 0.0010	0.0010	10/12/16 21:41	
Cadmium	mg/L	< 0.00050	0.00050	10/12/16 21:41	
Cobalt	mg/L	< 0.0010	0.0010	10/12/16 21:41	
Molybdenum	mg/L	< 0.0010	0.0010	10/12/16 21:41	
Selenium	mg/L	< 0.0010	0.0010	10/12/16 21:41	
Thallium	mg/L	< 0.0010	0.0010	10/12/16 21:41	

LABORATORY CONTROL SAMPLE:	1833597					
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	.04	0.040	100	85-115	
Arsenic	mg/L	.04	0.041	101	85-115	
Cadmium	mg/L	.04	0.039	98	85-115	
Cobalt	mg/L	.04	0.041	101	85-115	
Molybdenum	mg/L	.04	0.042	104	85-115	
Selenium	mg/L	.04	0.039	97	85-115	
Thallium	mg/L	.04	0.038	95	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 183359	98		1833599							
Parameter	6 Units	0228378002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	<0.0010	.04	.04	0.040	0.039	99	96	70-130	3	20	
Arsenic	mg/L	0.0080	.04	.04	0.049	0.049	102	102	70-130	0	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.035	0.034	88	86	70-130	2	20	
Cobalt	mg/L	0.033	.04	.04	0.068	0.068	89	88	70-130	1	20	
Molybdenum	mg/L	0.12	.04	.04	0.17	0.16	110	106	70-130	1	20	
Selenium	mg/L	< 0.0010	.04	.04	0.043	0.042	107	104	70-130	3	20	
Thallium	mg/L	< 0.0010	.04	.04	0.035	0.034	87	86	70-130	1	20	

MATRIX SPIKE SAMPLE:	1833600						
		60228510004	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	.04	0.039	98	70-130	
Arsenic	mg/L	0.0035	.04	0.045	104	70-130	
Cadmium	mg/L	< 0.00050	.04	0.036	89	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

MATRIX SPIKE SAMPLE:	1833600						
Parameter	Units	60228510004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
							Qualificis
Cobalt	mg/L	< 0.0010	.04	0.038	94	70-130	
Molybdenum	mg/L	0.047	.04	0.090	108	70-130	
Selenium	mg/L	< 0.0010	.04	0.044	110	70-130	
Thallium	mg/L	< 0.0010	.04	0.035	87	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

QC Batch: 448309 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

METHOD BLANK: 1833986 Matrix: Water

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

Blank Reporting

ParameterUnitsResultLimitAnalyzedQualifiersTotal Dissolved Solidsmg/L<5.0</td>5.009/28/16 11:00

LABORATORY CONTROL SAMPLE: 1833987

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 995 99 80-120

SAMPLE DUPLICATE: 1833988

60228510001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 573 **Total Dissolved Solids** 570 1 10 mg/L

SAMPLE DUPLICATE: 1833989

Date: 10/18/2016 02:09 PM

60228563004 Dup Max RPD RPD Parameter Units Result Result Qualifiers 3300 **Total Dissolved Solids** mg/L 3480 5 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

QC Batch: 449966 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

SAMPLE DUPLICATE: 1841236

Date: 10/18/2016 02:09 PM

60229217001 Dup Max Parameter Units Result Result **RPD** RPD Qualifiers pH at 25 Degrees C 8.0 5 H6 Std. Units 8.1 0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

QC Batch: 450605 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

METHOD BLANK: 1843933 Matrix: Water

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 10/14/16 15:19

LABORATORY CONTROL SAMPLE: 1843934

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.6 102 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1843935 1843936

MS MSD 60228510001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 3.2 Fluoride mg/L 0.38 2.5 2.5 3.3 115 116 80-120 15

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Chloride

Date: 10/18/2016 02:09 PM

Sulfate

QC Batch: 450676 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

METHOD BLANK: 1844258 Matrix: Water

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

Blank Reporting Limit Parameter Units Result Analyzed Qualifiers <1.0 10/15/16 12:57 mg/L 1.0 mg/L <1.0 1.0 10/15/16 12:57

 LABORATORY CONTROL SAMPLE:
 1844259
 Spike
 LCS
 LCS
 % Rec

 Parameter
 Units
 Conc.
 Result
 % Rec
 Limits
 Qualifiers

 Chloride
 mg/L
 5
 4.7
 94
 90-110

 Chloride
 mg/L
 5
 4.7
 94
 90-110

 Sulfate
 mg/L
 5
 5.1
 103
 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1844261 1844260 MS MSD 60228378001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Chloride mg/L 233 100 100 351 345 118 112 80-120 2 15 Sulfate mg/L 1840 1000 1000 2960 2920 112 108 80-120 15

MATRIX SPIKE SAMPLE: 1844262 MS MS 60229306001 % Rec Spike Parameter Units Result Conc. Result % Rec Limits Qualifiers Chloride 189 100 301 113 80-120 mg/L 820 1370 80-120 Sulfate mg/L 500 111

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Sample: FGD2-092316 Lab ID: 60228510001 Collected: 09/23/16 07:50 Received: 09/24/16 09:20 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.118 ± 0.327 (0.635) C:NA T:85%	pCi/L	10/12/16 22:20	13982-63-3	
Radium-228	EPA 904.0	0.250 ± 0.441 (0.963) C:68% T:81%	pCi/L	10/12/16 15:36	15262-20-1	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Sample: FGD3-092316 Lab ID: 60228510002 Collected: 09/23/16 08:56 Received: 09/24/16 09:20 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.740 ± 0.665 (1.01) C:NA T:83%	pCi/L	10/12/16 22:46	13982-63-3	
Radium-228	EPA 904.0	-0.0553 ± 0.385 (0.911) C:64% T:81%	pCi/L	10/12/16 15:36	15262-20-1	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Sample: FGD4-092316 Lab ID: 60228510003 Collected: 09/23/16 10:16 Received: 09/24/16 09:20 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.180 ± 0.392 (0.903) C:NA T:84%	pCi/L	10/12/16 22:46	13982-63-3	
Radium-228	EPA 904.0	0.731 ± 0.509 (0.981) C:59% T:80%	pCi/L	10/12/16 15:36	15262-20-1	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Sample: FAA 5-092316 Lab ID: 60228510004 Collected: 09/23/16 11:53 Received: 09/24/16 09:20 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.900 ± 0.504 (0.523) C:NA T:89%	pCi/L	10/12/16 22:45	13982-63-3	
Radium-228	EPA 904.0	0.535 ± 0.425 (0.833) C:60% T:82%	pCi/L	10/12/16 15:56	15262-20-1	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Sample: FAA 4-092316 Lab ID: 60228510005 Collected: 09/23/16 13:01 Received: 09/24/16 09:20 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0683 ± 0.354 (0.735) C:NA T:82%	pCi/L	10/12/16 23:01	13982-63-3	
Radium-228	EPA 904.0	0.384 ± 0.333 (0.658) C:65% T:84%	pCi/L	10/12/16 15:38	15262-20-1	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Sample: DUP-092316 Lab ID: 60228510006 Collected: 09/23/16 17:00 Received: 09/24/16 09:20 Matrix: Water

PWS: Site ID: Sample Type:

FWS.	Site ID.	Sample Type.				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0601 ± 0.274 (0.443) C:NA T:86%	pCi/L	10/12/16 22:47	13982-63-3	
Radium-228	EPA 904.0	-0.309 ± 0.414 (1.05) C:60% T:72%	pCi/L	10/12/16 15:56	15262-20-1	



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

QC Batch: 234970 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

METHOD BLANK: 1153085 Matrix: Water

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

Parameter Act ± Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-226 0.0625 ± 0.285 (0.580) C:NA T:89% pCi/L 10/12/16 21:46

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

QC Batch: 234962 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

METHOD BLANK: 1153048 Matrix: Water

Associated Lab Samples: 60228510001, 60228510002, 60228510003, 60228510004, 60228510005, 60228510006

Parameter Act ± Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-228 0.716  $\pm$  0.442 (0.813) C:58% T:86% pCi/L 10/12/16 15:36

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

# **ANALYTE QUALIFIERS**

Date: 10/18/2016 02:09 PM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

0228510002         FGD3-092316         EPA 200.7         448189         EPA 200.7         44826           0228510004         FGD4-092316         EPA 200.7         448189         EPA 200.7         448246           0228510005         FAA 4-092316         EPA 200.7         448189         EPA 200.7         448246           0228510005         FAA 4-092316         EPA 200.7         448189         EPA 200.7         448246           0228510001         FDD2-092316         EPA 200.8         448190         EPA 200.8         448226           0228510002         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510003         FGD4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510004         FAA 5-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FAB 2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD-092316         EPA 24	Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytica Batch
0228510002         FGD3-092316         EPA 200.7         448189         EPA 200.7         44826           0228510003         FGD4-092316         EPA 200.7         448189         EPA 200.7         448246           0228510005         FAA 4-992316         EPA 200.7         448189         EPA 200.7         448246           0228510005         FAA 4-992316         EPA 200.7         448189         EPA 200.7         448246           0228510001         FDD2-092316         EPA 200.8         448190         EPA 200.8         448246           0228510002         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510002         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510004         FAA 5-992316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-992316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA 2	60228510001	FGD2-092316	EPA 200.7	448189	EPA 200.7	448246
0228510003         FGD4-092316         EPA 200.7         448189         EPA 200.7         448189           0228510005         FAA 4-092316         EPA 200.7         448189         EPA 200.7         448246           0228510005         FAA 4-092316         EPA 200.7         448189         EPA 200.7         448246           0228510001         FGD2-092316         EPA 200.7         448189         EPA 200.7         448246           0228510001         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510002         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510003         FGD4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-992316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-992316         EPA 200.8         448190         EPA 200.8         448248           0228510007         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA	0228510002	FGD3-092316	EPA 200.7	448189	EPA 200.7	448246
0228510004         FAA 5-092316         EPA 200.7         448189         EPA 200.7         448246           0228510006         DUP-092316         EPA 200.7         448189         EPA 200.7         448246           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510002         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510003         FGD4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FGD4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510006         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510007         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 245.1         447972         EPA 245.1         448022           0228510002         FGD3-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 2	0228510003	FGD4-092316	EPA 200.7		EPA 200.7	
0228510005         FAA 4-092316         EPA 200.7         448189         EPA 200.7         448189           0228510006         DUP-092316         EPA 200.7         448189         EPA 200.7         448246           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510002         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510004         FAA 5-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FQD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 205.1         447972         EPA 205.1         448022           0228510002         FGD3-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510006         DUP-092316         EPA 2						
0228510006         DUP-092316         EPA 200.7         448189         EPA 200.8         448246           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510003         FGD4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510004         FAA 5-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510006         DUP-092316         EPA 200.8         448190         EPA 200.8         448248           0228510007         FGD2-092316         EPA 205.1         447972         EPA 205.1         448022           0228510002         FGD3-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 2						
0228510002         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510004         FAA 5-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510002         FGD3-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970         2245.1         448022           0228510002         FGD3-092316         EPA 9	0228510006					
0228510002         FGD3-092316         EPA 200.8         448190         EPA 200.8         448248           0228510004         FAA 5-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510002         FGD3-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970         2245.1         448022           0228510002         FGD3-092316         EPA 9	0228510001	FGD2-092316	EPA 200.8	448190	EPA 200.8	448248
0228510003         FGD4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 5-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA	0228510002	FGD3-092316				448248
0228510004         FAA 5-092316         EPA 200.8         448190         EPA 200.8         448248           0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510006         DUP-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 245.1         447972         EPA 245.1         448022           0228510002         FGD3-092316         EPA 245.1         447972         EPA 245.1         448022           0228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970         234970         234970           0228510002         FGD3-092316         EPA 903.1         234970         234970         234962           0228510001         FGD2-092316         EPA 904.0						
0228510005         FAA 4-092316         EPA 200.8         448190         EPA 200.8         448248           0228510006         DUP-092316         EPA 200.8         448190         EPA 200.8         448248           0228510001         FGD2-092316         EPA 2045.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         DUP-092316         EPA 245.1         447972         EPA 245.1         448022           0228510006         DUP-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970         234970           0228510002         FGD3-092316         EPA 903.1         234970           0228510005         FAA 4-092316         EPA 903.1         234970           0228510006         DUP-092316         EPA 904.0         234962           0228510007         FGD3-092316         EPA 904.0						
D228510006         DUP-092316         EPA 200.8         448190         EPA 200.8         448248           D228510001         FGD2-092316         EPA 245.1         447972         EPA 245.1         448022           D228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           D228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           D228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           D228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           D228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           D228510001         FGD2-092316         EPA 903.1         234970         234970         234970           D228510002         FGD3-092316         EPA 903.1         234970         234970         234970           D228510004         FAA 5-092316         EPA 903.1         234970         234962         234970           D228510005         FAA 4-092316         EPA 904.0         234962         234962         234962         234962         234962         234962         234962						
0228510002         FGD3-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510006         DUP-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970         234970         234970           0228510002         FGD3-092316         EPA 903.1         234970         234970         234970           0228510004         FAA 5-092316         EPA 903.1         234970         234970         234970           0228510005         FAA 4-092316         EPA 903.1         234970         234970         234962         2228510005         FAA 4-092316         EPA 903.1         234970         234962         2228510005         FAA 4-092316         EPA 904.0         234962         2228510005         FAA 4-092316         EPA 904.0         234962         2228510005         FAA 5-092316         EPA 904.0         234962         2228510005         FAA 4-092316         EPA 904.0         234962         2228510005         EAA 4-092316         E						
0228510002         FGD3-092316         EPA 245.1         447972         EPA 245.1         448022           0228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         DUP-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970         234970         0228510002         FGD3-092316         EPA 903.1         234970         0228510004         FAA 5-092316         EPA 903.1         234970         0228510005         FAA 4-092316         EPA 903.1         234970         0228510005         FAA 4-092316         EPA 903.1         234970         0228510005         FAA 5-092316         EPA 904.0         234962         0228510001         FGD2-092316         EPA 904.0         234962         0228510001         FGD4-092316         EPA 904.0         234962         0228510005         FAA 4-092316         EPA 904.0         234962         0228510005         FAA 4-092316         EPA 904.0         234962         0228510005						
0228510003         FGD4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510006         DUP-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970         234970         234970           0228510002         FGD3-092316         EPA 903.1         234970         234970         234970           0228510004         FAA 5-092316         EPA 903.1         234970         234970         234970           0228510005         FAA 4-092316         EPA 903.1         234970         234970         234970           0228510006         DUP-092316         EPA 904.0         234962         222851000         234962         222851000         234962         222851000         234962         222851000         234962         222851000         234962         222851000         234962         222851000         222851000         EPA 904.0         234962         222851000         222851000         234962         222851000 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
0228510004         FAA 5-092316         EPA 245.1         447972         EPA 245.1         448022           0228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970         234970         234970           0228510002         FGD3-092316         EPA 903.1         234970         234970         234970           0228510004         FAA 5-092316         EPA 903.1         234970         234970         234970           0228510005         FAA 4-092316         EPA 903.1         234970         234970         234970           0228510006         DUP-092316         EPA 903.1         234970         234970         234970           0228510001         FGD2-092316         EPA 903.1         234970         234970         234970           0228510002         FGD3-092316         EPA 904.0         234962         234970         234962           0228510002         FGD3-092316         EPA 904.0         234962         2228510002         234962         2228510005         FAA 4-092316         EPA 904.0         234962         2228510005         FAA 4-092316         EPA 904.0         234962         2228510005         234962         222851000						
D228510005         FAA 4-092316         EPA 245.1         447972         EPA 245.1         448022           D228510006         DUP-092316         EPA 245.1         447972         EPA 245.1         448022           D228510001         FGD2-092316         EPA 903.1         234970         234970         234970           D228510003         FGD4-092316         EPA 903.1         234970         234970         234970           D228510004         FAA 5-092316         EPA 903.1         234970         234970         234970           D228510005         FAA 4-092316         EPA 903.1         234970         234970         234970           D228510006         DUP-092316         EPA 903.1         234970         234970         234970           D228510001         FGD2-092316         EPA 904.0         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962         234962						
0228510006         DUP-092316         EPA 245.1         447972         EPA 245.1         448022           0228510001         FGD2-092316         EPA 903.1         234970           0228510002         FGD3-092316         EPA 903.1         234970           0228510003         FGD4-092316         EPA 903.1         234970           0228510005         FAA 4-092316         EPA 903.1         234970           0228510006         DUP-092316         EPA 903.1         234970           0228510001         FGD2-092316         EPA 904.0         234962           0228510002         FGD3-092316         EPA 904.0         234962           0228510003         FGD4-092316         EPA 904.0         234962           0228510004         FAA 5-092316         EPA 904.0         234962           0228510005         FAA 4-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510003         FGD4-092316         SM 2540C						
0228510001         FGD2-092316         EPA 903.1         234970           0228510002         FGD3-092316         EPA 903.1         234970           0228510003         FGD4-092316         EPA 903.1         234970           0228510004         FAA 5-092316         EPA 903.1         234970           0228510005         FAA 4-092316         EPA 903.1         234970           0228510006         DUP-092316         EPA 903.1         234970           0228510001         FGD2-092316         EPA 904.0         234962           0228510002         FGD3-092316         EPA 904.0         234962           0228510003         FGD4-092316         EPA 904.0         234962           0228510004         FAA 5-092316         EPA 904.0         234962           0228510005         FAA 4-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         EPA 904.0         234962           0228510005         FAA 4-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510003         FGD4-092316         SM 2540C         448309						
0228510002         FGD3-092316         EPA 903.1         234970           0228510003         FGD4-092316         EPA 903.1         234970           0228510005         FAA 4-092316         EPA 903.1         234970           0228510006         DUP-092316         EPA 903.1         234970           0228510001         FGD2-092316         EPA 904.0         234962           0228510002         FGD3-092316         EPA 904.0         234962           0228510003         FGD4-092316         EPA 904.0         234962           0228510004         FAA 5-092316         EPA 904.0         234962           0228510005         FAA 4-092316         EPA 904.0         234962           0228510005         FAA 4-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510002         FGD3-092316         SM 2540C         448309           0228510004         FAA 5-092316         SM 2540C         448309           0228510005         FAA 4-092316         SM 2540C         448309	0228510006	DUP-092316	EPA 245.1	447972	EPA 245.1	448022
D228510003         FGD4-092316         EPA 903.1         234970           D228510004         FAA 5-092316         EPA 903.1         234970           D228510005         FAA 4-092316         EPA 903.1         234970           D228510006         DUP-092316         EPA 903.1         234970           D228510001         FGD2-092316         EPA 904.0         234962           D228510002         FGD3-092316         EPA 904.0         234962           D228510003         FGD4-092316         EPA 904.0         234962           D228510004         FAA 5-092316         EPA 904.0         234962           D228510005         FAA 4-092316         EPA 904.0         234962           D228510006         DUP-092316         EPA 904.0         234962           D228510001         FGD2-092316         SM 2540C         448309           D228510002         FGD3-092316         SM 2540C         448309           D228510004         FAA 5-092316         SM 2540C         448309           D228510005         FAA 4-092316         SM 2540C         448309           D228510006         DUP-092316         SM 2540C         448309           D228510006         DUP-092316         SM 4500-H+B         449966	0228510001	FGD2-092316	EPA 903.1	234970		
D228510004       FAA 5-092316       EPA 903.1       234970         D228510005       FAA 4-092316       EPA 903.1       234970         D228510006       DUP-092316       EPA 903.1       234970         D228510001       FGD2-092316       EPA 904.0       234962         D228510002       FGD3-092316       EPA 904.0       234962         D228510003       FGD4-092316       EPA 904.0       234962         D228510004       FAA 5-092316       EPA 904.0       234962         D228510005       FAA 4-092316       EPA 904.0       234962         D228510006       DUP-092316       EPA 904.0       234962         D228510001       FGD2-092316       SM 2540C       448309         D228510002       FGD3-092316       SM 2540C       448309         D228510003       FGA 4-092316       SM 2540C       448309         D228510004       FAA 5-092316       SM 2540C       448309         D228510005       FAA 4-092316       SM 2540C       448309         D228510006       DUP-092316       SM 2540C       448309         D228510001       FGD2-092316       SM 4500-H+B       449966         D228510002       FGD3-092316       SM 4500-H+B       449966	0228510002	FGD3-092316	EPA 903.1	234970		
D228510005         FAA 4-092316         EPA 903.1         234970           D228510006         DUP-092316         EPA 903.1         234970           D228510001         FGD2-092316         EPA 904.0         234962           D228510002         FGD3-092316         EPA 904.0         234962           D228510003         FGD4-092316         EPA 904.0         234962           D228510005         FAA 4-092316         EPA 904.0         234962           D228510006         DUP-092316         EPA 904.0         234962           D228510001         FGD2-092316         SM 2540C         448309           D228510002         FGD3-092316         SM 2540C         448309           D228510003         FGD4-092316         SM 2540C         448309           D228510004         FAA 5-092316         SM 2540C         448309           D228510005         FAA 4-092316         SM 2540C         448309           D228510006         DUP-092316         SM 2540C         448309           D228510006         DUP-092316         SM 2540C         448309           D228510006         DUP-092316         SM 4500-H+B         449966           D228510001         FGD2-092316         SM 4500-H+B         449966	228510003	FGD4-092316	EPA 903.1	234970		
D228510006         DUP-092316         EPA 903.1         234970           D228510001         FGD2-092316         EPA 904.0         234962           D228510002         FGD3-092316         EPA 904.0         234962           D228510003         FGD4-092316         EPA 904.0         234962           D228510005         FAA 4-092316         EPA 904.0         234962           D228510006         DUP-092316         EPA 904.0         234962           D228510001         FGD2-092316         EPA 904.0         234962           D228510001         FGD2-092316         SM 2540C         448309           D228510002         FGD3-092316         SM 2540C         448309           D228510004         FAA 5-092316         SM 2540C         448309           D228510005         FAA 4-092316         SM 2540C         448309           D228510006         DUP-092316         SM 2540C         448309           D228510006         DUP-092316         SM 2540C         448309           D228510001         FGD2-092316         SM 2540C         448309           D228510002         FGD3-092316         SM 4500-H+B         449966           D228510003         FGD4-092316         SM 4500-H+B         449966	0228510004	FAA 5-092316	EPA 903.1	234970		
0228510001         FGD2-092316         EPA 904.0         234962           0228510002         FGD3-092316         EPA 904.0         234962           0228510003         FGD4-092316         EPA 904.0         234962           0228510004         FAA 5-092316         EPA 904.0         234962           0228510005         FAA 4-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510002         FGD3-092316         SM 2540C         448309           0228510003         FGD4-092316         SM 2540C         448309           0228510004         FAA 5-092316         SM 2540C         448309           0228510005         FAA 4-092316         SM 2540C         448309           0228510006         DUP-092316         SM 2540C         448309           0228510001         FGD2-092316         SM 2540C         448309           0228510002         FGD3-092316         SM 4500-H+B         449966           0228510003         FGD4-092316         SM 4500-H+B         449966           0228510004         FAA 5-092316         SM 4500-H+B         449966	0228510005	FAA 4-092316	EPA 903.1	234970		
0228510002       FGD3-092316       EPA 904.0       234962         0228510003       FGD4-092316       EPA 904.0       234962         0228510004       FAA 5-092316       EPA 904.0       234962         0228510005       FAA 4-092316       EPA 904.0       234962         0228510006       DUP-092316       EPA 904.0       234962         0228510001       FGD2-092316       SM 2540C       448309         0228510002       FGD3-092316       SM 2540C       448309         0228510003       FGD4-092316       SM 2540C       448309         0228510004       FAA 5-092316       SM 2540C       448309         0228510005       FAA 4-092316       SM 2540C       448309         0228510006       DUP-092316       SM 2540C       448309         0228510001       FGD2-092316       SM 4500-H+B       449966         0228510002       FGD3-092316       SM 4500-H+B       449966         0228510003       FGD4-092316       SM 4500-H+B       449966         0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966	0228510006	DUP-092316	EPA 903.1	234970		
0228510003         FGD4-092316         EPA 904.0         234962           0228510004         FAA 5-092316         EPA 904.0         234962           0228510005         FAA 4-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510002         FGD3-092316         SM 2540C         448309           0228510003         FGD4-092316         SM 2540C         448309           0228510004         FAA 5-092316         SM 2540C         448309           0228510005         FAA 4-092316         SM 2540C         448309           0228510006         DUP-092316         SM 2540C         448309           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510002         FGD3-092316         SM 4500-H+B         449966           0228510003         FGD4-092316         SM 4500-H+B         449966           0228510004         FAA 5-092316         SM 4500-H+B         449966           0228510005         FAA 4-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966	0228510001	FGD2-092316	EPA 904.0	234962		
0228510004         FAA 5-092316         EPA 904.0         234962           0228510005         FAA 4-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510002         FGD3-092316         SM 2540C         448309           0228510003         FGD4-092316         SM 2540C         448309           0228510004         FAA 5-092316         SM 2540C         448309           0228510005         FAA 4-092316         SM 2540C         448309           0228510006         DUP-092316         SM 2540C         448309           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510002         FGD3-092316         SM 4500-H+B         449966           0228510004         FAA 5-092316         SM 4500-H+B         449966           0228510005         FAA 4-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966	0228510002	FGD3-092316	EPA 904.0	234962		
0228510005         FAA 4-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510002         FGD3-092316         SM 2540C         448309           0228510003         FGD4-092316         SM 2540C         448309           0228510005         FAA 4-092316         SM 2540C         448309           0228510006         DUP-092316         SM 2540C         448309           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510002         FGD3-092316         SM 4500-H+B         449966           0228510003         FGD4-092316         SM 4500-H+B         449966           0228510005         FAA 4-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510007         FAA 4-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510001         FGD2-092316         SM 4500-H+B         449966	0228510003	FGD4-092316	EPA 904.0	234962		
0228510005         FAA 4-092316         EPA 904.0         234962           0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510002         FGD3-092316         SM 2540C         448309           0228510003         FGD4-092316         SM 2540C         448309           0228510005         FAA 4-092316         SM 2540C         448309           0228510006         DUP-092316         SM 2540C         448309           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510002         FGD3-092316         SM 4500-H+B         449966           0228510003         FGD4-092316         SM 4500-H+B         449966           0228510004         FAA 5-092316         SM 4500-H+B         449966           0228510005         FAA 4-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510007         FAD 4-092316         SM 4500-H+B         449966           0228510001         FGD2-092316         SM 4500-H+B         449966	0228510004	FAA 5-092316	EPA 904.0	234962		
0228510006         DUP-092316         EPA 904.0         234962           0228510001         FGD2-092316         SM 2540C         448309           0228510002         FGD3-092316         SM 2540C         448309           0228510003         FGD4-092316         SM 2540C         448309           0228510005         FAA 4-092316         SM 2540C         448309           0228510006         DUP-092316         SM 2540C         448309           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510002         FGD3-092316         SM 4500-H+B         449966           0228510003         FGD4-092316         SM 4500-H+B         449966           0228510004         FAA 5-092316         SM 4500-H+B         449966           0228510005         FAA 4-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510005         FAA 4-092316         SM 4500-H+B         449966           0228510001         FGD2-092316         SM 4500-H+B         449966 </td <td></td> <td>FAA 4-092316</td> <td>EPA 904.0</td> <td>234962</td> <td></td> <td></td>		FAA 4-092316	EPA 904.0	234962		
0228510002       FGD3-092316       SM 2540C       448309         0228510003       FGD4-092316       SM 2540C       448309         0228510004       FAA 5-092316       SM 2540C       448309         0228510005       FAA 4-092316       SM 2540C       448309         0228510006       DUP-092316       SM 2540C       448309         0228510001       FGD2-092316       SM 4500-H+B       449966         0228510002       FGD3-092316       SM 4500-H+B       449966         0228510003       FGD4-092316       SM 4500-H+B       449966         0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       SM 4500-H+B       449966	0228510006	DUP-092316	EPA 904.0	234962		
0228510003         FGD4-092316         SM 2540C         448309           0228510004         FAA 5-092316         SM 2540C         448309           0228510005         FAA 4-092316         SM 2540C         448309           0228510006         DUP-092316         SM 2540C         448309           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510002         FGD3-092316         SM 4500-H+B         449966           0228510003         FGD4-092316         SM 4500-H+B         449966           0228510004         FAA 5-092316         SM 4500-H+B         449966           0228510005         FAA 4-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510001         FGD2-092316         EPA 300.0         450605	0228510001	FGD2-092316	SM 2540C	448309		
0228510004       FAA 5-092316       SM 2540C       448309         0228510005       FAA 4-092316       SM 2540C       448309         0228510006       DUP-092316       SM 2540C       448309         0228510001       FGD2-092316       SM 4500-H+B       449966         0228510002       FGD3-092316       SM 4500-H+B       449966         0228510003       FGD4-092316       SM 4500-H+B       449966         0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       EPA 300.0       450605	0228510002	FGD3-092316	SM 2540C	448309		
0228510004       FAA 5-092316       SM 2540C       448309         0228510005       FAA 4-092316       SM 2540C       448309         0228510006       DUP-092316       SM 2540C       448309         0228510001       FGD2-092316       SM 4500-H+B       449966         0228510002       FGD3-092316       SM 4500-H+B       449966         0228510003       FGD4-092316       SM 4500-H+B       449966         0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       EPA 300.0       450605	0228510003	FGD4-092316	SM 2540C	448309		
0228510005       FAA 4-092316       SM 2540C       448309         0228510006       DUP-092316       SM 2540C       448309         0228510001       FGD2-092316       SM 4500-H+B       449966         0228510002       FGD3-092316       SM 4500-H+B       449966         0228510003       FGD4-092316       SM 4500-H+B       449966         0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       EPA 300.0       450605	0228510004	FAA 5-092316				
0228510006         DUP-092316         SM 2540C         448309           0228510001         FGD2-092316         SM 4500-H+B         449966           0228510002         FGD3-092316         SM 4500-H+B         449966           0228510003         FGD4-092316         SM 4500-H+B         449966           0228510004         FAA 5-092316         SM 4500-H+B         449966           0228510005         FAA 4-092316         SM 4500-H+B         449966           0228510006         DUP-092316         SM 4500-H+B         449966           0228510001         FGD2-092316         EPA 300.0         450605						
0228510002       FGD3-092316       SM 4500-H+B       449966         0228510003       FGD4-092316       SM 4500-H+B       449966         0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       EPA 300.0       450605						
0228510002       FGD3-092316       SM 4500-H+B       449966         0228510003       FGD4-092316       SM 4500-H+B       449966         0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       EPA 300.0       450605	0228510001	FGD2-092316	SM 4500-H+B	449966		
0228510003       FGD4-092316       SM 4500-H+B       449966         0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       EPA 300.0       450605						
0228510004       FAA 5-092316       SM 4500-H+B       449966         0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       EPA 300.0       450605						
0228510005       FAA 4-092316       SM 4500-H+B       449966         0228510006       DUP-092316       SM 4500-H+B       449966         0228510001       FGD2-092316       EPA 300.0       450605						
0228510006         DUP-092316         SM 4500-H+B         449966           0228510001         FGD2-092316         EPA 300.0         450605						
<b>0228510001 FGD2-092316</b> EPA 300.0 450605						
<b>0228510001 FGD2-092316</b> EPA 300.0 450676	0228510001	FGD2-092316	EPA 300.0	450605		
	0228510001	FGD2-092316	EPA 300.0	450676		



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228510

Date: 10/18/2016 02:09 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60228510002	FGD3-092316	EPA 300.0	450605		
60228510002	FGD3-092316	EPA 300.0	450676		
60228510003	FGD4-092316	EPA 300.0	450605		
60228510003	FGD4-092316	EPA 300.0	450676		
60228510004	FAA 5-092316	EPA 300.0	450605		
60228510004	FAA 5-092316	EPA 300.0	450676		
60228510005	FAA 4-092316	EPA 300.0	450605		
60228510005	FAA 4-092316	EPA 300.0	450676		
60228510006	DUP-092316	EPA 300.0	450605		
60228510006	DUP-092316	EPA 300.0	450676		



# Sample Condition Upon Receipt



Client Name:			Ame
Client Name: WStar Energy Courier: FedEx UPS VIA Clay			
	PEX 🗆 ECI 🗆	Pace ☐ Xroads ☐ Client	□ Other □
Tracking #: P	ace Shipping Label Used		
Custody Seal on Cooler/Box Present: Yes No 🗆	Seals intact: Yes	Ño□	
Packing Material: Bubble Wrap ☐ Bubble Bags	s □ Foam □	None ☐ Other □	
Thermometer Used: (T-266 / T-239 Type	of Ice Wet Blue Nor	17.47	and labels of a second
Cooler Temperature (°C): As-read <u>0-3/1-1</u> Corr. Fa	ctol CF +1.1) CF -0.1 Correct	1 . 1 . 2 . 2	and initials of person ining contepts:
Temperature should be above freezing to 6°C			pra/24/16
Chain of Custody present:	DYes □No □N/A		6 156
Chain of Custody relinquished:	Yes □No □N/A		
Samples arrived within holding time:	ØYes □No □N/A		
Short Hold Time analyses (<72hr):	✓Yes □No □N/A	214	
Rush Turn Around Time requested:	□Yes 🗖No □N/A	, .	
Sufficient volume:	Yes □No □N/A		
Correct containers used:	√yes □No □N/A		
Pace containers used:	Yes ONO ON/A		
Containers intact:	Yes No N/A		
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No ØN/A		
Filtered volume received for dissolved tests?	□Yes □No IN/A		
Sample labels match COC: Date / time / ID / analyses	ZYes □No □N/A		
Samples contain multiple phases? Matrix:	Yes INO N/A		
Containers requiring pH preservation in compliance?	Yes 🗆 No 🗆 N/A		
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide)			
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)  Cyanide water sample checks:   N/A			
Lead acetate strip turns dark? (Record only)	□Yes □No		
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No		
Trip Blank present:	Yes No ZN/A		
Headspace in VOA vials ( >6mm):	□Yes □No ☑N/A		
Samples from USDA Regulated Area: State:	□Yes □No □N/A		
Additional labels attached to 5035A / TX1005 vials in the fie	Id? □Yes □No ØN/A		
	to Client? Y N	Field Data Required? Y	/ N
	e/Time:	·	
Comments/ Resolution:	<u> </u>		
Almai		al-ulu	
Project Manager Review:	Date	: <u>4/26/16</u>	



# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Section B Required Pro	ject Inform	nation:					Section Invoice	on C e Inforr	nation	:												Pa	age:	l	of		6:
Company: WESTAR ENERGY	Report To: B	randon (	Griffin					Attenti	ion:	Jar	ed M	опів	on											5.60	8.4		4	
Address: 818 Kansas Ave	Copy To: J	ared Mo	rrison, He	eath Horr	пуа		$\neg$	Compa	any Na	me:	WES	STAR	ENE	RGY				RE	GUL	ATOF	RY AC	SENC	Υ			Jey		
Topeka, KS 66612								Addre	ss:		SEE	SEC	TION	A				V	NPI	DES	Γ	GROU	JND V	VATER	۲ ۲	DRINKIN	G WATE	R
Email To: brandon.l.griffin@westarenergy.com	Purchase Ord	er No.:					$\exists$	Pace C										1 -	บร	Т	Г	RCRA				OTHER	-	
Phone: (785) 575-8135 Fax:	Project Name	JEC	CCR Gro	undwate	er	TT		Pace P Manag	roject	He	ather	Wils	on, 91	3-563	3-14	07		Sit	te Lo	cation								
Requested Due Date/TAT: 7 DAY	Project Numb	ег.							rofile #:	96	57, 1								s	TATE:	-	K	S	- 1				
			_	-34	TE.					т	Т			4	Re	eque	sted	Ana	lysis	Filte	red (	Y/N)						
Section D Valid Matrix C	odes	£ 5		5.8	4 Y E									NIA									П					
Required Client Information MATRIX DRINKING WATER WATER	OL WP AR OT TS	MATRIX CODE (see vaild codes to left)  MATRIX CODE (see vaild codes to left)  SAMPLE TYPE (G=GRAB C=COMP)	COMPC	SITE	COMPOS ENDIGER	TIME 0 750	_	# OF CONTAINERS	Unpreserved	Pre ONH 3	HCI	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	lor	lysis Test	200.7 Total Metals*	200.8 Total Metals**	300.0 Cl, Fl, SO4	4500 H+B	2540C TDS	Radium 226 Radium 228				Residual Chlorine (Y/N)	Pace	Project	No./ La	(0) (0)
3 FGD 4-092316	ı	4 G			9/23	1016		4		3																		03
4 FAA 5-092316	ı	46			9/23	1153		4	1	3				1														004
5 FAA 4 - 092316		UT G		70 5	9/23	1301		4	1	3															+	+	¥	005
6	D.							4																				
7						- 5												-					1	Ш				
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9				1.					11	-				1		=	-	+			$\perp$	-	+	Н		_		
10										-				1	$\vdash$	4		+		-	$\perp$		-	$\vdash$	_			
11					6/03	100 00				1		-	1	-	H	$\vdash$	+	+		+	+	-	+	$\vdash$	1	1	1	
12 Dup- 092316		16			9/33		_	4	1-1	3		1 0	CEPTI	D DV			101	_		DATE		TIME	+	Щ	SAME	LE COND	TIONS	
ADDITIONAL COMMENTS	ma	RELINQUI	ISHED BY /	AFFILIAT	ION	DAT	_		TIME	-	11	ZA	CEPTI	DBI	7 AFF	TLIAT	ION		13	1					~/	LE OUND	1	
*200.7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Li  **200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl	11/	y,	/Wt	3/41		09/23	16	14	15		y	M	NO		52				9	124	0	920	7-	2	7	X		,
i.					m.										T												'	
P				- 2																8					I			
Page		_		SAMPL	ER NAME	AND SIGN	IATUI	RE				1			11					ijĠ.				ပ္	6 3	ealed /N)		ntact
41					PRINT Nan	ne of SAM	PLER	B	rai	de	h	6	rif	54	7									Temp in	Received on Ice (Y/N)	Jdy Sr	1	Samples Intact (Y/N)
of 43					SIGNATUR	RE of SAM	PLER	1	3/	2	1	-			1 D		Signed D/YY):		1/2	23/	16			Ē	Rec	Custody Sealed Cooler (Y/N)		Sam

# **Chain of Custody**

WO#:30197253





Workorder: 60228510 Workorder Name: JEC CCR GROUNDWATER

Owner Received Date: 9/24/2016 Results Requested By: 10/5/2016

Repo	rt To	Elijas ar Prode	Subcontra	ct To					Requested Analysis						
Pace Analytical Kansas 16 9608 Loiret Blvd. St Lenexa, KS 66219 Gr				Analytical Pittsburgh Roseytown Road 5 2,3, & 4 Isburg, PA 15601 6 (724)850-5600  Preserved Contai					Radium		G				
Item	Sample ID	Sample Type	Collect Date/Tim	Lab ID	Matrix	BP1N			m 226 & 228				h		LAB USE ONLY
1	FGD2-092316	PS	9/23/2016 07:50	60228510001	Water	2			X						001
2	FGD3-092316	PS	9/23/2016 08:56	60228510002	Water	2			X						003
3	FGD4-092316	PS	9/23/2016 10:16	60228510003	Water	2			X						003
4	FAA 5-092316	PS	9/23/2016 11:53	60228510004	Water	2			X						004
5	FAA 4-092316	PS	9/23/2016 13:01	60228510005	Water	2			X						005
6	DUP-092316	PS	9/23/2016 17:00	60228510006	Water	2			X						006
Trans	sfers Released By		D. C. T.										Com	ments	
1 2 3	May Un		Date/Time	Receive		k	S	Date/Tin		095	<i>6</i> 0				
	ler Temperature on R	A 2/A	°C Cus	tody Seal	O <sub>or N</sub>	IV.	-	ceived or		Yor	(N)			nples II	 for N

<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

# Sample Condition Upon Receipt Pittsburgh Pace KS Project # 30197253 Client Name: Courier: Fed Ex UPS USPS Client Commercial Pace Other Tracking #: 7044653 4584 Custody Seal on Cooler/Box Present: X yes Seals intact: Yes no Type of Ice: Wet Blue None Thermometer Used °C Correction Factor: °C Final Temp: Observed Temp Cooler Temperature Temp should be above freezing to 6°C Date and Initials of person examining contents: No N/A Yes Comments: Chain of Custody Present: Chain of Custody Filled Out: 3. Chain of Custody Relinquished: Sampler Name & Signature on COC: 5. Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: Samples Arrived within Hold Time: Short Hold Time Analysis (<72hr remaining): 8. Rush Turn Around Time Requested: 9. Sufficient Volume: 10. Correct Containers Used: -Pace Containers Used: 11. Containers Intact: 12. Filtered volume received for Dissolved tests All containers needing preservation have been checked. All containers needing preservation are found to be in compliance with EPA recommendation. Date/time of Initial when preservation completed exceptions: VOA, coliform, TOC, O&G, Phenolics Lot # of added preservative 14. Headspace in VOA Vials ( >6mm): 15. Trip Blank Present: Trip Blank Custody Seals Present Initial when Rad Aqueous Samples Screened > 0.5 mrem/hr

Comments/ Resolution		
	 	A SAME AND

Date/Time:

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Client Notification/ Resolution:

Person Contacted:

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Contacted By:



October 19, 2016

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

# Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on September 27, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Atartos M. Wilson

Heather Wilson heather.wilson@pacelabs.com

**Project Manager** 

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY







# **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification Idaho Certification Illinois Certification Indiana Certification Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification
Missouri Certification #: 235

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219 WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976 New Jersey/TNI Certification #: PA 051 New Mexico Certification #: PA01457

New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002

Pennsylvania/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60228567001	FAA3-092616	Water	09/26/16 09:16	09/27/16 06:36
60228567002	FAA2-092616	Water	09/26/16 10:37	09/27/16 06:36



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60228567001	FAA3-092616	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60228567002	FAA2-092616	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HAC	1	PASI-K
		EPA 300.0	OL	3	PASI-K



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: October 19, 2016

# **General Information:**

2 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

# Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

# **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 448189

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60228378001,60228510003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1833593)
  - Calcium
- MSD (Lab ID: 1833594)
  - Calcium



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: October 19, 2016

# **General Information:**

2 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

# Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

# **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

# Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: October 19, 2016

# **General Information:**

2 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

# Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

# **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** October 19, 2016

# **General Information:**

2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Method: EPA 904.0

**Description:** 904.0 Radium 228 **Client:** WESTAR ENERGY **Date:** October 19, 2016

# **General Information:**

2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY
Date: October 19, 2016

# **General Information:**

2 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: October 19, 2016

# **General Information:**

2 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

FAA2-092616 (Lab ID: 60228567002)FAA3-092616 (Lab ID: 60228567001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: October 19, 2016

# **General Information:**

2 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

Sample: FAA3-092616	Lab ID: 60228567001		Collected: 09/26/16 09:16		Received: 09/27/16 06:36		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.038	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:45	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	09/30/16 16:45	7440-41-7	
Boron, Total Recoverable	0.85	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:45	7440-42-8	
Calcium, Total Recoverable	218	mg/L	0.10	1	09/27/16 15:20	09/30/16 16:45	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20	09/30/16 16:45	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	09/27/16 15:20			
ithium	0.017	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:45	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:08	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:08	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	09/27/16 15:20	10/12/16 23:08	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:08	7440-48-4	
Molybdenum, Total Recoverable	0.011	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:08	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:08	7782-49-2	
Гhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:08	7440-28-0	
45.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	09/29/16 08:30	09/29/16 13:58	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	1490	mg/L	5.0	1		09/28/16 11:12		
1500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
oH at 25 Degrees C	7.1	Std. Units	0.10	1		10/05/16 08:55		H6
800.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	88.2	mg/L	10.0	10		10/18/16 09:25	16887-00-6	
Fluoride	0.31	mg/L	0.20	1		10/16/16 14:28	16984-48-8	
Sulfate	706	mg/L	50.0	50		10/18/16 09:39	14808-79-8	



## **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

Sample: FAA2-092616	Lab ID: 602	228567002	Collected: 09/26/1	6 10:37	Received: 09	0/27/16 06:36 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.028	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:47	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	09/30/16 16:47	7440-41-7	
Boron, Total Recoverable	3.2	mg/L	0.10	1		09/30/16 16:47		
Calcium, Total Recoverable	312	mg/L	0.10	1		09/30/16 16:47		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1		09/30/16 16:47		
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		09/30/16 16:47		
Lithium	0.018	mg/L	0.010	1	09/27/16 15:20	09/30/16 16:47	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:12	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:12	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	09/27/16 15:20	10/12/16 23:12	7440-43-9	
Cobalt, Total Recoverable	0.0012	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:12	7440-48-4	
Molybdenum, Total Recoverable	0.22	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:12	7439-98-7	
Selenium, Total Recoverable	0.0024	mg/L	0.0010	1		10/12/16 23:12		
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	09/27/16 15:20	10/12/16 23:12	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	09/29/16 08:30	09/29/16 14:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	3120	mg/L	5.0	1		09/28/16 11:13		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.3	Std. Units	0.10	1		10/05/16 08:55		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	73.5	mg/L	10.0	10		10/18/16 09:53	16887-00-6	
Fluoride	0.63	mg/L	0.20	1		10/16/16 14:42	16984-48-8	
Sulfate	2060	mg/L	200	200		10/18/16 10:07	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

QC Batch: 448464 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60228567001, 60228567002

METHOD BLANK: 1834635 Matrix: Water

Associated Lab Samples: 60228567001, 60228567002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 09/29/16 13:03

LABORATORY CONTROL SAMPLE: 1834636

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0053 106 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1834637 1834638

MS MSD 60228432001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual ND 0.0045 70-130 5 20 Mercury mg/L .005 .005 0.0048 95 90

MATRIX SPIKE SAMPLE: 1834639

60228562001 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers ND 70-130 Mercury mg/L .005 0.0047 94

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

QC Batch: 448189 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60228567001, 60228567002

METHOD BLANK: 1833591 Matrix: Water

Associated Lab Samples: 60228567001, 60228567002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	09/30/16 15:57	
Beryllium	mg/L	< 0.0010	0.0010	09/30/16 15:57	
Boron	mg/L	<0.10	0.10	09/30/16 15:57	
Calcium	mg/L	<0.10	0.10	09/30/16 15:57	
Chromium	mg/L	< 0.0050	0.0050	09/30/16 15:57	
Lead	mg/L	< 0.0050	0.0050	09/30/16 15:57	
Lithium	mg/L	< 0.010	0.010	09/30/16 15:57	

LABORATORY CONTROL SAMPLE:	1833592					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	102	85-115	
Beryllium	mg/L	1	1.0	101	85-115	
Boron	mg/L	1	0.98	98	85-115	
Calcium	mg/L	10	9.6	96	85-115	
Chromium	mg/L	1	0.99	99	85-115	
Lead	mg/L	1	1.0	103	85-115	
Lithium	mg/L	1	1.0	103	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 183359	93		1833594							
Parameter	6 Units	0228378001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec	RPD	Max RPD	Qual
Barium	mg/L	0.022	1	1	1.1	1.1	106	106	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	1.0	1.0	100	101	70-130	1	20	
Boron	mg/L	4.0	1	1	5.2	5.2	116	117	70-130	0	20	
Calcium	mg/L	478	10	10	509	506	312	279	70-130	1	20	M1
Chromium	mg/L	< 0.0050	1	1	0.98	1.0	98	100	70-130	1	20	
Lead	mg/L	< 0.0050	1	1	0.98	0.99	98	99	70-130	1	20	
Lithium	mg/L	0.10	1	1	1.2	1.2	114	115	70-130	0	20	

MATRIX SPIKE SAMPLE:	1833595						
		60228510003	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.057	1	1.1	102	70-130	
Beryllium	mg/L	< 0.0010	1	1.0	100	70-130	
Boron	mg/L	0.29	1	1.3	101	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

MATRIX SPIKE SAMPLE:	1833595						
Parameter	Units	60228510003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	160	10	170	92	70-130	
Chromium	mg/L	< 0.0050	1	0.98	98	70-130	
Lead	mg/L	< 0.0050	1	1.0	100	70-130	
Lithium	mg/L	0.014	1	1.1	106	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

QC Batch: 448190 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60228567001, 60228567002

METHOD BLANK: 1833596 Matrix: Water

Associated Lab Samples: 60228567001, 60228567002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	10/12/16 21:41	
Arsenic	mg/L	< 0.0010	0.0010	10/12/16 21:41	
Cadmium	mg/L	< 0.00050	0.00050	10/12/16 21:41	
Cobalt	mg/L	< 0.0010	0.0010	10/12/16 21:41	
Molybdenum	mg/L	< 0.0010	0.0010	10/12/16 21:41	
Selenium	mg/L	< 0.0010	0.0010	10/12/16 21:41	
Thallium	mg/L	< 0.0010	0.0010	10/12/16 21:41	

LABORATORY CONTROL SAMPLE:	1833597					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.040	100	85-115	
Arsenic	mg/L	.04	0.041	101	85-115	
Cadmium	mg/L	.04	0.039	98	85-115	
Cobalt	mg/L	.04	0.041	101	85-115	
Molybdenum	mg/L	.04	0.042	104	85-115	
Selenium	mg/L	.04	0.039	97	85-115	
Thallium	mg/L	.04	0.038	95	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 183359	98		1833599							
			MS	MSD					_			
	6	0228378002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	<0.0010	.04	.04	0.040	0.039	99	96	70-130	3	20	
Arsenic	mg/L	0.0080	.04	.04	0.049	0.049	102	102	70-130	0	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.035	0.034	88	86	70-130	2	20	
Cobalt	mg/L	0.033	.04	.04	0.068	0.068	89	88	70-130	1	20	
Molybdenum	mg/L	0.12	.04	.04	0.17	0.16	110	106	70-130	1	20	
Selenium	mg/L	< 0.0010	.04	.04	0.043	0.042	107	104	70-130	3	20	
Thallium	mg/L	< 0.0010	.04	.04	0.035	0.034	87	86	70-130	1	20	

MATRIX SPIKE SAMPLE:	1833600						
		60228510004	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	.04	0.039	98	70-130	
Arsenic	mg/L	0.0035	.04	0.045	104	70-130	
Cadmium	mg/L	< 0.00050	.04	0.036	89	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

MATRIX SPIKE SAMPLE:	1833600						
Parameter	Units	60228510004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/L	<0.0010	.04	0.038	94	70-130	
Molybdenum	mg/L	0.047	.04	0.090	108	70-130	
Selenium	mg/L	< 0.0010	.04	0.044	110	70-130	
Thallium	mg/L	< 0.0010	.04	0.035	87	70-130	

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Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

QC Batch: 448309 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60228567001, 60228567002

METHOD BLANK: 1833986 Matrix: Water

Associated Lab Samples: 60228567001, 60228567002

Parameter Units Blank Reporting
Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 09/28/16 11:00

LABORATORY CONTROL SAMPLE: 1833987

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 995 99 80-120

SAMPLE DUPLICATE: 1833988

60228510001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 573 10 **Total Dissolved Solids** 570 1 mg/L

SAMPLE DUPLICATE: 1833989

Date: 10/19/2016 09:36 AM

60228563004 Dup Max RPD RPD Parameter Units Result Result Qualifiers 3300 **Total Dissolved Solids** mg/L 3480 5 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

QC Batch: 449176 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60228567001, 60228567002

SAMPLE DUPLICATE: 1837935

Date: 10/19/2016 09:36 AM

 Parameter
 Units
 60228567001 Result
 Dup Result
 Max RPD
 RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.1
 7.1
 1
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

QC Batch: 450690 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60228567001, 60228567002

METHOD BLANK: 1844741 Matrix: Water

Associated Lab Samples: 60228567001, 60228567002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 10/16/16 13:17

LABORATORY CONTROL SAMPLE: 1844742

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.5 100 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1844743 1844744

MS MSD 60229439001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Fluoride ND 270 80-120 2 mg/L 250 250 276 108 110 15

MATRIX SPIKE SAMPLE: 1844745

MS 60229450001 Spike MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers ND 111 80-120 Fluoride mg/L 25 27.8

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

QC Batch: 450954 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60228567001, 60228567002

METHOD BLANK: 1845361 Matrix: Water

Associated Lab Samples: 60228567001, 60228567002

Blank Reporting Limit Parameter Result Qualifiers Units Analyzed Chloride <1.0 1.0 10/18/16 08:57 mg/L Sulfate mg/L <1.0 1.0 10/18/16 08:57

LABORATORY CONTROL SAMPLE: 1845362 Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Chloride 5 4.7 94 90-110 mg/L Sulfate mg/L 5 4.9 99 90-110

MATRIX SPIKE SAMPLE: 1845365 60229450004 Spike MS MS % Rec Parameter Units Result Conc. Result % Rec Limits Qualifiers Chloride mg/L 489 749 104 80-120 250 399 Sulfate mg/L 250 650 100 80-120

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



## **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Sample: FAA3-092616 Lab ID: 60228567001 Collected: 09/26/16 09:16 Received: 09/27/16 06:36 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0647 ± 0.295 (0.601) C:NA T:88%	pCi/L	10/13/16 11:46	13982-63-3	
Radium-228	EPA 904.0	-0.213 ± 0.315 (0.767) C:67% T:81%	pCi/L	10/13/16 14:55	15262-20-1	



## **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Sample: FAA2-092616 Lab ID: 60228567002 Collected: 09/26/16 10:37 Received: 09/27/16 06:36 Matrix: Water

PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0629 ± 0.370 (0.755) C:NA T:89%	pCi/L	10/13/16 11:47	13982-63-3	
Radium-228	EPA 904.0	0.498 ± 0.395 (0.773) C:63% T:77%	pCi/L	10/13/16 14:55	15262-20-1	



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

QC Batch: 234975 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60228567001, 60228567002

METHOD BLANK: 1153094 Matrix: Water

Associated Lab Samples: 60228567001, 60228567002

 Parameter
 Act  $\pm$  Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 -0.361  $\pm$  0.322 (0.801) C:65% T:83%
 pCi/L
 10/13/16 14:53

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

QC Batch: 234973 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60228567001, 60228567002

METHOD BLANK: 1153092 Matrix: Water

Associated Lab Samples: 60228567001, 60228567002

Parameter Act  $\pm$  Unc (MDC) Carr Trac Units Analyzed Qualifiers Radium-226 -0.057  $\pm$  0.258 (0.525) C:NA T:98% pCi/L 10/13/16 11:13

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 10/19/2016 09:36 AM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



## **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60228567

Date: 10/19/2016 09:36 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60228567001 60228567002	FAA3-092616 FAA2-092616	EPA 200.7 EPA 200.7	448189 448189	EPA 200.7 EPA 200.7	448246 448246
60228567001 60228567002	FAA3-092616 FAA2-092616	EPA 200.8 EPA 200.8	448190 448190	EPA 200.8 EPA 200.8	448248 448248
60228567001 60228567002	FAA3-092616 FAA2-092616	EPA 245.1 EPA 245.1	448464 448464	EPA 245.1 EPA 245.1	448501 448501
60228567001 60228567002	FAA3-092616 FAA2-092616	EPA 903.1 EPA 903.1	234973 234973		
60228567001 60228567002	FAA3-092616 FAA2-092616	EPA 904.0 EPA 904.0	234975 234975		
60228567001 60228567002	FAA3-092616 FAA2-092616	SM 2540C SM 2540C	448309 448309		
60228567001 60228567002	FAA3-092616 FAA2-092616	SM 4500-H+B SM 4500-H+B	449176 449176		
60228567001	FAA3-092616	EPA 300.0	450690		
60228567001 60228567002	FAA3-092616 FAA2-092616	EPA 300.0 EPA 300.0	450954 450690		
60228567002	FAA2-092616	EPA 300.0	450954		



## Sample Condition Upon Receipt



Client Name: WS for Energy	
Courier: FedEx   UPS   VIA Clay   PEX   ECI	Pace ☐ Xroads ☐ Client ☐ Other ☐
Tracking #: Pace Shipping Label Used	d? Yes □ No□
Custody Seal on Cooler/Box Present: Yes ✓ No □ Seals intact: Yes	No □
Packing Material: Bubble Wrap □ Bubble Bags □ Foam □	None ☐ Other □
Thermometer Used: T-266 / T-239  Type of Ice: Wet Blue Nor	
Cooler Temperature (°C): As-read / S Corr. Factor CF+1 CF-0.1 Correct	ted 2-9 Date and initials of person examining contents:
Temperature should be above freezing to 6°C	prg/27/16
Chain of Custody present:   ✓ Yes □No □N/A	/
Chain of Custody relinquished: ✓ ✓ Yes □No □N/A	_
Samples arrived within holding time:	
Short Hold Time analyses (<72hr):	PH
Rush Turn Around Time requested:	<u>'</u>
Sufficient volume:	
Correct containers used:   ✓ Yes □No □N/A	
Pace containers used:	
Containers intact:	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	
Filtered volume received for dissolved tests?	
Sample labels match COC: Date / time / ID / analyses	
Samples contain multiple phases? Matrix: WT □Yes ☑No □N/A	
Containers requiring pH preservation in compliance?	
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	
Cyanide water sample checks: N/A	
Lead acetate strip turns dark? (Ŕecord only) □Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	
Trip Blank present:	
Headspace in VOA vials ( >6mm): □Yes □No ☑N/A	
Samples from USDA Regulated Area: State:	
Additional labels attached to 5035A / TX1005 vials in the field?	
Client Notification/ Resolution: Copy COC to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/Time:	
Comments/ Resolution:	
Project Manager Review: Date	e: 9/27/16



## CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:	Section E Required F		mation:						tion C		on:													F	Page:	l	of		X
Company: WESTAR ENERGY	Report To:	Brandor	Griffin					Atten	ition:	J	ared	Morri	son					-30											
Address: 818 Kansas Ave	Сору То:	Jared M	orrison, H	eath Hor	nya			Comp	pany N	lame:	WE	STA	R EN	IER	ΞY				REC	SUL	ATOF	RY A	GENC	Y	1112	. 8 -2			
Topeka, KS 66612								Addre	ess:		SE	E SE	CTIC	N A					Ĭ <u>~</u>	NPE	ES	Г	GRO	UND '	WATE	R F	DRINKING	WATER	
Email To: brandon.l.griffin@westarenergy.com	Purchase (	Order No :						Pace Refere											Г	UST	-		RCRA	Ą		Г	OTHER		
Phone: (785) 575-8135 Fax:	Project Nar	ne: JE	C CCR Gr	oundwate	er				Project	ı <sub> </sub>	leath	er Wi	lson,	913	-563-	140	7		Sit	e Loc	ation	1	- 1/		F				
Requested Due Date/TAT: 7 DAY	Project Nur	nber.								#: 9	657,	1								ST	ATE:		K	S	- 1				
			,	-			T						Т			Red	ques	ted	Anal	ysis	Filte	red	(Y/N)		V///				
Section D Valid Matr Required Client Information MATRIX	CODE	codes to left)		COLL	ECTED	- 1 -	-	i IP		P	reser	vativ	es		N /A		-						-						
SAMPLE ID  (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE  **  **  **  **  **  **  **  **  **	WT	MATRIX CODE (see valid codes SAMPLE TYPE (G=GRAB C=C)	STA	POSITE	COMPCEND/G	OSITE RAB	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HCI HCI	NaOH	Methanol	Other	#Analysis Test#	200.7 Total Metals*	Total	300.0 CI, FI, SO4	4500 H+B	2540C TDS	Radium 228				Residual Chlorine (Y/N)	Pace	<i>U&amp;S</i> Project N	o./ Lab	
FAA3-092616		WTG	37.11	1	9/26		9	4	1	_	3			П	31		1	1				T				BRUI	BPZNO	2BPIN	2001
1 FAA3-092616 2 FAA2-092616		WT G			9/26	1037		4	1																	1	1	+	ws
3						I I																			Ш				
4														Ш					Ш		_				$\sqcup$				
5					13	12, 17		1							10						-				$\perp$				-
6						-					$\perp$	L°							Н	_				_	$\vdash$				
7				1		- 6	ь						-		2	-	-	-	$\vdash$		-	H	$\vdash$	+	+				
8				17.5					-	H	+	1	+	Н		+	+	+	$\vdash$	20	-	+	+	+	+				$\dashv$
9			1					-	+			H	+	Н		+	+	-	$\vdash$	-	+	+	<del>     </del>	+	+				-
10					6		+			H	+	++	+		H	+	+	+	$\vdash$		+	+	+	+	+		7		
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ADDITIONAL COMMENTS		RELINQ	UISHED BY	/ AFFILIAT	ПОИ	DAT	E	13	TIME	19.			ATCE	PTED	BY /	AFFIL	IATIO	ON		D	ATE	1	TIME	1		SAMP	LE CONDIT	ions	25
*200.7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Li	13	N	V/W	eski		09/2	10	11	14	5	9	DI	er	2	Or	152		I		9/	27	(	636	, 1	2-9	7	Y	У	
**200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl								-			1	4		9			H				_		_	+	11/				
				- 9				+	-	-	_						-	÷				+		+	- 1				
Page				SAMDI	ER NAME	AND SIGN	LATI	DE.		_							- 6			-	3,	1					pe (7	act	
31 of				SAMPL	PRINT Na	me of SAM	PLER	В	(an	de	7	60	F	5v	1	DAT	TE Sig	gned	0-	. /	,	/	/		Тетр іл °С	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	amples Inta	(Y/N)
æ				-	SIGNATU	RE of SAM	PLEM	//	V	Y	1					(MI	A/DD/	YY):	64	/2	26,	1	6				5	l o	

Chain	of	Custody
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WO#:30197368





Workorder: 60228567 Workorder Name: JEC CCR GROUNDWATER Owner Received Date: 9/27/2016 Results Requested By: 10/19/2016 Report To Subcontract To Requested Analysis Heather Wilson Pace Analytical Pittsburgh Pace Analytical Kansas 1638 Roseytown Road 9608 Loiret Blvd. Suites 2,3, & 4 Lenexa, KS 66219 Greensburg, PA 15601 Phone (913)599-5665 Phone (724)850-5600 Radium Preserved Containers 226 Collect ВР Qο Sample Date/Tim 228 È Item Sample ID Type Lab ID Matrix LAB USE ONLY FAA3-092616 PS 9/26/2016 09:16 60228567001 2 Water Χ 00 2 FAA2-092616 PS 9/26/2016 10:37 60228567002 Water 2 Χ 3 Comments Transfers Released By Date/Time Received Date/Time 1700 19-28-16 0950 Cooler Temperature on Receipt NA °C

/Yor

N

Custody Seal

Received on Ice Y or

N

Samples Intact Y or

<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

# Sample Condition Upon Receipt Pittsburgh

Pace Analytical	Client Name:				oce K	5	Proj	ject # <b>30</b>	197	7368
Courier: 🕅 Fed Ex 🗆 Tracking #: 70446	] UPS	nt 🗆	no VdVal- no	nercial	□ Pa	ce Other		_		
Custody Seal on Coole	er/Box Present: 🕅 yes		uo Na a	Seal	ls intact:	yes	□ no			
Thermometer Used	NIA		of Ice:			(None)				
Cooler Temperature	Observed Temp		٠c	Cor	rection F	actor:	° C	Final Temp	);	° C
Temp should be above free	ezing to 6°C		•							
				_				Date and Initials contents:	40000	examining
Comments:		Yes	No	N/A					9-28	-16
Chain of Custody Prese	nt:	X			1.					
Chain of Custody Filled	Out:	1.			2.					
Chain of Custody Reling	uished:	X			3.					
Sampler Name & Signat	ure on COC:		_X_		4.					
Sample Labels match Co	OC:			<u> </u>	5.					
-Includes date/time/ID	D/Analysis Matrix:		WT	· <del></del>						
Samples Arrived within F	Hold Time:	X			6.					
Short Hold Time Analys	sis (<72hr remaining):		<u>X</u>		7.					
Rush Turn Around Tim	e Requested:		X		8.		1.0			
Sufficient Volume:		X			9.					
Correct Containers Used	:	$X_{\perp}$			10.					
-Pace Containers Use	ed:	<u> </u>								
Containers Intact:		X			11.					
Filtered volume received				<u>X</u>	12.					
All containers needing preserv	ration have been checked.	Χ			13.					
All containers needing prese compliance with EPA recom		χ								
exceptions: VOA, colifor	m, TOC, O&G, Phenolics				Initial whe completed Lot # of ad	VIV 1	Date/ti preser			
					preservati					
Headspace in VOA Vials	( >6mm):			X	14.					
Trip Blank Present:				X	15.					
Trip Blank Custody Seals				X						
Rad Aqueous Samples	Screened > 0.5 mrem/hr		X		Initial where completed	**Second I	Date:	9-28-16	( )	
Client Notification/ Reso	olution:					, , ,				
			E	Date/T	īme:			Contacted By:		
Comments/ Resolution:								-		

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ATTACHMENT 1-3
November 2016 Sampling Event
Laboratory Analytical Report



December 07, 2016

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

## Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on November 05, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

Markon M. Wilson

heather.wilson@pacelabs.com

**Project Manager** 

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY







#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification Idaho Certification Illinois Certification

Indiana Certification
Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219 WY STR Certification #: 2456.01

Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1

New Hampshire/TNI Certification #: 2976 New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA 051

New York/TNI Certification #: 10888 North Carolina Certification #: 42706

North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002

Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282 South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 460198 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



## **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60231627001	BAA-6-110316	Water	11/03/16 08:38	11/05/16 08:50
60231627002	BAA-2-110316	Water	11/03/16 10:02	11/05/16 08:50
60231627003	BAA-4-110316	Water	11/03/16 11:17	11/05/16 08:50
60231627004	BAA-3-110316	Water	11/03/16 12:32	11/05/16 08:50
60231627005	FGD-1-110316	Water	11/03/16 13:55	11/05/16 08:50
60231627006	FGD-4-110316	Water	11/03/16 14:57	11/05/16 08:50
60231627007	FGD-3-110316	Water	11/03/16 13:55	11/05/16 08:50
60231627008	FGD-2-110316	Water	11/03/16 16:40	11/05/16 08:50
60231627009	FAA-5-110416	Water	11/03/16 08:31	11/05/16 08:50
60231627010	FAA-4-110416	Water	11/03/16 09:28	11/05/16 08:50
60231627011	DUP-110416	Water	11/03/16 06:00	11/05/16 08:50
60231627012	DUP-110316	Water	11/03/16 06:00	11/05/16 08:50
60231627013	FAA-3-110416	Water	11/04/16 10:30	11/05/16 08:50
60231627014	FAA-2-110416	Water	11/04/16 11:30	11/05/16 08:50



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60231627001	BAA-6-110316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627002	BAA-2-110316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627003	BAA-4-110316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627004	BAA-3-110316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627005	FGD-1-110316	EPA 200.7	SMW	7	PASI-K

## **REPORT OF LABORATORY ANALYSIS**

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Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	 JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627006	FGD-4-110316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627007	FGD-3-110316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627008	FGD-2-110316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627009	FAA-5-110416	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627010	FAA-4-110416	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627011	DUP-110416	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627012	DUP-110316	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
0231627013	FAA-3-110416	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K

## **REPORT OF LABORATORY ANALYSIS**

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Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	RAB	3	PASI-K
60231627014	FAA-2-110416	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	ACM	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
	Total Radium Calculation	CMC	1	PASI-PA	
	SM 2540C	JSS	1	PASI-K	
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	RAB	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: December 07, 2016

#### **General Information:**

14 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: December 07, 2016

#### **General Information:**

14 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: December 07, 2016

#### **General Information:**

14 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 455898

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60231627003,60232038001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1866968)
  - Mercury
- MSD (Lab ID: 1866969)
  - Mercury



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** December 07, 2016

#### **General Information:**

14 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method: EPA 904.0

Description:904.0 Radium 228Client:WESTAR ENERGYDate:December 07, 2016

#### **General Information:**

14 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:December 07, 2016

#### **General Information:**

14 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method: SM 2540C

**Description:** 2540C Total Dissolved Solids

Client: WESTAR ENERGY

Date: December 07, 2016

#### **General Information:**

14 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: December 07, 2016

#### **General Information:**

14 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

- BAA-2-110316 (Lab ID: 60231627002)
- BAA-3-110316 (Lab ID: 60231627004)
- BAA-4-110316 (Lab ID: 60231627003)
- BAA-6-110316 (Lab ID: 60231627001)
- DUP-110316 (Lab ID: 60231627012)
- DUP-110416 (Lab ID: 60231627011)
- FAA-2-110416 (Lab ID: 60231627014)
- FAA-3-110416 (Lab ID: 60231627013)
- FAA-4-110416 (Lab ID: 60231627010)
- FAA-5-110416 (Lab ID: 60231627009)
- FGD-1-110316 (Lab ID: 60231627005)
- FGD-2-110316 (Lab ID: 60231627008)
- FGD-3-110316 (Lab ID: 60231627007)
- FGD-4-110316 (Lab ID: 60231627006)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

## Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

#### **Additional Comments:**



### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: December 07, 2016

### **General Information:**

14 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 456713

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60232075004,60232096004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1869910)
  - Sulfate
- MS (Lab ID: 1869912)
  - ChlorideSulfate
- MSD (Lab ID: 1869911)
  - Fluoride
  - Sulfate

QC Batch: 456831

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60232532002,60233017001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1870416)
  - Chloride
- MSD (Lab ID: 1870417)
  - Chloride

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: BAA-6-110316	Lab ID: 602	231627001	Collected: 11/03/1	6 08:38	Received: 11	/05/16 08:50 M	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.021	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:08	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:08	7440-41-7	
Boron, Total Recoverable	3.8	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:08	7440-42-8	
Calcium, Total Recoverable	513	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:08	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:08	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:08	7439-92-1	
Lithium	0.095	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:08	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:26	7440-36-0	
Arsenic, Total Recoverable	0.0012	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:26	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 16:26	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:26	7440-48-4	
Molybdenum, Total Recoverable	0.0059	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:26	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:26	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:26	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:31	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	3220	mg/L	5.0	1		11/09/16 11:27		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
pH at 25 Degrees C	7.1	Std. Units	0.10	1		11/11/16 16:20		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	183	mg/L	20.0	20		11/29/16 15:27	16887-00-6	
Fluoride	0.62	mg/L	0.20	1		11/29/16 15:13		
Sulfate	2070	mg/L	200	200		11/30/16 03:45	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: BAA-2-110316	Lab ID: 602	231627002	Collected: 11/03/1	6 10:02	Received: 11	/05/16 08:50 <b>I</b>	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.055	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:19	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:19	7440-41-7	
Boron, Total Recoverable	1.1	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:19	7440-42-8	
Calcium, Total Recoverable	188	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:19	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:19	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:19	7439-92-1	
Lithium	0.020	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:19	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:39	7440-36-0	
Arsenic, Total Recoverable	0.0062	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:39	7440-38-2	
Cadmium, Total Recoverable	< 0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 16:39	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:39	7440-48-4	
Molybdenum, Total Recoverable	0.044	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:39	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:39	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:39	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:33	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC					
Total Dissolved Solids	1360	mg/L	5.0	1		11/09/16 11:29		
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	0-H+B					
oH at 25 Degrees C	7.5	Std. Units	0.10	1		11/11/16 16:20		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	137	mg/L	10.0	10		11/29/16 16:10	16887-00-6	
Fluoride	0.51	mg/L	0.20	1		11/29/16 15:56	16984-48-8	
Sulfate	983	mg/L	100	100		11/30/16 18:29	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: BAA-4-110316	Lab ID: 602	231627003	Collected: 11/03/1	6 11:17	Received: 11	/05/16 08:50 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.032	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:23	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:23	7440-41-7	
Boron, Total Recoverable	0.92	mg/L	0.10	1		11/09/16 13:23		
Calcium, Total Recoverable	393	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:23	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:23	7440-47-3	
∟ead, Total Recoverable	<0.0050	mg/L	0.0050	1		11/09/16 13:23		
ithium	0.015	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:23	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:48	7440-36-0	
Arsenic, Total Recoverable	0.0082	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:48	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 16:48	7440-43-9	
Cobalt, Total Recoverable	0.026	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:48	7440-48-4	
Molybdenum, Total Recoverable	0.13	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:48	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:48	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:48	7440-28-0	
45.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury (	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:35	7439-97-6	M1
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	3820	mg/L	5.0	1		11/09/16 11:30		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	O-H+B					
H at 25 Degrees C	7.2	Std. Units	0.10	1		11/11/16 16:20		H6
000.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	183	mg/L	20.0	20		11/29/16 18:59	16887-00-6	
Fluoride	0.36	mg/L	0.20	1		11/29/16 18:45	16984-48-8	
Sulfate	2800	mg/L	200	200		11/29/16 19:13	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: BAA-3-110316	Lab ID: 602	231627004	Collected: 11/03/1	6 12:32	Received: 11	/05/16 08:50 M	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.015	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:27	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:27	7440-41-7	
Boron, Total Recoverable	2.3	mg/L	0.10	1	11/08/16 09:00			
Calcium, Total Recoverable	507	mg/L	0.10	1	11/08/16 09:00			
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:27	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00			
_ithium	0.095	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:27	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:52	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:52	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 16:52	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:52	7440-48-4	
Molybdenum, Total Recoverable	0.0023	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:52	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:52	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:52	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:42	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	C					
Total Dissolved Solids	3150	mg/L	5.0	1		11/09/16 11:30		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	-H+B					
oH at 25 Degrees C	7.1	Std. Units	0.10	1		11/11/16 16:20		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	157	mg/L	20.0	20		11/29/16 20:10	16887-00-6	
Fluoride	0.92	mg/L	0.20	1		11/29/16 19:56	16984-48-8	
Sulfate	2290	mg/L	200	200		11/29/16 20:24	1/808-70-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: FGD-1-110316	Lab ID: 602	231627005	Collected: 11/03/1	6 13:55	Received: 11	/05/16 08:50 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.31	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:31	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:31	7440-41-7	
Boron, Total Recoverable	0.10	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:31	7440-42-8	
Calcium, Total Recoverable	94.6	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:31	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:31	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1		11/09/16 13:31		
ithium	0.016	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:31	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:56	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:56	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 16:56	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:56	7440-48-4	
Molybdenum, Total Recoverable	0.0013	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:56	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:56	7782-49-2	
Γhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 16:56	7440-28-0	
45.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:44	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	OC .					
Total Dissolved Solids	495	mg/L	5.0	1		11/09/16 11:31		
1500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		11/11/16 16:20		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	49.2	mg/L	5.0	5		11/29/16 20:53	16887-00-6	
- Fluoride	0.32	mg/L	0.20	1		11/29/16 20:39	16984-48-8	
Sulfate	95.4	mg/L	5.0	5		11/29/16 20:53	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: FGD-4-110316	Lab ID: 602	231627006	Collected: 11/03/1	6 14:57	Received: 11	/05/16 08:50 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.057	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:35	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:35	7440-41-7	
Boron, Total Recoverable	0.28	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:35	7440-42-8	
Calcium, Total Recoverable	164	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:35	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:35	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:35	7439-92-1	
Lithium	0.015	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:35	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:09	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:09	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:09	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:09	7440-48-4	
Molybdenum, Total Recoverable	0.0040	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:09	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:09	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:09	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:46	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	947	mg/L	5.0	1		11/09/16 11:32		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.2	Std. Units	0.10	1		11/12/16 11:00		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	80.9	mg/L	5.0	5		11/29/16 21:21	16887-00-6	
Fluoride	0.32	mg/L	0.20	1		11/29/16 21:07	16984-48-8	
Sulfate	412	mg/L	50.0	50		11/29/16 21:35	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: FGD-3-110316	Lab ID: 602	231627007	Collected: 11/03/1	6 13:55	Received: 11	/05/16 08:50 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.19	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:38	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:38	7440-41-7	
Boron, Total Recoverable	0.13	mg/L	0.10	1	11/08/16 09:00			
Calcium, Total Recoverable	160	mg/L	0.10	1	11/08/16 09:00			
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:38	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00			
Lithium	0.016	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:38	7439-93-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:14	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:14	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:14	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:14	7440-48-4	
Molybdenum, Total Recoverable	0.0062	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:14	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:14	7782-49-2	
Гhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:14	7440-28-0	
245.1 Mercury	Analytical Met	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:53	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	OC					
Total Dissolved Solids	817	mg/L	5.0	1		11/09/16 11:33		
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.3	Std. Units	0.10	1		11/11/16 16:20		H6
800.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	0.0					
Chloride	66.7	mg/L	5.0	5		11/29/16 22:46	16887-00-6	
Fluoride	0.29	mg/L	0.20	1		11/29/16 21:50	16984-48-8	
Sulfate	313	mg/L	20.0	20		11/29/16 22:04	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: FGD-2-110316	Lab ID: 602	31627008	Collected: 11/03/1	6 16:40	Received: 11	/05/16 08:50 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.097	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:42	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:42	7440-41-7	
Boron, Total Recoverable	0.26	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:42	7440-42-8	
Calcium, Total Recoverable	161	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:42	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:42	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:42	7439-92-1	
Lithium	<0.010	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:42	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:18	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:18	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:18	7440-43-9	
Cobalt, Total Recoverable	0.0016	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:18	7440-48-4	
Molybdenum, Total Recoverable	0.0040	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:18	7439-98-7	
Selenium, Total Recoverable	0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:18	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:18	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:55	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	0C					
Total Dissolved Solids	769	mg/L	5.0	1		11/09/16 11:33		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B					
oH at 25 Degrees C	7.3	Std. Units	0.10	1		11/12/16 11:00		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	36.6	mg/L	5.0	5		11/30/16 18:44	16887-00-6	
Fluoride	0.35	mg/L	0.20	1		11/29/16 23:01	16984-48-8	
Sulfate	325	mg/L	20.0	20		11/29/16 23:29	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: FAA-5-110416	Lab ID: 602	231627009	Collected: 11/03/1	6 08:31	Received: 11	/05/16 08:50	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.011	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:46	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:46	7440-41-7	
Boron, Total Recoverable	1.0	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:46	7440-42-8	
Calcium, Total Recoverable	220	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:46	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:46	7440-47-3	
Lead, Total Recoverable	< 0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:46	7439-92-1	
Lithium	0.075	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:46	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:23	3 7440-36-0	
Arsenic, Total Recoverable	0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:23	3 7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:23	3 7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:23	3 7440-48-4	
Molybdenum, Total Recoverable	0.0093	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:23	3 7439-98-7	
Selenium, Total Recoverable	0.0039	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:23	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:23	3 7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 12:58	3 7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	oc .					
Total Dissolved Solids	1470	mg/L	5.0	1		11/09/16 11:34	ŀ	
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	)-H+B					
pH at 25 Degrees C	7.1	Std. Units	0.10	1		11/11/16 16:20	)	H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	99.6	mg/L	10.0	10		11/29/16 23:57	7 16887-00-6	
Fluoride	0.54	mg/L	0.20	1		11/29/16 23:43		
Sulfate	834	mg/L	200	200		11/30/16 00:12		



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: FAA-4-110416	Lab ID: 602	231627010	Collected: 11/03/1	6 09:28	Received: 11	/05/16 08:50 M	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.053	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:50	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:50	7440-41-7	
Boron, Total Recoverable	0.36	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:50	7440-42-8	
Calcium, Total Recoverable	205	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:50	7440-70-2	
Chromium, Total Recoverable	< 0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:50	7440-47-3	
Lead, Total Recoverable	< 0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:50	7439-92-1	
Lithium	0.016	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:50	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:27	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:27	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:27	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:27	7440-48-4	
Molybdenum, Total Recoverable	0.0030	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:27	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:27	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:27	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 13:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	oc					
Total Dissolved Solids	1170	mg/L	5.0	1		11/09/16 11:35		
4500H+ pH, Electrometric	Analytical Met	hod: SM 450	D-H+B					
pH at 25 Degrees C	7.3	Std. Units	0.10	1		11/11/16 16:20		H6
800.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	85.6	mg/L	10.0	10		11/30/16 00:40	16887-00-6	
Fluoride	0.32	mg/L	0.20	1		11/30/16 00:26		
Sulfate	579	mg/L	50.0	50		11/30/16 00:54		



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: DUP-110416	Lab ID: 602	231627011	Collected: 11/03/1	6 06:00	Received: 11	/05/16 08:50 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.052	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:54	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 13:54	7440-41-7	
Boron, Total Recoverable	0.35	mg/L	0.10	1		11/09/16 13:54		
Calcium, Total Recoverable	203	mg/L	0.10	1	11/08/16 09:00	11/09/16 13:54	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 13:54	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1		11/09/16 13:54		
ithium	0.016	mg/L	0.010	1	11/08/16 09:00	11/09/16 13:54	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:31	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:31	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:31	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:31	7440-48-4	
Molybdenum, Total Recoverable	0.0030	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:31	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:31	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:31	7440-28-0	
45.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 13:02	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	OC .					
Total Dissolved Solids	1150	mg/L	5.0	1		11/09/16 11:37		
1500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
oH at 25 Degrees C	7.2	Std. Units	0.10	1		11/09/16 16:12		H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	86.1	mg/L	20.0	20		11/30/16 01:51	16887-00-6	
Fluoride	0.32	mg/L	0.20	1		11/30/16 01:37	16984-48-8	
Sulfate	562	mg/L	50.0	50		11/30/16 18:58	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: DUP-110316	Lab ID: 602	231627012	Collected: 11/03/1	6 06:00	Received: 11	/05/16 08:50 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: EF	PA 200.7			
Barium, Total Recoverable	0.053	mg/L	0.0050	1	11/08/16 09:00	11/09/16 14:14	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 14:14	7440-41-7	
Boron, Total Recoverable	1.2	mg/L	0.10	1	11/08/16 09:00	11/09/16 14:14	7440-42-8	
Calcium, Total Recoverable	205	mg/L	0.10	1	11/08/16 09:00	11/09/16 14:14	7440-70-2	
Chromium, Total Recoverable	< 0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 14:14	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 14:14	7439-92-1	
_ithium	0.015	mg/L	0.010	1	11/08/16 09:00	11/09/16 14:14	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EF	PA 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:36	7440-36-0	
Arsenic, Total Recoverable	0.0075	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:36	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:36	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:36	7440-48-4	
Molybdenum, Total Recoverable	0.054	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:36	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:36	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:36	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EF	PA 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 13:04	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	0C					
Total Dissolved Solids	1460	mg/L	5.0	1		11/09/16 11:37		
1500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		11/09/16 16:12		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	158	mg/L	20.0	20		11/30/16 02:34	16887-00-6	
Fluoride	0.52	mg/L	0.20	1		11/30/16 02:19	16984-48-8	
Sulfate	900	mg/L	200	200		11/30/16 02:48	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: FAA-3-110416	Lab ID: 602	231627013	Collected: 11/04/1	6 10:30	Received: 11	/05/16 08:50 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.034	mg/L	0.0050	1	11/08/16 09:00	11/09/16 14:18	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 14:18	7440-41-7	
Boron, Total Recoverable	0.95	mg/L	0.10	1	11/08/16 09:00	11/09/16 14:18	7440-42-8	
Calcium, Total Recoverable	214	mg/L	0.10	1	11/08/16 09:00	11/09/16 14:18	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 14:18	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 14:18	7439-92-1	
Lithium	0.017	mg/L	0.010	1	11/08/16 09:00	11/09/16 14:18	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:40	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:40	7440-38-2	
Cadmium, Total Recoverable	< 0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:40	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:40	7440-48-4	
Molybdenum, Total Recoverable	0.014	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:40	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:40	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:40	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 13:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC .					
Total Dissolved Solids	1490	mg/L	5.0	1		11/09/16 11:38		
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	0-H+B					
pH at 25 Degrees C	6.9	Std. Units	0.10	1		11/12/16 11:00		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	89.5	mg/L	10.0	10		11/30/16 03:16	16887-00-6	
Fluoride	0.31	mg/L	0.20	1		11/30/16 03:02	16984-48-8	
Sulfate	896	mg/L	50.0	50		11/30/16 03:30	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Sample: FAA-2-110416	Lab ID: 602	231627014	Collected: 11/04/1	6 11:30	Received: 11	/05/16 08:50 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	thod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.035	mg/L	0.0050	1	11/08/16 09:00	11/09/16 14:22	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/09/16 14:22	7440-41-7	
Boron, Total Recoverable	3.2	mg/L	0.10	1	11/08/16 09:00	11/09/16 14:22	7440-42-8	
Calcium, Total Recoverable	330	mg/L	0.10	1	11/08/16 09:00	11/09/16 14:22	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00	11/09/16 14:22	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	11/08/16 09:00			
ithium	0.018	mg/L	0.010	1	11/08/16 09:00	11/09/16 14:22	7439-93-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:44	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:44	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	11/08/16 09:00	11/28/16 17:44	7440-43-9	
Cobalt, Total Recoverable	0.0012	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:44	7440-48-4	
Molybdenum, Total Recoverable	0.27	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:44	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:44	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	11/08/16 09:00	11/28/16 17:44	7440-28-0	
45.1 Mercury	Analytical Met	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	11/22/16 08:30	11/22/16 13:09	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	OC .					
Total Dissolved Solids	3160	mg/L	5.0	1		11/09/16 11:38		
1500H+ pH, Electrometric	Analytical Met	thod: SM 4500	0-H+B					
oH at 25 Degrees C	7.1	Std. Units	0.10	1		11/12/16 11:00		H6
800.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	0.0					
Chloride	68.8	mg/L	10.0	10		11/30/16 17:19	16887-00-6	
Fluoride	0.60	mg/L	0.20	1		11/30/16 18:15	16984-48-8	
Sulfate	2030	mg/L	200	200		11/30/16 17:33	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Mercury

Date: 12/07/2016 10:53 AM

QC Batch: 455898 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

 $Associated \ Lab \ Samples: \qquad 60231627001, \ 60231627002, \ 60231627003, \ 60231627004, \ 60231627005, \ 60231627006, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 6023$ 

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014

METHOD BLANK: 1866966 Matrix: Water

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60251607014, 60251607014, 60251607014, 60251607014, 60251607014, 60251607014, 602

 Parameter
 Units
 Blank Reporting Result
 Limit Limit
 Analyzed Analyzed
 Qualifiers

 Mercury
 mg/L
 <0.00020</td>
 0.00020
 11/22/16 12:26

LABORATORY CONTROL SAMPLE: 1866967

LCS LCS Spike % Rec Parameter Units Conc. Result % Rec Limits Qualifiers 103 .005 0.0052 85-115 Mercury mg/L

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1866968 1866969

mg/L

MS MSD Spike MS MSD MS MSD 60231627003 Spike % Rec Max Units Conc. % Rec % Rec RPD RPD Parameter Result Conc. Result Result Limits Qual Mercury < 0.00020 .005 .005 0.0028 0.0028 57 70-130 2 20 M1 mg/L 55

 MATRIX SPIKE SAMPLE:
 1866970

 60232038001
 Spike
 MS
 MS
 % Rec

 Parameter
 Units
 Result
 Conc.
 Result
 % Rec
 Limits
 Qualifiers

ND

.005

0.0063

126

70-130

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

QC Batch: 453876 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014

METHOD BLANK: 1858392 Matrix: Water

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60251607014, 60251607014, 60251607014, 60251607014, 602

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	11/09/16 12:35	
Beryllium	mg/L	< 0.0010	0.0010	11/09/16 12:35	
Boron	mg/L	<0.10	0.10	11/09/16 12:35	
Calcium	mg/L	< 0.10	0.10	11/09/16 12:35	
Chromium	mg/L	< 0.0050	0.0050	11/09/16 12:35	
Lead	mg/L	< 0.0050	0.0050	11/09/16 12:35	
Lithium	mg/L	<0.010	0.010	11/09/16 12:35	

LABORATORY CONTROL SAMPLE:	1858393					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.1	106	85-115	
Beryllium	mg/L	1	0.97	97	85-115	
Boron	mg/L	1	0.96	96	85-115	
Calcium	mg/L	10	9.9	99	85-115	
Chromium	mg/L	1	1.0	102	85-115	
Lead	mg/L	1	1.1	106	85-115	
Lithium	mg/L	1	1.0	102	85-115	

MATRIX SPIKE & MATRIX SI	PIKE DUPLIC	ATE: 185839			1858395							
Parameter	Units	60231598001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	6.3 ug/L	1	1	1.1	1.1	105	105	70-130	0	20	
Beryllium	mg/L	ND	1	1	0.97	0.97	97	97	70-130	0	20	
Boron	mg/L	ND	1	1	0.96	0.96	96	96	70-130	0	20	
Calcium	mg/L	2220 ug/L	10	10	12.2	12.2	99	100	70-130	0	20	
Chromium	mg/L	ND	1	1	1.0	1.0	103	102	70-130	1	20	
Lead	mg/L	ND	1	1	1.0	1.0	105	104	70-130	0	20	
Lithium	mg/L	ND	1	1	1.0	1.0	102	102	70-130	1	20	

Barium	mg/L	60.5 ug/L	1	1.1	105	70-130	
Parameter	Units	60231598002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
MATRIX SPIKE SAMPLE:	1858396	00004500000	Cailes	MC	MC	0/ <b>D</b> aa	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

MATRIX SPIKE SAMPLE:	1858396						
_		60231598002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Beryllium	mg/L	ND	1	0.99	99	70-130	
Boron	mg/L	ND	1	0.98	97	70-130	
Calcium	mg/L	11700 ug/L	10	21.4	97	70-130	
Chromium	mg/L	ND	1	1.0	102	70-130	
Lead	mg/L	ND	1	1.0	105	70-130	
Lithium	mg/L	ND	1	1.0	103	70-130	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

QC Batch: 453882 Analysis Method: EPA 200.8

QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014

METHOD BLANK: 1858415 Matrix: Water

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 6025014014, 6025014014, 6025014014, 6025014014, 6025014014, 60250140

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	11/28/16 16:18	
Arsenic	mg/L	< 0.0010	0.0010	11/28/16 16:18	
Cadmium	mg/L	< 0.00050	0.00050	11/28/16 16:18	
Cobalt	mg/L	< 0.0010	0.0010	11/28/16 16:18	
Molybdenum	mg/L	< 0.0010	0.0010	11/28/16 16:18	
Selenium	mg/L	< 0.0010	0.0010	11/28/16 16:18	
Thallium	mg/L	< 0.0010	0.0010	11/28/16 16:18	

LABORATORY CONTROL SAMPLE:	1858416					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.041	102	85-115	
Arsenic	mg/L	.04	0.041	103	85-115	
Cadmium	mg/L	.04	0.040	100	85-115	
Cobalt	mg/L	.04	0.040	100	85-115	
Molybdenum	mg/L	.04	0.042	105	85-115	
Selenium	mg/L	.04	0.039	97	85-115	
Thallium	mg/L	.04	0.038	96	85-115	

MATRIX SPIKE & MATRIX SP	IKE DUPLICA	TE: 18584	17		1858418							
			MS	MSD								
	6	0231627001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	<0.0010	.04	.04	0.041	0.041	101	101	70-130	0	20	
Arsenic	mg/L	0.0012	.04	.04	0.043	0.043	105	105	70-130	1	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.036	0.036	91	91	70-130	0	20	
Cobalt	mg/L	< 0.0010	.04	.04	0.038	0.038	92	93	70-130	1	20	
Molybdenum	mg/L	0.0059	.04	.04	0.050	0.050	110	110	70-130	0	20	
Selenium	mg/L	< 0.0010	.04	.04	0.040	0.042	100	103	70-130	3	20	
Thallium	mg/L	<0.0010	.04	.04	0.035	0.036	88	89	70-130	1	20	

MATRIX SPIKE SAMPLE:	1858419						
		60231627002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	.04	0.041	102	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

MATRIX SPIKE SAMPLE:	1858419						
Davamatan	l leite	60231627002	Spike	MS	MS % Dan	% Rec	O = 1:6: = ==
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Arsenic	mg/L	0.0062	.04	0.048	105	70-130	
Cadmium	mg/L	< 0.00050	.04	0.038	94	70-130	
Cobalt	mg/L	< 0.0010	.04	0.039	96	70-130	
Molybdenum	mg/L	0.044	.04	0.088	110	70-130	
Selenium	mg/L	<0.0010	.04	0.037	94	70-130	
Thallium	mg/L	< 0.0010	.04	0.037	92	70-130	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

QC Batch: 454069 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

 $Associated \ Lab \ Samples: \qquad 60231627001, \ 60231627002, \ 60231627003, \ 60231627004, \ 60231627005, \ 60231627006, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 60231627007, \ 6023$ 

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014

METHOD BLANK: 1859185 Matrix: Water

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 11/09/16 11:25

LABORATORY CONTROL SAMPLE: 1859186

LCS LCS Spike % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** 1000 938 94 80-120 mg/L

SAMPLE DUPLICATE: 1859187

60231627001 Max Dup RPD RPD Result Qualifiers Parameter Units Result 3220 Total Dissolved Solids 3180 10 mg/L 1

SAMPLE DUPLICATE: 1859188

Date: 12/07/2016 10:53 AM

60231627010 Dup Max Parameter Units Result Result RPD RPD Qualifiers **Total Dissolved Solids** mg/L 1170 1140 3 10



### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

QC Batch: 454194 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60231627011, 60231627012

SAMPLE DUPLICATE: 1859816

Date: 12/07/2016 10:53 AM

 Parameter
 Units
 60231381007 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 6.8
 6.8
 0
 5 H6



### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

QC Batch: 454625 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627007, 60231627009,

60231627010

SAMPLE DUPLICATE: 1861765

Date: 12/07/2016 10:53 AM

60231480001 Dup Max Parameter Units Result Result **RPD RPD** Qualifiers 8.2 Std. Units 0 5 H6 pH at 25 Degrees C 8.2



### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

QC Batch: 454661 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60231627006, 60231627008, 60231627013, 60231627014

SAMPLE DUPLICATE: 1862077

Date: 12/07/2016 10:53 AM

 Parameter
 Units
 60231506002 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.0
 7.0
 0
 5 H6



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

QC Batch: 456713 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013

METHOD BLANK: 1869908 Matrix: Water

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	11/29/16 09:18	
Fluoride	mg/L	<0.20	0.20	11/29/16 09:18	
Sulfate	mg/L	<1.0	1.0	11/29/16 09:18	

LABORATORY CONTROL SAMPLE:	1869909					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L		4.8	96	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIR	KE DUPLIC	ATE: 18699	10		1869911							
			MS	MSD								
		60232075004	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	ND	100	100	113	117	103	107	80-120	3	15	
Fluoride	mg/L	ND	50	50	57.9	60.8	116	122	80-120	5	15	M1
Sulfate	mg/L	166	100	100	287	288	121	122	80-120	0	15	M1

MATRIX SPIKE SAMPLE:	1869912						
		60232096004	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L	97.9	50	160	123	80-120	M1
Fluoride	mg/L	ND	25	30.0	117	80-120	
Sulfate	mg/L	194	50	255	122	80-120	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

QC Batch: 456831 Analysis Method: EPA 300.0 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60231627002, 60231627008, 60231627011, 60231627014

METHOD BLANK: 1870414 Matrix: Water Associated Lab Samples: 60231627002, 60231627008, 60231627011, 60231627014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	11/30/16 14:28	
Fluoride	mg/L	<0.20	0.20	11/30/16 14:28	
Sulfate	mg/L	<1.0	1.0	11/30/16 14:28	

LABORATORY CONTROL SAMPLE:	1870415					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L		4.8	95	90-110	
Fluoride	mg/L	2.5	2.6	105	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIR	KE DUPLICA	ATE: 18704	16		1870417							
			MS	MSD								
	6	0232532002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	66400	25000	25000	97800	98100	125	127	80-120	0	15	M1
Fluoride	mg/L	ND	12500	12500	13700	14700	107	115	80-120	7	15	
Sulfate	mg/L	19500	25000	25000	48100	48100	115	114	80-120	0	15	

MATRIX SPIKE SAMPLE:	1870418						
Parameter	Units	60233017001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	587	500	1090	101	80-120	_
Fluoride	mg/L	ND	250	254	97	80-120	
Sulfate	mg/L	ND	500	572	98	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: BAA-6-110316 Lab ID: 60231627001 Collected: 11/03/16 08:38 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.142 ± 0.342 (0.661) Radium-226 pCi/L 12/05/16 22:01 13982-63-3 C:NA T:89% EPA 904.0 1.73 ± 0.641 (0.939) Radium-228 pCi/L 12/06/16 11:38 15262-20-1 C:62% T:81% Total Radium **Total Radium** 1.87 ± 0.983 (1.60) pCi/L 12/07/16 11:07 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60231627

Sample: BAA-2-110316 Lab ID: 60231627002 Collected: 11/03/16 10:02 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.479 \pm 0.406 \quad (0.503)$ Radium-226 pCi/L 12/05/16 22:01 13982-63-3 C:NA T:91% EPA 904.0 0.845 ± 0.453 (0.816) Radium-228 pCi/L 12/06/16 11:38 15262-20-1 C:72% T:83% Total Radium **Total Radium**  $1.32 \pm 0.859$  (1.32) pCi/L 12/07/16 11:07 7440-14-4



Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60231627

Sample: BAA-4-110316 Lab ID: 60231627003 Collected: 11/03/16 11:17 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 -0.137 ± 0.314 (0.739) Radium-226 pCi/L 12/05/16 22:01 13982-63-3 C:NA T:90% EPA 904.0 0.456 ± 0.507 (1.07) Radium-228 pCi/L 12/06/16 11:38 15262-20-1 C:77% T:82% Total Radium **Total Radium**  $0.593 \pm 0.821$  (1.81) pCi/L 12/07/16 11:07 7440-14-4



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: BAA-3-110316 Lab ID: 60231627004 Collected: 11/03/16 12:32 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.262 \pm 0.364 \quad (0.608)$ Radium-226 pCi/L 12/05/16 22:01 13982-63-3 C:NA T:90% EPA 904.0  $0.635 \pm 0.416 \quad (0.790)$ Radium-228 pCi/L 12/06/16 11:38 15262-20-1 C:77% T:80% Total Radium **Total Radium**  $0.897 \pm 0.780 \quad (1.40)$ pCi/L 12/07/16 11:07 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: FGD-1-110316 PWS:	<b>Lab ID: 6023162</b> Site ID:	7005 Collected: 11/03/16 13:55 Sample Type:	Received:	11/05/16 08:50	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.01 ± 0.577 (0.531) C:NA T:85%	pCi/L	12/05/16 22:32	13982-63-3	
Radium-228	EPA 904.0	0.325 ± 0.388 (0.820) C:73% T:84%	pCi/L	12/06/16 11:38	15262-20-1	
Total Radium	Total Radium Calculation	1.34 ± 0.965 (1.35)	pCi/L	12/07/16 11:07	7440-14-4	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: FGD-4-110316 PWS:	<b>Lab ID: 602316</b> Site ID:	<b>Collected:</b> 11/03/16 14:57 Sample Type:	Received:	11/05/16 08:50	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.149 ± 0.461 (0.892) C:NA T:84%	pCi/L	12/05/16 22:32	13982-63-3	
Radium-228	EPA 904.0	0.345 ± 0.434 (0.922) C:67% T:81%	pCi/L	12/06/16 11:38	3 15262-20-1	
Total Radium	Total Radium Calculation	0.494 ± 0.895 (1.81)	pCi/L	12/07/16 11:07	7 7440-14-4	



Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60231627

Sample: FGD-3-110316 Lab ID: 60231627007 Collected: 11/03/16 13:55 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.667 ± 0.568 (0.798) Radium-226 pCi/L 12/05/16 22:32 13982-63-3 C:NA T:88% EPA 904.0 0.131 ± 0.336 (0.749) Radium-228 pCi/L 12/06/16 11:39 15262-20-1 C:73% T:88% Total Radium **Total Radium**  $0.798 \pm 0.904 \quad (1.55)$ pCi/L 12/07/16 11:07 7440-14-4



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: FGD-2-110316 Lab ID: 60231627008 Collected: 11/03/16 16:40 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.233 \pm 0.356 \quad (0.211)$ Radium-226 pCi/L 12/05/16 22:32 13982-63-3 C:NA T:80% EPA 904.0  $0.470 \pm 0.342 \quad (0.662)$ Radium-228 pCi/L 12/06/16 11:39 15262-20-1 C:75% T:87% Total Radium **Total Radium**  $0.703 \pm 0.698 \quad (0.873)$ pCi/L 12/07/16 11:07 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: FAA-5-110416 PWS:	<b>Lab ID: 6023162</b> Site ID:	77009 Collected: 11/03/16 08:31 Sample Type:	Received:	11/05/16 08:50	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.135 ± 0.373 (0.724) C:NA T:91%	pCi/L	12/05/16 22:32	13982-63-3	
Radium-228	EPA 904.0	0.821 ± 0.519 (0.988) C:61% T:85%	pCi/L	12/06/16 11:39	15262-20-1	
Total Radium	Total Radium Calculation	0.956 ± 0.892 (1.71)	pCi/L	12/07/16 11:07	7440-14-4	



Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60231627

Sample: FAA-4-110416 Lab ID: 60231627010 Collected: 11/03/16 09:28 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.0681 \pm 0.311 \quad (0.502)$ Radium-226 pCi/L 12/05/16 22:32 13982-63-3 C:NA T:88% EPA 904.0 0.404 ± 0.395 (0.811) Radium-228 pCi/L 12/06/16 11:39 15262-20-1 C:68% T:83% Total Radium **Total Radium**  $0.472 \pm 0.706 \quad (1.31)$ pCi/L 12/07/16 11:07 7440-14-4



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: DUP-110416 Lab ID: 60231627011 Collected: 11/03/16 06:00 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 1.30 ± 0.679 (0.668) Radium-226 pCi/L 12/05/16 23:00 13982-63-3 C:NA T:91% EPA 904.0 -0.163 ± 0.338 (0.822) Radium-228 pCi/L 12/06/16 11:39 15262-20-1 C:66% T:89% Total Radium **Total Radium**  $1.30 \pm 1.02 \quad (1.49)$ pCi/L 12/07/16 11:07 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: DUP-110316 Lab ID: 60231627012 Collected: 11/03/16 06:00 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.907 ± 0.540 (0.514) Radium-226 pCi/L 12/05/16 23:00 13982-63-3 C:NA T:88% EPA 904.0 1.03 ± 0.450 (0.722) Radium-228 pCi/L 12/06/16 11:39 15262-20-1 C:68% T:86% Total Radium **Total Radium** 1.94 ± 0.990 (1.24) pCi/L 12/07/16 11:07 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60231627

Sample: FAA-3-110416 Lab ID: 60231627013 Collected: 11/04/16 10:30 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Method Act ± Unc (MDC) Carr Trac **Parameters** Units Analyzed CAS No. Qual EPA 903.1  $0.0681 \pm 0.353 \quad (0.733)$ Radium-226 pCi/L 12/05/16 23:00 13982-63-3 C:NA T:89% EPA 904.0  $0.0499 \pm 0.328 \quad (0.756)$ Radium-228 pCi/L 12/06/16 11:39 15262-20-1 C:65% T:87% Total Radium **Total Radium**  $0.118 \pm 0.681 \quad (1.49)$ pCi/L 12/07/16 11:07 7440-14-4



Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Sample: FAA-2-110416 Lab ID: 60231627014 Collected: 11/04/16 11:30 Received: 11/05/16 08:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.203 ± 0.310 (0.499) Radium-226 pCi/L 12/05/16 23:00 13982-63-3 C:NA T:93% EPA 904.0  $0.0530 \pm 0.350 \quad (0.802)$ Radium-228 pCi/L 12/06/16 11:39 15262-20-1 C:67% T:86% Total Radium **Total Radium**  $0.256 \pm 0.660 \quad (1.30)$ pCi/L 12/07/16 11:07 7440-14-4 Calculation

(913)599-5665



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

QC Batch: 241312 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627012, 60231627013, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 60231627014, 602

METHOD BLANK: 1186284 Matrix: Water

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014

ParameterAct  $\pm$  Unc (MDC) Carr TracUnitsAnalyzedQualifiersRadium-2260.214  $\pm$  0.327 (0.193) C:NA T:87%pCi/L12/05/16 22:01

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

(913)599-5665



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

QC Batch: 241313 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014

METHOD BLANK: 1186285 Matrix: Water

Associated Lab Samples: 60231627001, 60231627002, 60231627003, 60231627004, 60231627005, 60231627006, 60231627007,

60231627008, 60231627009, 60231627010, 60231627011, 60231627012, 60231627013, 60231627014

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.214 ± 0.294 (0.629) C:76% T:91%
 pCi/L
 12/06/16 11:40

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 12/07/2016 10:53 AM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60231627001	BAA-6-110316	EPA 200.7	453876	EPA 200.7	453988
60231627002	BAA-2-110316	EPA 200.7	453876	EPA 200.7	453988
0231627003	BAA-4-110316	EPA 200.7	453876	EPA 200.7	453988
0231627004	BAA-3-110316	EPA 200.7	453876	EPA 200.7	453988
0231627005	FGD-1-110316	EPA 200.7	453876	EPA 200.7	453988
0231627006	FGD-4-110316	EPA 200.7	453876	EPA 200.7	453988
0231627007	FGD-3-110316	EPA 200.7	453876	EPA 200.7	453988
0231627008	FGD-2-110316	EPA 200.7	453876	EPA 200.7	453988
0231627009	FAA-5-110416	EPA 200.7	453876	EPA 200.7	453988
0231627010	FAA-4-110416	EPA 200.7	453876	EPA 200.7	453988
0231627011	DUP-110416	EPA 200.7	453876	EPA 200.7	453988
0231627012	DUP-110316	EPA 200.7	453876	EPA 200.7	453988
0231627013	FAA-3-110416	EPA 200.7	453876	EPA 200.7	453988
0231627014	FAA-2-110416	EPA 200.7	453876	EPA 200.7	453988
0231627001	BAA-6-110316	EPA 200.8	453882	EPA 200.8	453990
0231627002	BAA-2-110316	EPA 200.8	453882	EPA 200.8	453990
0231627003	BAA-4-110316	EPA 200.8	453882	EPA 200.8	453990
0231627004	BAA-3-110316	EPA 200.8	453882	EPA 200.8	453990
0231627005	FGD-1-110316	EPA 200.8	453882	EPA 200.8	453990
0231627006	FGD-4-110316	EPA 200.8	453882	EPA 200.8	453990
0231627007	FGD-3-110316	EPA 200.8	453882	EPA 200.8	453990
0231627008	FGD-2-110316	EPA 200.8	453882	EPA 200.8	453990
0231627009	FAA-5-110416	EPA 200.8	453882	EPA 200.8	453990
0231627010	FAA-4-110416	EPA 200.8	453882	EPA 200.8	453990
0231627011	DUP-110416	EPA 200.8	453882	EPA 200.8	453990
0231627012	DUP-110316	EPA 200.8	453882	EPA 200.8	453990
0231627013	FAA-3-110416	EPA 200.8	453882	EPA 200.8	453990
0231627014	FAA-2-110416	EPA 200.8	453882	EPA 200.8	453990
0231627001	BAA-6-110316	EPA 245.1	455898	EPA 245.1	455994
0231627002	BAA-2-110316	EPA 245.1	455898	EPA 245.1	455994
0231627003	BAA-4-110316	EPA 245.1	455898	EPA 245.1	455994
0231627004	BAA-3-110316	EPA 245.1	455898	EPA 245.1	455994
0231627005	FGD-1-110316	EPA 245.1	455898	EPA 245.1	455994
0231627006	FGD-4-110316	EPA 245.1	455898	EPA 245.1	455994
0231627007	FGD-3-110316	EPA 245.1	455898	EPA 245.1	455994
0231627008	FGD-2-110316	EPA 245.1	455898	EPA 245.1	455994
0231627009	FAA-5-110416	EPA 245.1	455898	EPA 245.1	455994
0231627010	FAA-4-110416	EPA 245.1	455898	EPA 245.1	455994
0231627011	DUP-110416	EPA 245.1	455898	EPA 245.1	455994
0231627012	DUP-110316	EPA 245.1	455898	EPA 245.1	455994
0231627013	FAA-3-110416	EPA 245.1	455898	EPA 245.1	455994
0231627014	FAA-2-110416	EPA 245.1	455898	EPA 245.1	455994
0231627001	BAA-6-110316	EPA 903.1	241312		
0231627002	BAA-2-110316	EPA 903.1	241312		
0231627003	BAA-4-110316	EPA 903.1	241312		
0231627004	BAA-3-110316	EPA 903.1	241312		
0231627005	FGD-1-110316	EPA 903.1	241312		



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

ab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytica Batch
0231627006	FGD-4-110316	EPA 903.1	241312	_	
0231627007	FGD-3-110316	EPA 903.1	241312		
0231627008	FGD-2-110316	EPA 903.1	241312		
0231627009	FAA-5-110416	EPA 903.1	241312		
0231627010	FAA-4-110416	EPA 903.1	241312		
0231627011	DUP-110416	EPA 903.1	241312		
0231627012	DUP-110316	EPA 903.1	241312		
0231627013	FAA-3-110416	EPA 903.1	241312		
0231627014	FAA-2-110416	EPA 903.1	241312		
0231627001	BAA-6-110316	EPA 904.0	241313		
0231627002	BAA-2-110316	EPA 904.0	241313		
231627003	BAA-4-110316	EPA 904.0	241313		
231627004	BAA-3-110316	EPA 904.0	241313		
0231627005	FGD-1-110316	EPA 904.0	241313		
0231627006	FGD-4-110316	EPA 904.0	241313		
231627007	FGD-3-110316	EPA 904.0	241313		
0231627008	FGD-2-110316	EPA 904.0	241313		
0231627009	FAA-5-110416	EPA 904.0	241313		
231627010	FAA-4-110416	EPA 904.0	241313		
0231627011	DUP-110416	EPA 904.0	241313		
231627012	DUP-110316	EPA 904.0	241313		
231627013	FAA-3-110416	EPA 904.0	241313		
231627014	FAA-2-110416	EPA 904.0	241313		
0231627001	BAA-6-110316	Total Radium Calculation	242594		
0231627002	BAA-2-110316	Total Radium Calculation	242594		
231627003	BAA-4-110316	Total Radium Calculation	242594		
0231627004	BAA-3-110316	Total Radium Calculation	242594		
0231627005	FGD-1-110316	Total Radium Calculation	242594		
0231627006	FGD-4-110316	Total Radium Calculation	242594		
231627007	FGD-3-110316	Total Radium Calculation	242594		
0231627008	FGD-2-110316	Total Radium Calculation	242594		
0231627009	FAA-5-110416	Total Radium Calculation	242594		
0231627010	FAA-4-110416	Total Radium Calculation	242594		
0231627011	DUP-110416	Total Radium Calculation	242594		
0231627012	DUP-110316	Total Radium Calculation	242594		
0231627013	FAA-3-110416	Total Radium Calculation	242594		
0231627014	FAA-2-110416	Total Radium Calculation	242594		
0231627001	BAA-6-110316	SM 2540C	454069		
0231627002	BAA-2-110316	SM 2540C	454069		
231627003	BAA-4-110316	SM 2540C	454069		
0231627004	BAA-3-110316	SM 2540C	454069		
0231627005	FGD-1-110316	SM 2540C	454069		
0231627006	FGD-4-110316	SM 2540C	454069		
0231627007	FGD-3-110316	SM 2540C	454069		
0231627008	FGD-2-110316	SM 2540C	454069		
0231627009	FAA-5-110416	SM 2540C	454069		
0231627010	FAA-4-110416	SM 2540C	454069		



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60231627

Date: 12/07/2016 10:53 AM

ab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60231627011	DUP-110416	SM 2540C	454069	_	•
0231627012	DUP-110316	SM 2540C	454069		
0231627013	FAA-3-110416	SM 2540C	454069		
0231627014	FAA-2-110416	SM 2540C	454069		
60231627001	BAA-6-110316	SM 4500-H+B	454625		
0231627002	BAA-2-110316	SM 4500-H+B	454625		
0231627003	BAA-4-110316	SM 4500-H+B	454625		
0231627004	BAA-3-110316	SM 4500-H+B	454625		
0231627005	FGD-1-110316	SM 4500-H+B	454625		
60231627006	FGD-4-110316	SM 4500-H+B	454661		
60231627007	FGD-3-110316	SM 4500-H+B	454625		
60231627008	FGD-2-110316	SM 4500-H+B	454661		
0231627009	FAA-5-110416	SM 4500-H+B	454625		
0231627010	FAA-4-110416	SM 4500-H+B	454625		
0231627011	DUP-110416	SM 4500-H+B	454194		
60231627012	DUP-110316	SM 4500-H+B	454194		
60231627013	FAA-3-110416	SM 4500-H+B	454661		
60231627014	FAA-2-110416	SM 4500-H+B	454661		
0231627001	BAA-6-110316	EPA 300.0	456713		
0231627002	BAA-2-110316	EPA 300.0	456713		
0231627002	BAA-2-110316	EPA 300.0	456831		
0231627003	BAA-4-110316	EPA 300.0	456713		
0231627004	BAA-3-110316	EPA 300.0	456713		
0231627005	FGD-1-110316	EPA 300.0	456713		
0231627006	FGD-4-110316	EPA 300.0	456713		
0231627007	FGD-3-110316	EPA 300.0	456713		
60231627008	FGD-2-110316	EPA 300.0	456713		
0231627008	FGD-2-110316	EPA 300.0	456831		
60231627009	FAA-5-110416	EPA 300.0	456713		
0231627010	FAA-4-110416	EPA 300.0	456713		
0231627011	DUP-110416	EPA 300.0	456713		
60231627011	DUP-110416	EPA 300.0	456831		
0231627012	DUP-110316	EPA 300.0	456713		
0231627013	FAA-3-110416	EPA 300.0	456713		
0231627014	FAA-2-110416	EPA 300.0	456831		



# Sample Condition Upon Receipt



Client Name: Westar Energy	
Courier: FedEx □ UPS □ VIA □ Clay □ PEX □ ECI □	Pace □ Xroads □ Client □ Other □
Tracking #: Pace Shipping Label Us	ed? Yes \ No.
Custody Seal on Cooler/Box Present: Yes ✓ No □ Seals intact: Yes	No 🗆
Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐	None □ Other □
Thermometer Used: 17-266 / T-239 Type of Ice: Wet Blue N	one Date and initials of person
Cooler Temperature (°C): As-read( <u>0.7   1.1   2-2  </u> Corr. Factor <u>cf +0.7 CF -0.5</u> Corre	cted /. 4/1-8/2-9/2 / examining contents:
Temperature should be above freezing to 6°C ′ 1.4	PV11/5/16
Chain of Custody present:   ☐Yes ☐No ☐N/A	
Chain of Custody relinquished:   ✓ Yes □No □N/A	
Samples arrived within holding time: Yes □No □N/A	
Short Hold Time analyses (<72hr):	PH
Rush Turn Around Time requested:	
Sufficient volume:	x
Correct containers used: Yes □No □N/A	
Pace containers used: Yes □No □N/A	
Containers intact: ✓ Yes □No □N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs? □Yes □No ☑N/A	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Filtered volume received for dissolved tests?	
Sample labels match COC: Date / time / ID / analyses	FAA-4 collected @ 092
Samples contain multiple phases? Matrix: & T ☐Yes █No ☐N/A	A
Containers requiring pH preservation in compliance? ✓ 🗸 🖂 🖒 🖒 🖒 🖒 🖒 🖒 🖒 🖒 🖒 🖒 🖒 🖒 🖒	\
(HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	
Cyanide water sample checks: N/A	
Lead acetate strip turns dark? (Record only) □Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve) □Yes □No	
Trip Blank present: □Yes □No ØN/	
Headspace in VOA vials ( >6mm): □Yes □No ØN/	A
Samples from USDA Regulated Area: State: □Yes □No ZN/A	A
Additional labels attached to 5035A / TX1005 vials in the field? ☐Yes ☐No 🗹N//	
Client Notification/ Resolution: Copy COC to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/Time:	
Comments/ Resolution:	
Project Managan Paviews	***
Project Manager Review:	ate:



# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Phone: (785) 575-8135 Fax: Project Name: JEC CCR Groundwater Pace Project Manager: Heather Wilson, 913-563-1407  Requested Due Date/TAT: 7 DAY Project Number: Pace Profile #: 9657, 1  Requested Description Pace Profile #: 9657, 1  Requested Client Information Pace Profile #: 9657, 1  Requested Description Pace Profile #: 9657, 1	REGULATOR  REGULATOR  NPDES  UST  Site Location  STATE:  d Analysis Filter	☐ GROUN ☐ RCRA KS	ND WATE		DRINKING V	VATER
Topeka, KS 66612  Email To: brandon.l.griffin@westarenergy.com Purchase Order No.:  Pace Quote Reference: Phone: (785) 575-8135 Fax:  Project Name: JEC CCR Groundwater  Pace Project Manager: Pace Profile #: 9657, 1  Requested Due Date/TAT: 7 DAY  Project Number:  Pace Profile #: 9657, 1  Requested District Codes MATRIX CODE DRINKING WATER WT WASTE WATER WT WASTE WATER WT WASTE WAST	Site Location STATE: ed Analysis Filter	☐ GROUN ☐ RCRA KS	ND WATE			VATER
Pace Quote Reference:   Project Name: JEC CCR Groundwater   Pace Project Heather Wilson, 913-563-1407	Site Location STATE: ed Analysis Filter	RCRA KS				VATER
Phone: (785) 575-8135 Fax: Project Name: JEC CCR Groundwater Pace Project Manager: Pace Project Number: Pace Profile #: 9657, 1  Requested Due Date/TAT: 7 DAY Project Number: Pace Profile #: 9657, 1  Requested Due Date/TAT: 7 DAY Project Number: Pace Profile #: 9657, 1  Requested Due Date/TAT: 7 DAY Project Number: Pace Profile #: 9657, 1	Site Location STATE: ed Analysis Filter	KS			OTHER	
Requested Due Date/TAT: 7 DAY  Project Number:  Pace Profile #: 9657, 1  Requested  Nanager.  Pace Profile #: 9657, 1  Requested  Nanager.  Pace Profile #: 9657, 1	STATE:	KS —				
Section D Required Client Information    Valid Matrix Codes   Preservatives	ed Analysis Filter	_				
Section D Required Client Information  MATRIX CODE DRINKING WATER WT WASTE WATER WAY  COMPOSITE	804	red (Y/N)	(Y/N)			
DRINKING WATER DW WASTE WATER WT 8 0 COMPOSITE COMPOSITE			(Y/N)			
DRINKING WATER DW WASTE WATER WT 8 0 COMPOSITE COMPOSITE			(Y/N)			
SAMPLE ID  (A-Z, 0-9 / -)  Sample ID MATRIX CODE  (Begin black of the control of	300.0 Cl, Fl, 4500 H+B 2540C TDS Radium 226 Radium 228		Residual Chlorine (Y/N)	Pace	Project No	J Lab I.D. 289/N a/ UZ W
4 BAA-3-116316 WT 6 11/3/16/1232 4/13				144	-	ay
5 FGO-1-110316 WTG 11/3/16/1355 4 1 3		IE				as
6 FGD-4-110316 MTG 11/3/16/1957 4/1/3			$\vdash$			06
7 FGD-3-110316 VTG 11/3/61358 41 3		181			1	wg
8 FGD-2-110316 VTG 11/3/161640 41 3					1	CAR.
9 FAA-5-110416 WIG 114/140831 4 1 3			$\vdash$	125	-	069
10 FAA-4-1104 16 VTB 11/416 4 1 3		$\perp \perp \perp$	+			0(0
11 DUP- 110416 WTG 11/416 DECO 14 1 3			+			011-
12 DYP-110316 WTG 11/3/1610600 41 3				1 .	<u> </u>	4 012
ADDITIONAL COMMENTS RELINQUISHED BY / AFFILIATION DATE TIME ACCEPTED BY / AFFILIATION		TIME		SAME	PLE CONDITIO	
*200.7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Li  **200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl	11/5/16	0650	1.8	7	7	7
			29			
			2.1	+	F	+
SAMPLER NAME AND SIGNATURE	West at the first first			-	pel (r	- V
SAMPLER NAME AND SIGNATURE  PRINT Name of SAMPLER: Brandon Griffin  SIGNATURE of SAMPLER: DATE Signe (MM/DD/YY)		16	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)



# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:	Section Required		t Inform	nation.					Secti Invoic	ion C e infon	mation	1:													Page:	2	of _	2
Company: WESTAR ENERGY	Report T	o: Brai	ndon	Griffin				2	Attent	ion:	Jai	red M	lorris	on		3.5		5						- 5				
Address: 818 Kansas Ave	Сору То	Jare	ed Mo	rrison, He	eath Hori	nya			Comp	any Na	ame:	WES	STAF	ENE	RGY	-			RE	GU	LATO	DRY	AGEN	CY				
Topeka, KS 66612	80		7				-	1	Addre	SS.		SEE	SEC	4OIT	1 A				V	N	PDES		GRO	DUNE	WATE	R	DRINKING	WATER
Email To: brandon.l.griffin@westarenergy.c	om Purchase	e Order	No.:					5	Pace (							11		5	7	U	ST	F.	RCF	RA .			OTHER	
Phone: (785) 575-8135 Fax:	Project N	lame:	JEC	CCR Gro	oundwate	er	7 F			roject	He	ather	Wils	son, 9	13-5	63-1	407		S	ite L	.ocati	on		KS				
Requested Due Date/TAT: 7 DAY	Project N	lumber.	7							Profile #	<sup>‡</sup> 96	57, 1							-		STAT	E:	_	100	- 1			
1 30	-		T	TT	L			5								F	Requ	este	d An	alys	is Fil	tere	d (Y/N)	)	_////			
Section D Valid M	atrix Codes	(£	a a		2011	HE R	FE				Dec	2005/	otivo		N /A													
Required Client Information MATRIX  DRINKING	CODE WATER DW	as to l	C=COMP)		COLL	ECTED		Z		$\vdash$	7	serva	auve.	T	+	+		-		$^{+}$	H	+	##		TT	////////	,,,,,,,,,	<i></i>
WATER WASTEV		valid çodes to left)	B C	COMPO		COMPOS END/GR	SITE	COLLECTION				15					*								Ê	1.3		
PRODUC SOIL/SOL OIL		(see val	(G=GRAB		H.	17.7	7.7	COLLE	S				93		-	als*	*sle	cun)	4						ے او			.03
SAMPLE ID WIPE AIR	WP AR	10.00	1 1					¥	CONTAINERS	1					Test	Metals	Metals**	245.1 Total Mercury	, SO4		0	_			Residual Chlorine (Y/N)			22
(A-Z, 0-9 / ,-) OTHER Sample IDs MUST BE UNIQUE TISSUE	OT TS	CODE	TYPE			2.5	7 -	TEMP	A F	Unpreserved		8					Total	otal	300.0 CI, FI, 4500 H+B	2540C TDS	226	228			[호]			
*		\ ĕ	LE T			1.55	-	PE	00	lese	ر م ا		ည်လို	Methanol	Other	\ \ \ \	8 T	+	잉분	၂၀	<u>  </u>	틢			sidus			
ITEM #		MATRIX	SAMPLE	DATE	TIME	DATE	TIME	SAMPLE	# OF	1 S	H <sub>2</sub> SO <sub>4</sub>	[모]	NaOH Na <sub>2</sub> S <sub>2</sub> (	Met	Other	18	200.8	245	300.0	254	Radium 226	Rad			% %	Pace	Project N	o./ Lab I.D.
FAA-3-119416	-	_	-6	BATE	75 0	11/4/16	_		4	11	13	_					10									BRY	IBPZN2	· 2BPINOB
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10				-		-			$\vdash$	$\dagger$		$\forall$													П			9
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ADDITIONAL COMMENTS		RE	LINQU	JISHED BY	/ AFFILIAT	TION	DAT	E		TIME		-5	Α	GCEP	TED B	Y/A	FFILI	MOITA	1		DATE	,	TIME			SAMP	LE CONDIT	ions
*200.7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Li	/	16/-	n	1/1	wes-	k	11/4	116	13	00		1	Mi	·n	1	74	52	-		b	1/5/	16	085	3	1.4	1	7	x
**200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl		10	1	-				3				1		1	/			4.7		100					1.8		1	
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Page			E .	====	CAMPI	LER NAME	AND SICK	JATI	RE		- 1									_		Ħ				5		tact
e 64				200	SAIVIP	PRINT Na		2 853-	100	10	den	,	S	H	3	1 - 2									Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
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# **Chain of Custody**

WO#:30201895





Workorder: 60231627

Workorder Name: JEC CCR GROUNDWATER

**Custody Seal** 

Owner Received Date: 11/5/2016 Results Requested By: 12/1/2016

Repo	rt To		Subcontrac	t To			100				Requested Ar	nalysis		
Pace 9608 Lene	her Wilson e Analytical Kansas I Loiret Blvd. exa, KS 66219 ne (913)599-5665		1638 F Suites Greens	nalytical Pittsbu loseytown Road 2,3, & 4 sburg, PA 1560 (724)850-5600	i				,					
			Collect				eserved C	ontainers	Radium 226 &					
Item	Sample ID	Sample Type	Date/Tim e	Lab ID	Matrix	BP1N			\$ 228 <i>f</i> /					LAB USE ONLY
1	BAA-6-110316	PS	11/3/2016 08:38	60231627001	Water	2			X					001
2	BAA-2-110316	PS	11/3/2016 10:02	60231627002	Water	2			Х					002
3	BAA-4-110316	PS	11/3/2016 11:17	60231627003	Water	2			X					003
4	BAA-3-110316	PS	11/3/2016 12:32	60231627004	Water	2			X					<u></u>
5	FGD-1-110316	PS	11/3/2016 13:55	60231627005	Water	2			X					005
6	FGD-4-110316	PS	11/3/2016 14:57	60231627006	Water	2			X					004
7	FGD-3-110316	PS	11/3/2016 13:55	60231627007	Water	2			X					007
8	FGD-2-110316	PS	11/3/2016 16:40	60231627008	Water	2			X			+ + + -		008
9	FAA-5-110416	PS	11/3/2016 08:31	60231627009	Water	2			X					009
10	FAA-4-110416	PS	11/3/2016 09:28	60231627010	Water	2			X					010
11	DUP-110416	PS	11/3/2016 06:00	60231627011	Water	2			X			<del>                                     </del>		011
12	DUP-110316	PS	11/3/2016 06:00	60231627012	Water	2			X			1		012
13	FAA-3-110416	PS	11/4/2016 10:30	60231627013	Water	2			X			1 1 1	+	013
14	FAA-2-110416	PS	11/4/2016 11:30	60231627014	Water	2			X					014
316177547											<u> </u>			
Trans	fers Released By		Date/Time	Receive	4			Deta/T:	_	1-20-		Comments	<u> </u>	
1 2	Mr Sh-	- Ja		200 Kluzun				Date/Time		A Pleas	sl ripo	nt Tot	al res	sult as

N

Received on Ice

င်္တြာler Temperature on Receipt NA °C

Samples Intact or

Yor W

N

Sample Condit	tion Upon Rece	ipt F	'itts:	ourg	n	
Pace Analytical (	Client Name:	Pe	rce	Kei	n.sas	Project # 3020189
Courier: Fed Ex U	454 1954		_			П
Custody Seal on Cooler/B					s intact:  yes	□ no
Thermometer Used	NA				t Blue (None)	A °C Final Tamp: 4 ()A. °C
•	bserved Temp <u>N</u>	V+	. °C	Corr	ection Factor <u>: // /</u>	A °C Final Temp: NVA °C
Temp should be above freezing	g to 6°C					Date and Initials of person examining
C		Yes	No	N/A	7	Date and Initials of person examining contents:
Comments:		100	140	14//		
Chain of Custody Present:		1	<u> </u>	<del> </del>	1.	
Chain of Custody Filled Out		1		<del> </del>	2.	
Chain of Custody Relinquish		-		/	3.	
Sampler Name & Signature	on COC:	ļ,		1	4.	
Sample Labels match COC:		V		L	5	
-Includes date/time/ID/Ar	nalysis <u>Matrix:</u> W		ľ	<del></del>		
Samples Arrived within Hold	Time:	/			6.	
Short Hold Time Analysis	(<72hr remaining):		V		7.	
Rush Turn Around Time R	equested:		/		8.	
Sufficient Volume:					9.	And the state of t
Correct Containers Used:	•	<u> </u>			10.	
-Pace Containers Used:		1				
Containers Intact:					11.	
Filtered volume received for				1	12.	
All containers needing preservatio	n have been checked.	1			13.PH LZ	
All containers needing preserval compliance with EPA recommer		✓			,	
exceptions: VOA, coliform,	TOC, O&G, Phenolics				Initial when KH completed	Date/time of preservation
					Lot # of added preservative	
Headspace in VOA Vials ( >6	Smm):			1	14.	
Trip Blank Present:				1	15.	
Trip Blank Custody Seals Pro	esent			1		
Rad Aqueous Samples Scr					Initial when completed:	Date: 11-8-16
Client Notification/ Resolut	ion:		***************************************		John Piloto I. P. M.	
				Date/	Time:	Contacted By:
Comments/ Resolution:						
Commenter (Cooletion)						

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ATTACHMENT 1-4
December 2016 Sampling Event
Laboratory Analytical Report



January 19, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

### Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on December 17, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

Markon M. Wilson

heather.wilson@pacelabs.com Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification Idaho Certification Illinois Certification

Indiana Certification lowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976 New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190

Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Lab ID	Sample ID	Matrix	Date Collected	Date Received	
60234592001	FAA-5-121616	Water	12/16/16 13:08	12/17/16 09:45	
60234592002	DUP-121616	Water	12/16/16 06:00	12/17/16 09:45	



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60234592001	FAA-5-121616	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60234592002	DUP-121616	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	OL	3	PASI-K

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method: EPA 200.7

**Description:** 200.7 Metals, Total **Client:** WESTAR ENERGY **Date:** January 19, 2017

#### **General Information:**

2 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 459902

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60234340002,60234594003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1882846)
  - Calcium
- MSD (Lab ID: 1882847)
  - Calcium



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: January 19, 2017

#### **General Information:**

2 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: January 19, 2017

#### **General Information:**

2 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** January 19, 2017

#### **General Information:**

2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method: EPA 904.0

**Description:** 904.0 Radium 228 **Client:** WESTAR ENERGY **Date:** January 19, 2017

#### **General Information:**

2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

(913)599-5665



#### PROJECT NARRATIVE

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:January 19, 2017

#### **General Information:**

2 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY

Date: January 19, 2017

#### **General Information:**

2 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 459669

D6: The precision between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1881982)
  - Total Dissolved Solids



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: January 19, 2017

#### **General Information:**

2 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

DUP-121616 (Lab ID: 60234592002)
FAA-5-121616 (Lab ID: 60234592001)

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: January 19, 2017

#### **General Information:**

2 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 461088

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60235068001,60235068003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1887370)
  - Fluoride

QC Batch: 461555

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60235242001,60235242002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1889268)
  - Chloride

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

Sample: FAA-5-121616	Lab ID: 602	234592001	Collected: 12/16/1	6 13:08	Received: 12	/17/16 09:45 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.0074	mg/L	0.0050	1	12/21/16 15:15	12/28/16 18:59	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/28/16 18:59	7440-41-7	
Boron, Total Recoverable	1.2	mg/L	0.10	1	12/21/16 15:15	12/28/16 18:59	7440-42-8	
Calcium, Total Recoverable	343	mg/L	0.10	1	12/21/16 15:15	12/28/16 18:59	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/21/16 15:15	12/28/16 18:59	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	12/21/16 15:15	12/28/16 18:59	7439-92-1	
Lithium	0.12	mg/L	0.010	1	12/21/16 15:15	12/28/16 18:59	7439-93-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/29/16 15:58	7440-36-0	
Arsenic, Total Recoverable	0.0012	mg/L	0.0010	1	12/21/16 15:15	12/29/16 15:58	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/21/16 15:15	12/29/16 15:58	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/29/16 15:58	7440-48-4	
Molybdenum, Total Recoverable	0.023	mg/L	0.0010	1	12/21/16 15:15	12/29/16 15:58	7439-98-7	
Selenium, Total Recoverable	0.0018	mg/L	0.0010	1	12/21/16 15:15	12/29/16 15:58	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/29/16 15:58	7440-28-0	
245.1 Mercury	Analytical Met	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	12/19/16 16:15	12/20/16 10:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	)C					
Total Dissolved Solids	2400	mg/L	5.0	1		12/20/16 12:37	•	
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500	)-H+B					
pH at 25 Degrees C	7.2	Std. Units	0.10	1		12/27/16 09:30	)	H6
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	.0					
Chloride	101	mg/L	10.0	10		01/10/17 20:44	16887-00-6	
Fluoride	0.61	mg/L	0.20	1		01/04/17 15:19	16984-48-8	
Sulfate	1300	mg/L	100	100		01/10/17 23:18	14808-79-8	



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

Sample: DUP-121616	Lab ID: 602	234592002	Collected: 12/16/1	6 06:00	Received: 12	/17/16 09:45 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.074	mg/L	0.0050	1	12/21/16 15:15	12/28/16 19:03	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/28/16 19:03	7440-41-7	
Boron, Total Recoverable	0.24	mg/L	0.10	1	12/21/16 15:15	12/28/16 19:03	7440-42-8	
Calcium, Total Recoverable	121	mg/L	0.10	1	12/21/16 15:15	12/28/16 19:03	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/21/16 15:15	12/28/16 19:03	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	12/21/16 15:15			
ithium	0.011	mg/L	0.010	1	12/21/16 15:15	12/28/16 19:03	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/29/16 16:02	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/29/16 16:02	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/21/16 15:15	12/29/16 16:02	7440-43-9	
Cobalt, Total Recoverable	0.0010	mg/L	0.0010	1	12/21/16 15:15	12/29/16 16:02	7440-48-4	
Molybdenum, Total Recoverable	0.0038	mg/L	0.0010	1	12/21/16 15:15	12/29/16 16:02	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/29/16 16:02	7782-49-2	
Γhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/21/16 15:15	12/29/16 16:02	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	12/19/16 16:15	12/20/16 10:02	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	632	mg/L	5.0	1		12/20/16 12:37		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	0-H+B					
oH at 25 Degrees C	7.5	Std. Units	0.10	1		12/27/16 09:30	1	H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	34.0	mg/L	2.0	2		01/10/17 21:00	16887-00-6	
Fluoride	0.31	mg/L	0.20	1		01/04/17 15:32	16984-48-8	
Sulfate	199	mg/L	20.0	20		01/10/17 23:34	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

QC Batch: 459521 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60234592001, 60234592002

METHOD BLANK: 1881503 Matrix: Water

Associated Lab Samples: 60234592001, 60234592002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 12/20/16 09:20

LABORATORY CONTROL SAMPLE: 1881504

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0048 96 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1881505 1881506

MS MSD 60234342001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0036 70-130 20 Mercury mg/L <0.20 ug/L .005 .005 0.0041 81 73 11

MATRIX SPIKE SAMPLE: 1881507

60234340001 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers < 0.00020 70-130 Mercury mg/L .005 0.0049 98

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

QC Batch: 459902 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60234592001, 60234592002

METHOD BLANK: 1882844 Matrix: Water

Associated Lab Samples: 60234592001, 60234592002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	12/28/16 18:10	
Beryllium	mg/L	< 0.0010	0.0010	12/28/16 18:10	
Boron	mg/L	<0.10	0.10	12/28/16 18:10	
Calcium	mg/L	<0.10	0.10	12/28/16 18:10	
Chromium	mg/L	< 0.0050	0.0050	12/28/16 18:10	
Lead	mg/L	< 0.0050	0.0050	12/28/16 18:10	
Lithium	mg/L	< 0.010	0.010	12/28/16 18:10	

LABORATORY CONTROL SAMPLE:	1882845					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		0.96	96	85-115	
Beryllium	mg/L	1	1.0	101	85-115	
Boron	mg/L	1	0.94	94	85-115	
alcium	mg/L	10	9.7	97	85-115	
hromium	mg/L	1	0.95	95	85-115	
ead	mg/L	1	1.1	106	85-115	
thium	mg/L	1	0.99	99	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 18828	46		1882847							
			MS	MSD								
	6	0234340002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	0.028	1	1	1.0	1.0	98	99	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	1.0	1.0	102	103	70-130	1	20	
Boron	mg/L	1.0	1	1	1.9	2.0	92	98	70-130	3	20	
Calcium	mg/L	303	10	10	297	303	-60	-3	70-130	2	20	M1
Chromium	mg/L	< 0.0050	1	1	0.93	0.97	93	97	70-130	4	20	
Lead	mg/L	< 0.0050	1	1	1.0	1.0	99	101	70-130	2	20	
Lithium	mg/L	0.024	1	1	1.1	1.1	104	106	70-130	2	20	

MATRIX SPIKE SAMPLE:	1882848						
		60234594003	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.15	1	1.1	97	70-130	
Beryllium	mg/L	< 0.0010	1	1.0	102	70-130	
Boron	mg/L	0.14	1	1.1	95	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

MATRIX SPIKE SAMPLE:	1882848						
Parameter	Units	60234594003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
							Qualificis
Calcium	mg/L	164	10	172	85	70-130	
Chromium	mg/L	< 0.0050	1	0.93	93	70-130	
Lead	mg/L	< 0.0050	1	1.0	100	70-130	
Lithium	mg/L	0.018	1	1.1	104	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

QC Batch: 459903 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60234592001, 60234592002

METHOD BLANK: 1882849 Matrix: Water

Associated Lab Samples: 60234592001, 60234592002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	12/29/16 14:56	
Arsenic	mg/L	< 0.0010	0.0010	12/29/16 14:56	
Cadmium	mg/L	< 0.00050	0.00050	12/29/16 14:56	
Cobalt	mg/L	< 0.0010	0.0010	12/29/16 14:56	
Molybdenum	mg/L	< 0.0010	0.0010	12/29/16 14:56	
Selenium	mg/L	< 0.0010	0.0010	12/29/16 14:56	
Thallium	mg/L	< 0.0010	0.0010	12/29/16 14:56	

LABORATORY CONTROL SAMPLE:	1882850					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.039	97	85-115	
Arsenic	mg/L	.04	0.038	95	85-115	
Cadmium	mg/L	.04	0.038	96	85-115	
Cobalt	mg/L	.04	0.039	96	85-115	
Molybdenum	mg/L	.04	0.039	98	85-115	
Selenium	mg/L	.04	0.037	93	85-115	
Thallium	mg/L	.04	0.040	99	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 18828	51 MS	MSD	1882852							
Parameter	6 Units	0234340003 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	<0.0010	.04	.04	0.039	0.039	97	97	70-130		20	
Arsenic	mg/L	< 0.0010	.04	.04	0.037	0.037	93	92	70-130	1	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.035	0.035	86	87	70-130	0	20	
Cobalt	mg/L	0.0029	.04	.04	0.038	0.038	87	87	70-130	0	20	
Molybdenum	mg/L	< 0.0010	.04	.04	0.041	0.042	101	102	70-130	2	20	
Selenium	mg/L	< 0.0010	.04	.04	0.035	0.035	87	88	70-130	2	20	
Thallium	mg/L	< 0.0010	.04	.04	0.037	0.037	93	93	70-130	0	20	

MATRIX SPIKE SAMPLE:	1882853						
		60234594002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	.04	0.039	97	70-130	
Arsenic	mg/L	< 0.0010	.04	0.037	91	70-130	
Cadmium	mg/L	< 0.00050	.04	0.036	90	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

MATRIX SPIKE SAMPLE:	1882853						
Parameter	Units	60234594002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Farameter	Offics	Result	Conc.	Kesuit	70 KeC	LIIIIIII	Qualifiers
Cobalt	mg/L	< 0.0010	.04	0.036	89	70-130	
Molybdenum	mg/L	0.0037	.04	0.044	102	70-130	
Selenium	mg/L	< 0.0010	.04	0.034	84	70-130	
Thallium	mg/L	< 0.0010	.04	0.038	95	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

QC Batch: 459669 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60234592001, 60234592002

METHOD BLANK: 1881980 Matrix: Water

Associated Lab Samples: 60234592001, 60234592002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 12/20/16 12:22

LABORATORY CONTROL SAMPLE: 1881981

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 975 98 80-120

SAMPLE DUPLICATE: 1881982

60234338001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 3610 10 D6 **Total Dissolved Solids** 3230 11 mg/L

SAMPLE DUPLICATE: 1881983

Date: 01/19/2017 08:09 AM

Parameter Units 60234594001 Dup Max Result RPD Qualifiers
Total Dissolved Solids mg/L 496 502 1 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

QC Batch: 460391 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60234592001, 60234592002

SAMPLE DUPLICATE: 1884623

Date: 01/19/2017 08:09 AM

 Parameter
 Units
 60234524007 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 6.6
 6.6
 0
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

QC Batch: 461088 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60234592001, 60234592002

METHOD BLANK: 1887366 Matrix: Water

Associated Lab Samples: 60234592001, 60234592002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 01/04/17 12:48

LABORATORY CONTROL SAMPLE: 1887367

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.7 106 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1887368 1887369

MS MSD 60235068001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Fluoride ND 80-120 mg/L 2.5 2.5 3.1 3.1 118 119 0 15

MATRIX SPIKE SAMPLE: 1887370 MS 60235068003 Spike MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers 0.30 3.3 121 80-120 M1 Fluoride mg/L 2.5

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Sulfate

Date: 01/19/2017 08:09 AM

QC Batch: 461555 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60234592001, 60234592002

METHOD BLANK: 1889265 Matrix: Water

Associated Lab Samples: 60234592001, 60234592002

ParameterUnitsBlank ResultReporting LimitAnalyzedQualifiersChloridemg/L<1.0</td>1.001/10/17 17:09

Sulfate mg/L <1.0 1.0 01/10/17 17:09

mg/L

LABORATORY CONTROL SAMPLE: 1889266

Spike LCS LCS % Rec
Parameter Units Conc. Result % Rec Limits Qualifiers

 Chloride
 mg/L
 5
 4.8
 97
 90-110

 Sulfate
 mg/L
 5
 4.8
 97
 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1889267 1889268 MS MSD

60235242001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual 15 M1 Chloride mg/L 2960 2500 2500 5640 5980 120 134 80-120 6 Sulfate mg/L ND 2500 2500 3340 3410 116 118 80-120 2 15

MATRIX SPIKE SAMPLE: 1889269 MS MS 60235242002 % Rec Spike Qualifiers Parameter Units Result Conc. Result % Rec Limits Chloride 1150 500 1720 113 80-120 mg/L

131

500

694

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

#### **REPORT OF LABORATORY ANALYSIS**

80-120

113



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Sample: FAA-5-121616 PWS:	<b>Lab ID: 60234</b> 5 Site ID:	<b>592001</b> Collected: 12/16/16 13:08 Sample Type:	Received:	12/17/16 09:45	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.713 ± 0.530 (0.662) C:NA T:86%	pCi/L	01/18/17 11:43	13982-63-3	
Radium-228	EPA 904.0	0.411 ± 0.402 (0.824) C:66% T:85%	pCi/L	01/17/17 11:45	5 15262-20-1	
Total Radium	Total Radium Calculation	1.12 ± 0.932 (1.49)	pCi/L	01/19/17 08:23	3 7440-14-4	



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Sample: DUP-121616 PWS:	<b>Lab ID: 6023459</b> Site ID:	2002 Collected: 12/16/16 06:00 Sample Type:	Received:	12/17/16 09:45	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.226 ± 0.344 (0.204) C:NA T:87%	pCi/L	01/18/17 11:43	13982-63-3	
Radium-228	EPA 904.0	0.590 ± 0.444 (0.871) C:67% T:80%	pCi/L	01/17/17 11:46	5 15262-20-1	
Total Radium	Total Radium Calculation	$0.816 \pm 0.788  (1.08)$	pCi/L	01/19/17 08:23	3 7440-14-4	



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

QC Batch: 245951 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60234592001, 60234592002

METHOD BLANK: 1209764 Matrix: Water

Associated Lab Samples: 60234592001, 60234592002

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.132 ± 0.301 (0.178) C:NA T:86%
 pCi/L
 01/18/17 10:45

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

QC Batch: 245952 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60234592001, 60234592002

METHOD BLANK: 1209765 Matrix: Water

Associated Lab Samples: 60234592001, 60234592002

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.0251 ± 0.336 (0.783) C:63% T:80%
 pCi/L
 01/17/17 11:52

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 01/19/2017 08:09 AM

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234592

Date: 01/19/2017 08:09 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60234592001 60234592002	FAA-5-121616 DUP-121616	EPA 200.7 EPA 200.7	459902 459902	EPA 200.7 EPA 200.7	459945 459945
60234592001 60234592002	FAA-5-121616 DUP-121616	EPA 200.8 EPA 200.8	459903 459903	EPA 200.8 EPA 200.8	459947 459947
60234592001 60234592002	FAA-5-121616 DUP-121616	EPA 245.1 EPA 245.1	459521 459521	EPA 245.1 EPA 245.1	459549 459549
60234592001 60234592002	FAA-5-121616 DUP-121616	EPA 903.1 EPA 903.1	245951 245951		
60234592001 60234592002	FAA-5-121616 DUP-121616	EPA 904.0 EPA 904.0	245952 245952		
60234592001 60234592002	FAA-5-121616 DUP-121616	Total Radium Calculation Total Radium Calculation	246856 246856		
60234592001 60234592002	FAA-5-121616 DUP-121616	SM 2540C SM 2540C	459669 459669		
60234592001 60234592002	FAA-5-121616 DUP-121616	SM 4500-H+B SM 4500-H+B	460391 460391		
60234592001	FAA-5-121616	EPA 300.0	461088		
60234592001	FAA-5-121616	EPA 300.0	461555		
60234592002	DUP-121616	EPA 300.0	461088		
60234592002	DUP-121616	EPA 300.0	461555		



# Sample Condition Upon Receipt



Client Name: Wester Energy	
Courier: FedEx UPS VIA VIA Clay PEX E	CI □ Pace □ Xroads □ Client □ Other □
	bel Used? Yes □ No□
Custody Seal on Cooler/Box Present: Yes ✓ No □ Seals intact	'
CF+0.7 CF-0.5	pam □ None □ Other □
Thermometer Used: 1-266 / 1-239 Type of Ice: Wet B	lue None  Date and initials of person
Cooler Temperature (°C): As-read 1.3 Corr. Factor Cf +9/7 CF -0.5	Corrected examining contents:
Temperature should be above freezing to 6°C	PV12/17116
Chain of Custody present:   ✓ Yes □No	□n/A
Chain of Custody relinquished:   ✓ Yes □No	□n/A
Samples arrived within holding time:   ✓ Yes □No	□n/a
Short Hold Time analyses (<72hr): ✓Yes □No	□N/A PH
Rush Turn Around Time requested:	□n/a
Sufficient volume:	□N/A
Correct containers used:   ✓ Yes □No	□n/a
Pace containers used: ☐Yes ☐No	□n/a
Containers intact:	□n/a
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs? □Yes □No	∠ N/A
Filtered volume received for dissolved tests?	ZIN/A
Sample labels match COC: Date / time / ID / analyses	□n/a
Samples contain multiple phases? Matrix:	□n/a
Containers requiring pH preservation in compliance? □Yes □No	ØN/A
(HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TŖH, OK-DRO)	
Cyanide water sample checks: N/A	
Lead acetate strip turns dark? (Ŕecord only) □Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve) □Yes □No	
Trip Blank present: □Yes □No	ØN/A
Headspace in VOA vials ( >6mm): □Yes □No	ÇÎN/A
Samples from USDA Regulated Area: State: □Yes □No	ZÍN/A
Additional labels attached to 5035A / TX1005 vials in the field? ☐Yes ☐No	ŹN/A
Client Notification/ Resolution: Copy COC to Client? Y	/ N Field Data Required? Y / N
Person Contacted: Date/Time:	
Comments/ Resolution:	
*	
	<del></del>
Project Manager Review:	Date:

By HMW at 10:02 am, 12/19/16



# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section Require	n A ed Client Information:	Section E Required		t Inform	nation;						on C e Infom	nation:													Page	e:	1	of	1	
ompar	WESTAR ENERGY	Report To:	Brai	ndon	Griffin	ed i				Attent	ion:	Jar	ed M	orriso	on	-		1	100						150	300	10			LEIST
ddress	818 Kansas Ave	Сору То:	Jare	ed Mo	rrison, He	eath Hor	nya			Comp	any Na	me:	WES	STAR	ENE	RGY	Ħ	1		RE	GUL	ATOR	YA	GENCY	1	1.5				1 × Y =
÷	Topeka, KS 66612		7			1				Addre	SS:		SEE	SEC.	TION	Α				P	NPI	DES	<u></u>	GROU	VD WA	ATER		DRINKING	S WAT	ER
mail T	brandon.l.griffin@westarenergy.com	Purchase 6	Order 1	No.:	T S	-7-				Pace C Refere								Т		1	US	Т	Г	RCRA	Ι.		T (	OTHER		
hone:	(785) 575-8135 Fax:	Project Na	me:	JEC	CCR Gro	oundwate	эг	177			Project	He	ather	Wils	on, 9	13-56	3-14	07	H	Si	te Lo	cation								
Reques	sted Due Date/TAT; 7 DAY	Project Nu	mber.	9		2 5					rofile #.	965	57, 1		П	m					s	TATE:	1	KS						
	TU E			1	. 1	.0.		2.1			-0						R	eque	ested	Ana	lysis	Filter	red (	Y/N)						
	Section D Valid Matrix Required Client Information MATRIX DRINKING WATER	CODE	codes to left)	C=COMP)		COLL	ECTED		-			Pre	serva	atives		N/N					-		ij	10.18						
ITEM#	SAMPLE ID  (A-Z, 0-9 /,-)  Sample IDs MUST BE UNIQUE  Sample IDs MUST BE UNIQUE  WIPE  AIR  TISSUE	WT WW P SL OL WP AR OT TS	MATRIX CODE (see valid	SAMPLE TYPE (G=GRAB	COMPC		COMPO END/GF	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	N HNO <sub>3</sub>	HCI	Nach Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol	# Analysis Test	200,7 Total Metals*	Total	245.1 Total Mercury 300.0 Cl. Fl. SO4		2540C TDS	Radium 226 Radium 228	The state of the s		(IA/V) original dollars	Residual Chlorine (Y/N)		345 Project I		-
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12										1		9 =																The second	(WEAVOYOUT)	
844	ADDITIONAL COMMENTS	-	PEI	INOU	BHED BY	-	1	DAT	CESS1	1000	TIME		,	/	CEPT	-			TION			ATE	-	TIME		_	SAMP	LE CONDI	TIONS	
145SUP	Total Metals: Ba, Be, B, Ca, Cr, Pb, Li  B Total Metals: Co, As, Se, Mo, Cd, Sb, Tl	114	1	/	/w	esta	×/	12/16	16	15	45		H	m	v	PI	95:	5			12/	17/16	0	945	2-0	)	Y	7	7	
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	Page		-			CAMP	ER NAME	AND CICE	IATUE	DE.					= 1%		100	100		-	1	27.0					_	bed (	1	ot
1	32 of					SAMPL	PRINT Nar	ne of SAM	PLER:	BI	mo	len	(	20	Æ	1	D	ATE S	Signed		/	. /	11		Temp in °C		Received on (ce (Y/N)	Custody Sealed Cooler (Y/N)		Samples intact (Y/N)
	34					L	SIGNATUR	RE of SAM	PLER:	1	12	Y	P				(1	MM/DE	D/YY):	17	11	6/1	6		334	_	ır.	30		S

Chain of	Custody
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WO#:30206143





Workorder: 60234592 Workorder Name: JEC CCR GROUNDWATER Owner Received Date: 12/17/2016 Results Requested By: 1/12/2017 Report To Subcontract To Requested Analysis Heather Wilson Pace Analytical Pittsburgh Pace Analytical Kansas 1638 Roseytown Road 9608 Loiret Blvd. Suites 2,3, & 4 Lenexa, KS 66219 Greensburg, PA 15601 Phone (913)599-5665 Phone (724)850-5600 Preserved Containers & Total Sum Collect BP1N Sample Date/Tim Item Sample ID Type Lab ID Matrix LAB USE ONLY FAA-5-121616 PS 12/16/2016 13:08 60234592001 2 Χ Water Χ 001 DUP-121616 PS Χ 12/16/2016 06:00 60234592002 Water 2 Х 000 Comments Released By Transfers Date/Time Received Date/Time 12-20-11,1220 2 Cooler Temperature on Receipt NA °C **Custody Seal** Y or  $\mathbb{R}$ Samples Intact Y or Received on Ice Y or N

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<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

# Sample Condition Upon Receipt Pittsburgh

30206143

				_	
Face Analytical Client Name:	Po	ace.		KS	Project #
Onert Ivame.	1 0				1 10ject #
Courier: Fed Ex UPS USPS Clic Tracking#: 1044 6657 8478	ent □	Comn	nercia	I ☐ Pace Other _	<del></del>
Custody Seal on Cooler/Box Present: Eyes		_			7
. 1/1					⊥ no
Thermometer Used				et Blue (None)	- °C Final Temp. °C
Cooler Temperature Observed Temp Temp should be above freezing to 6°C	1/27	-	Cor	rection Factor:	- °C Final Temp: °C
Temp should be above freezing to 0.0					Date and Initials of person examining contents: ML 12-20-16
Comments:	Yes	No	N/A	<b>V</b>	contents: ML 12-20-16
Chain of Custody Present:	$\times$	1		1.	
Chain of Custody Filled Out:	$\supset$	]		2.	
Chain of Custody Relinquished:	$\searrow$	1		3.	
Sampler Name & Signature on COC:		$\overline{}$		4.	
Sample Labels match COC:	$\supset$			5.	
-Includes date/time/ID/Analysis Matrix: V	1 <del>7</del>		_		
Samples Arrived within Hold Time:	X			6.	
Short Hold Time Analysis (<72hr remaining):		$\overline{\mathbf{X}}$		7.	·
Rush Turn Around Time Requested:		X		8.	
Sufficient Volume:	X			9.	
Correct Containers Used:	X			10.	
-Pace Containers Used:	$\mathbf{X}$				
Containers Intact:				11.	
Filtered volume received for Dissolved tests			$\checkmark$	12.	
All containers needing preservation have been checked.	X			13. 011	
All containers needing preservation are found to be in	X'			13. PH < 2	
compliance with EPA recommendation.		!	<u>.</u>	Initial colors	Po.1. III.
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when MC	Date/time of preservation
				Lot#of added	
Headspace in VOA Vials ( >6mm):		1	$\overline{\times}$	preservative	
Trip Blank Present:		eq		14.  15.	
Trip Blank Custody Seals Present		$\rightarrow$	$\nabla$	10.	· ·
Rad Aqueous Samples Screened > 0.5 mrem/hr		$\forall$		Initial when	Date: 12-20-16
				completed: / '/	Date: 12-26-/6
Client Notification/ Resolution:					
Person Contacted:		I	Date/	ıme:	Contacted By:
Comments/ Resolution:	· <del></del>			<u> </u>	
		·- ·- ·-			
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Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

<sup>\*</sup>PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.



January 20, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

### Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on December 21, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Wilson

Markon M. Wilson

heather.wilson@pacelabs.com

**Project Manager** 

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY







#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification

Idaho Certification
Illinois Certification

Indiana Certification

Iowa Certification #: 391 Kansas/TNI Certification #: E-10358

Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1

New Hampshire/TNI Certification #: 2976 New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Lab ID	Sample ID	Matrix	Date Collected	Date Received	
60234727001	FAA-4-121916	Water	12/19/16 10:34	12/21/16 07:55	
60234727002	FAA-3-121916	Water	12/19/16 11:31	12/21/16 07:55	
60234727003	FAA-2-121916	Water	12/19/16 12:51	12/21/16 07:55	



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

₋ab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60234727001	FAA-4-121916	EPA 200.7	ZBM	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0234727002	FAA-3-121916	EPA 200.7	ZBM	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0234727003	FAA-2-121916	EPA 200.7	ZBM	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	NDJ	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	AGO	1	PASI-K
		EPA 300.0	OL	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method: EPA 200.7

Description:200.7 Metals, TotalClient:WESTAR ENERGYDate:January 20, 2017

#### **General Information:**

3 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: January 20, 2017

#### **General Information:**

3 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: January 20, 2017

#### **General Information:**

3 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** January 20, 2017

#### **General Information:**

3 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method: EPA 904.0

**Description:** 904.0 Radium 228 **Client:** WESTAR ENERGY **Date:** January 20, 2017

#### **General Information:**

3 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:January 20, 2017

#### **General Information:**

3 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY

Date: January 20, 2017

#### **General Information:**

3 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: January 20, 2017

#### **General Information:**

3 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

FAA-2-121916 (Lab ID: 60234727003)
FAA-3-121916 (Lab ID: 60234727002)
FAA-4-121916 (Lab ID: 60234727001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: January 20, 2017

#### **General Information:**

3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

Sample: FAA-4-121916	Lab ID: 602	234727001	Collected: 12/19/1	6 10:34	Received: 12	2/21/16 07:55 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.053	mg/L	0.0050	1	12/23/16 15:15	12/28/16 13:00	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/23/16 15:15	12/28/16 13:00	7440-41-7	
Boron, Total Recoverable	0.36	mg/L	0.10	1		12/28/16 13:00		
Calcium, Total Recoverable	223	mg/L	0.10	1	12/23/16 15:15	12/28/16 13:00	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/23/16 15:15	12/28/16 13:00	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		12/28/16 13:00		
_ithium	0.016	mg/L	0.010	1	12/23/16 15:15	12/28/16 13:00	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:52	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:52	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/27/16 14:00	12/29/16 13:52	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:52	7440-48-4	
Molybdenum, Total Recoverable	0.0026	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:52	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:52	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:52	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	12/21/16 15:00	12/22/16 08:44	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	1150	mg/L	5.0	1		12/23/16 08:38		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	O-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		12/29/16 11:38		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	83.7	mg/L	10.0	10		01/13/17 15:13	16887-00-6	
Fluoride	0.31	mg/L	0.20	1		01/11/17 15:08	16984-48-8	
Sulfate	531	mg/L	50.0	50		01/13/17 15:27	14808-79-8	



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

Sample: FAA-3-121916	Lab ID: 602	234727002	Collected: 12/19/1	6 11:31	Received: 12	/21/16 07:55 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.036	mg/L	0.0050	1	12/23/16 15:15	12/28/16 13:02	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/23/16 15:15	12/28/16 13:02	7440-41-7	
Boron, Total Recoverable	0.79	mg/L	0.10	1	12/23/16 15:15	12/28/16 13:02	7440-42-8	
Calcium, Total Recoverable	225	mg/L	0.10	1	12/23/16 15:15	12/28/16 13:02	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/23/16 15:15	12/28/16 13:02	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	12/23/16 15:15	12/28/16 13:02	7439-92-1	
ithium	0.019	mg/L	0.010	1	12/23/16 15:15	12/28/16 13:02	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:56	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:56	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/27/16 14:00	12/29/16 13:56	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:56	7440-48-4	
Molybdenum, Total Recoverable	0.011	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:56	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:56	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 13:56	7440-28-0	
45.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	12/21/16 15:00	12/22/16 08:47	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	OC					
Total Dissolved Solids	1390	mg/L	5.0	1		12/23/16 08:41		
1500H+ pH, Electrometric	Analytical Met	hod: SM 450	O-H+B					
oH at 25 Degrees C	7.3	Std. Units	0.10	1		12/29/16 11:39		H6
800.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	86.6	mg/L	10.0	10		01/13/17 15:41	16887-00-6	
Fluoride	0.29	mg/L	0.20	1		01/11/17 15:23	16984-48-8	
Sulfate	651	mg/L	50.0	50		01/13/17 15:55	14808-79-8	



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

Sample: FAA-2-121916	Lab ID: 602	34727003	Collected: 12/19/1	6 12:51	Received: 12	/21/16 07:55 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.031	mg/L	0.0050	1	12/23/16 15:15	12/28/16 13:28	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/23/16 15:15	12/28/16 13:28	7440-41-7	
Boron, Total Recoverable	3.6	mg/L	0.10	1	12/23/16 15:15	12/28/16 13:28	7440-42-8	
Calcium, Total Recoverable	291	mg/L	0.10	1	12/23/16 15:15	12/28/16 13:28	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/23/16 15:15	12/28/16 13:28	3 7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	12/23/16 15:15	12/28/16 13:28	7439-92-1	
Lithium	0.016	mg/L	0.010	1	12/23/16 15:15	12/28/16 13:28	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 14:14	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 14:14	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/27/16 14:00	12/29/16 14:14	7440-43-9	
Cobalt, Total Recoverable	0.0011	mg/L	0.0010	1	12/27/16 14:00	12/29/16 14:14	7440-48-4	
Molybdenum, Total Recoverable	0.33	mg/L	0.0010	1	12/27/16 14:00	12/29/16 14:14	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 14:14	7782-49-2	
Гhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/27/16 14:00	12/29/16 14:14	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	12/21/16 15:00	12/22/16 08:49	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	0C					
Total Dissolved Solids	3130	mg/L	5.0	1		12/23/16 08:42	2	
1500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B					
oH at 25 Degrees C	7.5	Std. Units	0.10	1		12/29/16 11:40	)	H6
800.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	68.6	mg/L	5.0	5		01/13/17 16:37	16887-00-6	
Fluoride	0.60	mg/L	0.20	1		01/11/17 15:38	16984-48-8	
Sulfate	2100	mg/L	200	200		01/13/17 16:51	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

QC Batch: 459920 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60234727001, 60234727002, 60234727003

METHOD BLANK: 1882906 Matrix: Water

Associated Lab Samples: 60234727001, 60234727002, 60234727003

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 12/22/16 08:29

LABORATORY CONTROL SAMPLE: 1882907

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0048 96 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1882908 1882909

MS MSD 60234631003 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual ND 0.0057 70-130 20 Mercury mg/L .005 .005 0.0057 114 113

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

QC Batch: 460236 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60234727001, 60234727002, 60234727003

METHOD BLANK: 1884140 Matrix: Water

Associated Lab Samples: 60234727001, 60234727002, 60234727003

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	12/28/16 12:26	
Beryllium	mg/L	< 0.0010	0.0010	12/28/16 12:26	
Boron	mg/L	<0.10	0.10	12/28/16 12:26	
Calcium	mg/L	<0.10	0.10	12/28/16 12:26	
Chromium	mg/L	< 0.0050	0.0050	12/28/16 12:26	
Lead	mg/L	< 0.0050	0.0050	12/28/16 12:26	
Lithium	mg/L	< 0.010	0.010	12/28/16 12:26	

LABORATORY CONTROL SAMPLE:	1884141					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	103	85-115	
Beryllium	mg/L	1	1.0	104	85-115	
Boron	mg/L	1	0.96	96	85-115	
Calcium	mg/L	10	10	100	85-115	
Chromium	mg/L	1	0.98	98	85-115	
Lead	mg/L	1	0.98	98	85-115	
Lithium	mg/L	1	1.1	109	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	NTE: 18841	42		1884143							
Parameter	6 Units	0234133003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.16	1	1	1.2	1.2	104	105	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	1.0	1.0	102	103	70-130	2	20	
Boron	mg/L	1.7	1	1	2.7	2.7	104	99	70-130	2	20	
Calcium	mg/L	254	10	10	266	262	113	83	70-130	1	20	
Chromium	mg/L	< 0.0050	1	1	0.96	0.96	96	96	70-130	0	20	
Lead	mg/L	< 0.0050	1	1	0.87	0.86	86	86	70-130	0	20	
Lithium	mg/L	0.21	1	1	1.3	1.3	112	114	70-130	1	20	

MATRIX SPIKE SAMPLE:	1884144						
		60234727003	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.031	2	2.2	107	70-130	
Beryllium	mg/L	< 0.0010	2	2.1	106	70-130	
Boron	mg/L	3.6	2	5.6	104	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

MATRIX SPIKE SAMPLE:	1884144						
Parameter	Units	60234727003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
- arameter							Qualificio
Calcium	mg/L	291	20	317	128	70-130	
Chromium	mg/L	< 0.0050	2	2.0	98	70-130	
Lead	mg/L	< 0.0050	2	1.8	92	70-130	
Lithium	mg/L	0.016	2	2.3	116	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

QC Batch: 460439 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60234727001, 60234727002, 60234727003

METHOD BLANK: 1884750 Matrix: Water

Associated Lab Samples: 60234727001, 60234727002, 60234727003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	12/29/16 12:25	
Arsenic	mg/L	< 0.0010	0.0010	12/29/16 12:25	
Cadmium	mg/L	< 0.00050	0.00050	12/29/16 12:25	
Cobalt	mg/L	< 0.0010	0.0010	12/29/16 12:25	
Molybdenum	mg/L	< 0.0010	0.0010	12/29/16 12:25	
Selenium	mg/L	< 0.0010	0.0010	12/29/16 12:25	
Thallium	mg/L	< 0.0010	0.0010	12/29/16 12:25	

LABORATORY CONTROL SAMPLE:	1884751					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.039	98	85-115	
Arsenic	mg/L	.04	0.040	99	85-115	
Cadmium	mg/L	.04	0.039	98	85-115	
Cobalt	mg/L	.04	0.038	96	85-115	
Molybdenum	mg/L	.04	0.039	98	85-115	
Selenium	mg/L	.04	0.040	101	85-115	
Thallium	mg/L	.04	0.038	94	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 18847	52		1884753							
Parameter	e Units	60234844001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	4.2 ug/L	.04	.04	0.041	0.041	93	93	70-130		20	
Arsenic	mg/L	26.8 ug/L	.04	.04	0.062	0.061	88	85	70-130	2	20	
Cadmium	mg/L	<0.50 ug/L	.04	.04	0.033	0.034	82	84	70-130	2	20	
Cobalt	mg/L	1.4 ug/L	.04	.04	0.035	0.034	83	83	70-130	0	20	
Molybdenum	mg/L	35.9 ug/L	.04	.04	0.077	0.076	103	99	70-130	2	20	
Selenium	mg/L	6.5 ug/L	.04	.04	0.040	0.041	85	85	70-130	1	20	
Thallium	mg/L	<1.0 ug/L	.04	.04	0.035	0.035	86	86	70-130	0	20	

MATRIX SPIKE SAMPLE:	1884754						
		60234845001	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<20.0 ug/L	.04	0.042	88	70-130	
Arsenic	mg/L	21.3 ug/L	.04	0.052	77	70-130	
Cadmium	mg/L	12.3 ug/L	.04	0.048	90	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

MATRIX SPIKE SAMPLE:	1884754						
Parameter	Units	60234845001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
- Farameter	Office	Resuit	Conc.	Result	76 KeC	LIIIIIIS	Qualifiers
Cobalt	mg/L	39.8 ug/L	.04	0.075	88	70-130	
Molybdenum	mg/L	156 ug/L	.04	0.20	105	70-130	
Selenium	mg/L	62.7 ug/L	.04	0.091	70	70-130	
Thallium	mg/L	<20.0 ug/L	.04	0.039	90	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

QC Batch: 460157 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60234727001, 60234727002, 60234727003

METHOD BLANK: 1883744 Matrix: Water

Associated Lab Samples: 60234727001, 60234727002, 60234727003

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 12/23/16 08:37

LABORATORY CONTROL SAMPLE: 1883745

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 934 93 80-120

SAMPLE DUPLICATE: 1883746

60234727001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 1150 3 10 **Total Dissolved Solids** 1180 mg/L

SAMPLE DUPLICATE: 1883747

Date: 01/20/2017 02:58 PM

60234723001 Dup Max RPD RPD Parameter Units Result Result Qualifiers 538 **Total Dissolved Solids** mg/L 513 5 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

QC Batch: 460624 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60234727001, 60234727002, 60234727003

SAMPLE DUPLICATE: 1885275

Date: 01/20/2017 02:58 PM

 Parameter
 Units
 60234727003 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.5
 7.5
 0
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Qualifiers

Analyzed



#### **QUALITY CONTROL DATA**

JEC CCR GROUNDWATER Project:

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

QC Batch: 461703 Analysis Method: EPA 300.0 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

60234727001, 60234727002, 60234727003 Associated Lab Samples:

METHOD BLANK: 1889823 Matrix: Water

Associated Lab Samples: 60234727001, 60234727002, 60234727003

> Blank Reporting Limit Parameter Units Result

< 0.20 0.20

Fluoride 01/11/17 10:36 mg/L

LABORATORY CONTROL SAMPLE: 1889824

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.5 102 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1889825 1889826

MS MSD 60235399001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Fluoride ND 125 mg/L 125 132 132 105 106 80-120 0 15

MATRIX SPIKE SAMPLE: 1889827 MS 60235400001 Spike MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers ND 103 80-120 Fluoride mg/L 12.5 13.2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

JEC CCR GROUNDWATER Project:

Pace Project No.: 60234727

461949

QC Batch: QC Batch Method: EPA 300.0 Analysis Method:

EPA 300.0

Analysis Description:

300.0 IC Anions

60234727001, 60234727002, 60234727003 Associated Lab Samples:

METHOD BLANK: 1891083 Matrix: Water

Associated Lab Samples:

60234727001, 60234727002, 60234727003

Blank

Reporting

Parameter Units Result mg/L

Limit Analyzed Qualifiers

Chloride <1.0 01/13/17 12:13 1.0 Sulfate mg/L <1.0 1.0 01/13/17 12:13

LABORATORY CONTROL SAMPLE: Parameter

1891084

Units

60235060014

Result

Spike LCS Conc. Result

MSD

Spike

Conc.

5

5

LCS % Rec

% Rec Limits

Qualifiers

Chloride Sulfate

mg/L mg/L

Units

5 5 4.7 5.1

95 103 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

1891085

8.4

4.6

MS

Spike

Conc.

1891086

Result

MS

MSD

Result

90-110

MSD

% Rec

101

103

% Rec Limits

Max **RPD** RPD

Chloride Sulfate

mg/L mg/L

60235060015

5

5

13.8 13.4 9.8 9.8 107 103

MS

MS

% Rec

80-120 80-120

% Rec

0

2 15 15

Qualifiers

Qual

MATRIX SPIKE SAMPLE:

Date: 01/20/2017 02:58 PM

Parameter

1891087

Parameter Units Chloride mg/L Sulfate mg/L

Spike Result Conc. 12.3 13.0

Result 5 17.9 5 18.3

MS

% Rec Limits 113 106

80-120 80-120

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60234727

Sample: FAA-4-121916 Lab ID: 60234727001 Collected: 12/19/16 10:34 Received: 12/21/16 07:55 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.000 \pm 0.489$  (1.03) Radium-226 pCi/L 01/19/17 11:51 13982-63-3 C:NA T:92% EPA 904.0  $0.349 \pm 0.407 \quad (0.856)$ 01/19/17 11:35 15262-20-1 Radium-228 pCi/L C:65% T:85% Total Radium Total Radium  $0.349 \pm 0.896$  (1.89) pCi/L 01/20/17 11:59 7440-14-4



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

<b>Sample: FAA-3-121916</b> PWS:	Lab ID: 60234 Site ID:	<b>727002</b> Collected: 12/19/16 11:31 Sample Type:	Received:	12/21/16 07:55	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.238 ± 0.412 (1.04) C:NA T:93%	pCi/L	01/19/17 12:03	13982-63-3	
Radium-228	EPA 904.0	0.484 ± 0.403 (0.802) C:65% T:83%	pCi/L	01/19/17 11:36	5 15262-20-1	
Total Radium	Total Radium Calculation	0.484 ± 0.815 (1.84)	pCi/L	01/20/17 11:59	7440-14-4	



#### **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Sample: FAA-2-121916 Lab ID: 60234727003 Collected: 12/19/16 12:51 Received: 12/21/16 07:55 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.807 ± 0.509 (0.219) Radium-226 pCi/L 01/19/17 12:02 13982-63-3 C:NA T:98% EPA 904.0  $0.789 \pm 0.441 \quad (0.787)$ Radium-228 pCi/L 01/19/17 11:36 15262-20-1 C:65% T:80% Total Radium Total Radium  $1.60 \pm 0.950 \quad (1.01)$ pCi/L 01/20/17 11:59 7440-14-4 Calculation



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

QC Batch: 245977 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60234727001, 60234727002, 60234727003

METHOD BLANK: 1209835 Matrix: Water

Associated Lab Samples: 60234727001, 60234727002, 60234727003

Parameter Act ± Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-228 0.657  $\pm$  0.382 (0.688) C:65% T:93% pCi/L 01/19/17 11:37

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

QC Batch: 245976 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60234727001, 60234727002, 60234727003

METHOD BLANK: 1209834 Matrix: Water

Associated Lab Samples: 60234727001, 60234727002, 60234727003

Parameter Act ± Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-226 -0.078 ± 0.356 (0.840) C:NA T:94% pCi/L 01/19/17 11:14

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 01/20/2017 02:58 PM

H6 Analysis initiated outside of the 15 minute EPA required holding time.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60234727

Date: 01/20/2017 02:58 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60234727001	FAA-4-121916	EPA 200.7	460236	EPA 200.7	460373
60234727002	FAA-3-121916	EPA 200.7	460236	EPA 200.7	460373
60234727003	FAA-2-121916	EPA 200.7	460236	EPA 200.7	460373
60234727001	FAA-4-121916	EPA 200.8	460439	EPA 200.8	460506
60234727002	FAA-3-121916	EPA 200.8	460439	EPA 200.8	460506
60234727003	FAA-2-121916	EPA 200.8	460439	EPA 200.8	460506
60234727001	FAA-4-121916	EPA 245.1	459920	EPA 245.1	459935
60234727002	FAA-3-121916	EPA 245.1	459920	EPA 245.1	459935
60234727003	FAA-2-121916	EPA 245.1	459920	EPA 245.1	459935
60234727001	FAA-4-121916	EPA 903.1	245976		
60234727002	FAA-3-121916	EPA 903.1	245976		
60234727003	FAA-2-121916	EPA 903.1	245976		
60234727001	FAA-4-121916	EPA 904.0	245977		
60234727002	FAA-3-121916	EPA 904.0	245977		
60234727003	FAA-2-121916	EPA 904.0	245977		
60234727001	FAA-4-121916	Total Radium Calculation	246983		
60234727002	FAA-3-121916	Total Radium Calculation	246983		
60234727003	FAA-2-121916	Total Radium Calculation	246983		
60234727001	FAA-4-121916	SM 2540C	460157		
60234727002	FAA-3-121916	SM 2540C	460157		
60234727003	FAA-2-121916	SM 2540C	460157		
60234727001	FAA-4-121916	SM 4500-H+B	460624		
60234727002	FAA-3-121916	SM 4500-H+B	460624		
60234727003	FAA-2-121916	SM 4500-H+B	460624		
60234727001	FAA-4-121916	EPA 300.0	461703		
60234727001	FAA-4-121916	EPA 300.0	461949		
60234727002	FAA-3-121916	EPA 300.0	461703		
60234727002	FAA-3-121916	EPA 300.0	461949		
60234727003	FAA-2-121916	EPA 300.0	461703		
60234727003	FAA-2-121916	EPA 300.0	461949		



# Sample Condition Upon Receipt



Client Name: Wester Energy		
	PEX 🗆 ECI 🗆	Pace □ Xroads □ Client □ Other □
Tracking #: Pa	ce Shipping Label Used	d? Yes□ Nodi
Custody Seal on Cooler/Box Present: Yes ✓ No □	Seals intact: Yes	No 🗆
Packing Material: Bubble Wrap ☐ Bubble Bags	□ Foam □	None ☐ Other □
Thermometer Used: T(266)/ T-239 / Type of	of Ice: Wet Blue No	Date and initials of person
Cooler Temperature (°C): As-read O.B/O. 4 Corr. Fac	tor <u>CF +0.7 CF +0.9</u> Correct	ed / 5/ / / examining contents:
Temperature should be above freezing to 6°C		PV12/21/16
Chain of Custody present:	Yes □No □N/A	
Chain of Custody relinquished:	Yes No N/A	
Samples arrived within holding time:	Yes □No □N/A	
Short Hold Time analyses (<72hr):	Yes □No □N/A	PH
Rush Turn Around Time requested:	□Yes ☑No □N/A	
Sufficient volume:	Ves □No □N/A	
Correct containers used:	Yes □No □N/A	
Pace containers used:	Yes □No □N/A	
Containers intact:	Yes □No □N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No ☑N/A	
Filtered volume received for dissolved tests?	□Yes □No □N/A	
Sample labels match COC: Date / time / ID / analyses	Yes □No □N/A	
Samples contain multiple phases? Matrix: wT	□Yes ☑No □N/A	
Containers requiring pH preservation in compliance?	Yes □No □N/A	
(HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)		
Cyanide water sample checks: N/A		
Lead acetate strip turns dark? (Record only)	□Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	· · · · · · · · · · · · · · · · · · ·
Trip Blank present:	□Yes □No □N/A	
Headspace in VOA vials ( >6mm):	□Yes □Nø ØN/A	
Samples from USDA Regulated Area: State:	□Yes □No □N/A	
Additional labels attached to 5035A / TX1005 vials in the field	d? □Yes □No ØN/A	
Client Notification/ Resolution: Copy COC	to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date	/Time:	
Comments/ Resolution:		
111		
Project Manager Review:	Dat	· 12/21/16



# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

Required Client Information: Req	ction B Juired Project			-		. 7		Invoic	on C e Infor		- d M							7					P	age:	1	of		
Company: WESTAR ENERGY Rep	ort To: Bran		2					Attent				lorris				- 1		-						-			-	
Address: 818 Kansas Ave Cop	y To: Jare	d Mo	rrison, He	ath Horr	iya	8		6	any Na				ENE		1		_	_	_	_	_	GENC				DDINIUM IC	)A/AİED	-
Topeka, KS 66612								Addre			SEE	SEC	TION	A					NP			GROU		WATE		DRINKING	WATER	
Email To: brandon,l.griffin@westarenergy.com Pur	chase Order f	Vo::	7 3					Pace C Refere	nce:									F	US	_	_	RCRA		- 12	,,,,,,,,	OTHER	,,,,,,,,,,	7///
Phone: (785) 575-8135 Fax: Pro	ject Name:	JEC	CCR Gro	undwate	Г	1		Pace F Manag	Project jer.	He	ather	r Wils	son, 9	13-5	63-1	407		Si	ite Lo	catio	n	K	s					
Requested Due Date/TAT: 7 DAY Pro	ject Number:	1	x		T 4 E			Pace F	Profile #	96	57, 1								1.91	TATE	-			_ [				<i>     </i>
VV =		1		3.7	E B	91					7	4 -				Requ	este	d Ana	lysis	Filte	ered	(Y/N)	-					
	s DDE Codes to left)	OMP)		COLL	ECTED	T				Pre	serv	ative	s	N/W							_							
DRINKING WATER DW WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER AND AIR AR	see valid	SAMPLE TYPE (G=GRAB C=COMP)	COMPC STAR		COMPOS END/GR	NTE AB	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H <sub>2</sub> SO <sub>4</sub>	0	NaoH Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol	Other	↓Analysis lest↓	Total Meta	Total	300.0 Cl, Fl, SO4 4500 H+B	2540C TDS	Radium 226	Kadium 220	ALL BURLING TO THE O		Residual Chlorine (Y/N)		2347		
IZEM	₹	SA	DATE	TIME	DATE	TIME	S <sub>Y</sub>		5	_	+	žž	Σ	Ō   <b>-</b>	3 6	118	24	8 4	12	<u> </u>	ř		+				10./ Lab 1.	
1 PAA-4-121916		6			121716	1034		14	111	13		4	+	4	-	1		-		+	# 8	H	+	++"	13120	181.50	26//	62
2 FAA- 3-121916		6		100	12-1916	1131		14	-	3		-	+	4	-			+	$\vdash$	-	-	++	+	+	+			WB
3 FAA-2-12(916	W	6			12196	125		14	1	-		+		4	-	-					+	H	-	+	V	v		~_
4 -			2	14.5		F 2	-	-	1		+		-	$\dashv$	1	Es .		+	H			+	+	11				
5				10.3			H		+	+	+	+		$\dashv$	+		H	+			+	++	+	11				
6					3		+	-	+						+	+									4			
7			-			- 87		IA.	+	3 10		+			1	1			13		15		1		-			
8	-34				1	-	+	1							I				¥,								3.1	
9	4							1 8			Н	1			ı			T	T					1 30				
10							T						Bar.										+4		13.			8
11						3				7		ē	1														72	
12 ADDITIONAL COMMENTS	RE	LINQU	ISHED BY	/ AFFILIAT	ION	DAT	E		TIME		NIA.		CCEP	TED	BY / A	FFILL	ATION			DATE		TIME	50	3	SAM	PLE CONDI	TIONS	
*200.7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Ll	ALI	5	16	DCL.	-	12/20	11	110	чіі	1		17	V	- 1	024	57			12	bil	16	755	-1	1.5	+	7	7	
**200.8 Total Metals: Co, As. Se, Mo, Cd, Sb, Tl	11/	y	1 00	971		175	/ 1 }	+		+	1	10	1/4	DU		CVS.	17.2	1	1	,-,,	T			1.1	7	4	Y	
2000 (State Wildland, Co., 710, Co., 1110, C		4.			-	-	-	H	Н	3 1	-			-	Ħ	H.			-	_	+	11 7 1				-		. 1
															Here	P	-1	-		-	+							
Pa	İ			1										-					1		_1_		-			00 4	7	
Page 34 of 36		. \		SAMPI	PRINT Na	me of SAN	PLE	R: [	3/2	du	1	SK.	FFiv	1		DATE (MM/	E Signo	ed /	2/3	10/	116			Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact	(N/A)

# **Chain of Custody**

WO#: 30206487





Workorder: 60234727 Workorder Name: JEC CCR GROUNDWATER **Owner Received Date:** 12/21/2016 Results Requested By: 1/16/2017 Report To Subcontract To Requested Analysis Heather Wilson Pace Analytical Pittsburgh Pace Analytical Kansas 1638 Roseytown Road 9608 Loiret Blvd. Suites 2.3. & 4 Lenexa, KS 66219 Greensburg, PA 15601 Phone (913)599-5665 Phone (724)850-5600 Radium-228 **Preserved Containers** HN03 Collect Sample Sample ID Type Date/Time Lab ID Matrix LAB USE ONLY FAA-4-121916 PS 12/19/2016 10:34 60234727001 Water 2 Χ Х 061 PS FAA-3-121916 12/19/2016 11:31 60234727002 Water 2 Χ Χ 007 FAA-2-121916 PS 12/19/2016 12:51 60234727003 2 Water Χ Χ 003 5 Comments \*Please report Total Radium as well Transfers Released By Date/Time Received By Date/Time 12/11/16 120 Var-IZ/ZZ BOO 3 MA°C Cooler Temperature on Receipt Custody Seal Y or N Received on Ice Y or N Samples Intact Y or N

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<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

# Sample Condition Upon Receipt Pittsburgh

30206487

Face Analytical Client Name:		Pac	CC	KS	,	Project #
Courier: Fed Ex UPS USPS C	Client $\Box$	Comm	nercial	I ☐ Pace	Other	·
Custody Seal on Cooler/Box Present:	es D	no	Sea	ls intact: [	J yes ∫	no
						4
Cooler Temperature Observed Temp	NA	- ° C	Cor	rection Fac	tor <u>: NA</u>	°C Final Temp <u>: //</u> °C
Temp should be above freezing to 6°C						Determining
	F		T	_		contents:
Comments:	Yes	No	N/A			PC 12-22-16
Chain of Custody Present:		<del> </del>	<u> </u>			
Chain of Custody Filled Out:	+	<del> </del>	ļ	2.		
Chain of Custody Relinquished:		-	ļ	3.		
Sampler Name & Signature on COC:	-/-		ļ	4.		
Sample Labels match COC:				5.		
-Includes date/time/ID/Analysis Matrix:	ترم}_	1	<del></del>			
Samples Arrived within Hold Time:				6.		
Short Hold Time Analysis (<72hr remaining):				7.		
Rush Turn Around Time Requested:	<u> </u>			8.		
Outrier: Ded Ex UPS UPS USPS Client Commercial Pace Other racking #: TOULU (657 ACC Use of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the content of the c						
Dute:   Fed Ex   UPS   USPS   Client   Commercial   Pace Other   Aciding #:   70_UL   U.C.5.7   C.U.C.   Istody Seal on Cooler/Box Present:   Yes   No   Seals Intact:   Yes   No   None   Yes   No   Seals Intact:   Yes   No   None   Yes   Yes   No   None   Yes   Ye						
butler:   Fed Ex						
Containers Intact:				11.		
Filtered volume received for Dissolved tests				12.		
All containers needing preservation have been checked.				13.		
All containers needing preservation are found to be in						
compliance with EPA recommendation.	<u>                                     </u>			Initial when	^	Date/time of
exceptions: VOA, coliform, TOC, O&G, Phenolic	s				120	preservation 12-22-16
					d	
III-de-e-in MOA Viole ( > Coom)	T			<del> </del>		
			_			
·				10.		
	<del>,      </del>	-		Initial when	00	17 77.1.
			myraswownia sa	completed:	1'( )	Date: 122212
Client Notification/ Resolution:						
			Date/T	Гіте:		Contacted B <u>y:</u>
Comments/ Resolution:						
	<u> </u>					

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ATTACHMENT 1-5
February 2017 Sampling Event
Laboratory Analytical Report





March 08, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

### Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on February 11, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Danson Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY







#### **CERTIFICATIONS**

JEC CCR GROUNDWATER Project:

Pace Project No.: 60237752

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

**Guam Certification** 

Hawaii Certification Idaho Certification

Illinois Certification

Indiana Certification Iowa Certification #: 391

Kansas/TNI Certification #: E-10358

Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14

Nevada Certification #: PA014572015-1

New Hampshire/TNI Certification #: 2976

New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8

Utah/TNI Certification #: PA014572015-5

USDA Soil Permit #: P330-14-00213

Vermont Dept. of Health: ID# VT-0282

Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 460198

Washington Certification #: C868

West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01

Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Lab ID	Sample ID	Matrix	Date Collected	Date Received	
60237752001	FAA-5-021017	Water	02/10/17 08:03	02/11/17 09:05	
60237752002	FAA-4-021017	Water	02/10/17 08:51	02/11/17 09:05	
60237752003	FAA-3-021017	Water	02/10/17 09:36	02/11/17 09:05	
60237752004	FAA-2-021017	Water	02/10/17 10:35	02/11/17 09:05	
60237752005	DUP-021017	Water	02/10/17 06:00	02/11/17 09:05	



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60237752001	FAA-5-021017	EPA 200.7	MDJ	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	AGO	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0237752002	FAA-4-021017	EPA 200.7	NDJ	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	AGO	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0237752003	FAA-3-021017	EPA 200.7	NDJ	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	AGO	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	OL	3	PASI-K
0237752004	FAA-2-021017	EPA 200.7	NDJ	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	AGO	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60237752005	DUP-021017	EPA 200.7	NDJ	7	PASI-K



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	ZBM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
		SM 2540C	AGO	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	OL	3	PASI-K



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: March 08, 2017

#### **General Information:**

5 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 465590

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60237510001,60237510002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1905575)
  - Calcium
- MSD (Lab ID: 1905574)
  - Calcium



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: March 08, 2017

#### **General Information:**

5 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: March 08, 2017

#### **General Information:**

5 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** March 08, 2017

#### **General Information:**

5 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method: EPA 904.0

Description: 904.0 Radium 228
Client: WESTAR ENERGY
Date: March 08, 2017

#### **General Information:**

5 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:March 08, 2017

#### **General Information:**

5 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method: SM 2540C

**Description:** 2540C Total Dissolved Solids

Client: WESTAR ENERGY

Date: March 08, 2017

#### **General Information:**

5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: March 08, 2017

#### **General Information:**

5 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

DUP-021017 (Lab ID: 60237752005)
FAA-2-021017 (Lab ID: 60237752004)
FAA-3-021017 (Lab ID: 60237752003)

• FAA-4-021017 (Lab ID: 60237752002) • FAA-5-021017 (Lab ID: 60237752001)

#### • FAA-5-021017 (Lab ID. 60237752001

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: March 08, 2017

#### **General Information:**

5 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

Sample: FAA-5-021017	Lab ID: 602	237752001	Collected: 02/10/1	7 08:03	Received: 02	2/11/17 09:05 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:47	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/17/17 12:47	7440-41-7	
Boron, Total Recoverable	1.6	mg/L	0.10	1	02/15/17 16:00	02/17/17 12:47	7440-42-8	
Calcium, Total Recoverable	509	mg/L	0.10	1	02/15/17 16:00	02/17/17 12:47	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:47	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:47	7439-92-1	
_ithium	0.15	mg/L	0.010	1	02/15/17 16:00	02/17/17 12:47	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:41	7440-36-0	
Arsenic, Total Recoverable	0.0034	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:41	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	02/15/17 16:00	02/22/17 13:41	7440-43-9	
Cobalt, Total Recoverable	0.0031	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:41	7440-48-4	
Molybdenum, Total Recoverable	0.057	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:41	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:41	7782-49-2	
Γhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:41	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	02/15/17 12:15	02/16/17 10:33	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	OC					
Total Dissolved Solids	3700	mg/L	5.0	1		02/16/17 14:48		
1500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B					
pH at 25 Degrees C	7.2	Std. Units	0.10	1		02/16/17 09:53		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	87.2	mg/L	10.0	10		02/15/17 15:25	16887-00-6	
Fluoride	0.86	mg/L	0.20	1		02/14/17 21:45		
Sulfate	2150	mg/L	200	200		02/15/17 15:38		



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

Sample: FAA-4-021017	Lab ID: 602	237752002	Collected: 02/10/1	7 08:51	Received: 02	2/11/17 09:05 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	thod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.049	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:49	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/17/17 12:49	7440-41-7	
Boron, Total Recoverable	0.35	mg/L	0.10	1		02/17/17 12:49		
Calcium, Total Recoverable	212	mg/L	0.10	1	02/15/17 16:00	02/17/17 12:49	7440-70-2	
Chromium, Total Recoverable	< 0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:49	7440-47-3	
Lead, Total Recoverable	< 0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:49	7439-92-1	
ithium	0.013	mg/L	0.010	1	02/15/17 16:00	02/17/17 12:49	7439-93-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:46	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:46	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	02/15/17 16:00	02/22/17 13:46	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:46	7440-48-4	
Molybdenum, Total Recoverable	0.0026	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:46	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:46	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:46	7440-28-0	
245.1 Mercury	Analytical Met	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	0.00023	mg/L	0.00020	1	02/15/17 12:15	02/16/17 10:37	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	OC					
Total Dissolved Solids	1210	mg/L	5.0	1		02/16/17 14:48		
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500	O-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		02/16/17 09:55		H6
800.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	0.0					
Chloride	84.6	mg/L	10.0	10		02/15/17 16:20	16887-00-6	
Fluoride	0.32	mg/L	0.20	1		02/14/17 21:59	16984-48-8	
Sulfate	524	mg/L	50.0	50		02/15/17 16:34	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

Sample: FAA-3-021017	Lab ID: 602	237752003	Collected: 02/10/1	7 09:36	Received: 02	/11/17 09:05 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.032	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:51	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/17/17 12:51	7440-41-7	
Boron, Total Recoverable	0.68	mg/L	0.10	1	02/15/17 16:00			
Calcium, Total Recoverable	210	mg/L	0.10	1	02/15/17 16:00			
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:51	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00			
_ithium	0.012	mg/L	0.010	1	02/15/17 16:00	02/17/17 12:51	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:50	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:50	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	02/15/17 16:00	02/22/17 13:50	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:50	7440-48-4	
Molybdenum, Total Recoverable	0.010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:50	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:50	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:50	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	02/15/17 12:15	02/16/17 10:39	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC					
Total Dissolved Solids	1290	mg/L	5.0	1		02/16/17 14:48		
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	0-H+B					
oH at 25 Degrees C	7.3	Std. Units	0.10	1		02/16/17 09:56		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	84.7	mg/L	10.0	10		02/15/17 16:48	16887-00-6	
Fluoride	0.32	mg/L	0.20	1		02/14/17 22:13	16984-48-8	
Sulfate	702	mg/L	50.0	50		02/15/17 17:02	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

Sample: FAA-2-021017	Lab ID: 602	237752004	Collected: 02/10/1	7 10:35	Received: 02	/11/17 09:05 <b>N</b>	Natrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.030	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:54	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/17/17 12:54	7440-41-7	
Boron, Total Recoverable	3.3	mg/L	0.10	1	02/15/17 16:00	02/17/17 12:54	7440-42-8	
Calcium, Total Recoverable	284	mg/L	0.10	1	02/15/17 16:00	02/17/17 12:54	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:54	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00			
ithium	0.014	mg/L	0.010	1	02/15/17 16:00	02/17/17 12:54	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:55	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:55	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	02/15/17 16:00	02/22/17 13:55	7440-43-9	
Cobalt, Total Recoverable	0.0013	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:55	7440-48-4	
Molybdenum, Total Recoverable	0.24	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:55	7439-98-7	
Selenium, Total Recoverable	0.0015	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:55	7782-49-2	
Гhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:55	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	02/15/17 12:15	02/16/17 10:40	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	3570	mg/L	5.0	1		02/16/17 14:49		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.5	Std. Units	0.10	1		02/16/17 09:58		H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	68.3	mg/L	5.0	5		02/15/17 17:16	16887-00-6	
Fluoride	0.77	mg/L	0.20	1		02/14/17 22:28	16984-48-8	
Sulfate	1910	mg/L	200	200		02/15/17 17:30	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

Sample: DUP-021017	Lab ID: 602	237752005	Collected: 02/10/1	7 06:00	Received: 02	/11/17 09:05 <b>N</b>	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua	
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7				
Barium, Total Recoverable	0.029	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:56	7440-39-3		
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/17/17 12:56	7440-41-7		
Boron, Total Recoverable	3.4	mg/L	0.10	1	02/15/17 16:00	02/17/17 12:56	7440-42-8		
Calcium, Total Recoverable	292	mg/L	0.10	1	02/15/17 16:00	02/17/17 12:56	7440-70-2		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:56	7440-47-3		
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	02/15/17 16:00	02/17/17 12:56	7439-92-1		
Lithium	0.013	mg/L	0.010	1	02/15/17 16:00	02/17/17 12:56	7439-93-2		
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8				
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:59	7440-36-0		
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:59	7440-38-2		
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	02/15/17 16:00	02/22/17 13:59	7440-43-9		
Cobalt, Total Recoverable	0.0013	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:59	7440-48-4		
Molybdenum, Total Recoverable	0.24	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:59	7439-98-7		
Selenium, Total Recoverable	0.0016	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:59	7782-49-2		
Гhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	02/15/17 16:00	02/22/17 13:59	7440-28-0		
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1				
Mercury	<0.00020	mg/L	0.00020	1	02/15/17 12:15	02/16/17 10:42	7439-97-6		
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC						
Total Dissolved Solids	3250	mg/L	5.0	1		02/16/17 14:49			
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B						
oH at 25 Degrees C	7.6	Std. Units	0.10	1		02/16/17 09:51		H6	
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0						
Chloride	68.8	mg/L	5.0	5		02/15/17 17:44	16887-00-6		
Fluoride	0.78	mg/L	0.20	1		02/14/17 22:42	16984-48-8		
Sulfate	2000	mg/L	200	200		02/15/17 17:58	14808-79-8		



#### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

 QC Batch:
 465533
 Analysis Method:
 EPA 245.1

 QC Batch Method:
 EPA 245.1
 Analysis Description:
 245.1 Mercury

 Associated Lab Samples:
 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

METHOD BLANK: 1905322 Matrix: Water

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

Blank Reporting

 Parameter
 Units
 Result
 Limit
 Analyzed
 Qualifiers

 Mercury
 mg/L
 <0.00020</td>
 0.00020
 02/17/17 12:30

LABORATORY CONTROL SAMPLE: 1905323

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0053 106 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1905324 1905325

MS MSD 60237454001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual ND 0.0050 70-130 20 Mercury mg/L .005 .005 0.0052 104 100

MATRIX SPIKE SAMPLE: 1905326 60237584003 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers ND 70-130 Mercury mg/L .005 0.0052 103

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

QC Batch: 465590 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

METHOD BLANK: 1905571 Matrix: Water

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	02/17/17 12:14	
Beryllium	mg/L	< 0.0010	0.0010	02/17/17 12:14	
Boron	mg/L	<0.10	0.10	02/17/17 12:14	
Calcium	mg/L	<0.10	0.10	02/17/17 12:14	
Chromium	mg/L	< 0.0050	0.0050	02/17/17 12:14	
Lead	mg/L	< 0.0050	0.0050	02/17/17 12:14	
Lithium	mg/L	<0.010	0.010	02/17/17 12:14	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		0.97	97	85-115	
Beryllium	mg/L	1	0.98	98	85-115	
Boron	mg/L	1	0.92	92	85-115	
Calcium	mg/L	10	9.7	97	85-115	
Chromium	mg/L	1	0.95	95	85-115	
Lead	mg/L	1	0.96	96	85-115	
Lithium	mg/L	1	1.0	101	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 19055	73		1905574							
Parameter	6 Units	0237510001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.076	1	1	0.99	0.98	92	91	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	0.93	0.92	93	92	70-130	1	20	
Boron	mg/L	0.74	1	1	1.7	1.7	93	91	70-130	1	20	
Calcium	mg/L	151	10	10	159	156	82	49	70-130	2	20	M1
Chromium	mg/L	< 0.0050	1	1	0.91	0.91	91	91	70-130	0	20	
Lead	mg/L	< 0.0050	1	1	0.88	0.88	88	88	70-130	0	20	
Lithium	mg/L	0.024	1	1	0.98	0.97	95	95	70-130	1	20	

MATRIX SPIKE SAMPLE:	1905575						
		60237510002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.30		1.2	92	70-130	
Beryllium	mg/L	< 0.0010	1	0.93	93	70-130	
Boron	mg/L	0.23	1	1.1	91	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

MATRIX SPIKE SAMPLE:	1905575						
Parameter	Units	60237510002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium		170	10	175	53	70-130	
Chromium	mg/L	<0.0050	10	0.91	91	70-130	
Lead	mg/L	<0.0050	1	0.88	88	70-130	)
Lithium	mg/L	<0.010	1	0.97	96	70-130	)

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

 QC Batch:
 465593
 Analysis Method:
 EPA 200.8

 QC Batch Method:
 EPA 200.8
 Analysis Description:
 200.8 MET

 Associated Lab Samples:
 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

METHOD BLANK: 1905588 Matrix: Water

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	02/22/17 12:27	
Arsenic	mg/L	< 0.0010	0.0010	02/22/17 12:27	
Cadmium	mg/L	< 0.00050	0.00050	02/22/17 12:27	
Cobalt	mg/L	< 0.0010	0.0010	02/22/17 12:27	
Molybdenum	mg/L	< 0.0010	0.0010	02/22/17 12:27	
Selenium	mg/L	< 0.0010	0.0010	02/22/17 12:27	
Thallium	mg/L	< 0.0010	0.0010	02/22/17 12:27	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.039	98	85-115	
Arsenic	mg/L	.04	0.040	99	85-115	
Cadmium	mg/L	.04	0.040	101	85-115	
Cobalt	mg/L	.04	0.039	97	85-115	
Molybdenum	mg/L	.04	0.041	102	85-115	
Selenium	mg/L	.04	0.040	100	85-115	
Thallium	mg/L	.04	0.037	93	85-115	

	esult	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
		Conc.	Result	% Rec	i imits	
n/I						Qualifiers
g <sup>,</sup> <b>–</b>	<0.0010	.04	0.035	88	70-130	
g/L	0.12	.04	0.17	110	70-130	
g/L	< 0.00050	.04	0.040	99	70-130	
g/L	0.013	.04	0.051	94	70-130	
g/L	0.0022	.04	0.040	94	70-130	
g/L	< 0.0010	.04	0.037	91	70-130	
g/L	< 0.0010	.04	0.038	93	70-130	
(	g/L g/L g/L g/L g/L	g/L 0.013 g/L 0.0022 g/L <0.0010	g/L 0.013 .04 g/L 0.0022 .04 g/L <0.0010 .04	g/L 0.013 .04 0.051 g/L 0.0022 .04 0.040 g/L <0.0010 .04 0.037	g/L 0.013 .04 0.051 94 g/L 0.0022 .04 0.040 94 g/L <0.0010 .04 0.037 91	g/L 0.013 .04 0.051 94 70-130 g/L 0.0022 .04 0.040 94 70-130 g/L <0.0010 .04 0.037 91 70-130

MATRIX SPIKE SAMPLE:	1905592						
		60237510004	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	.04	0.039	98	70-130	
Arsenic	mg/L	0.0017	.04	0.042	100	70-130	
Cadmium	mg/L	< 0.00050	.04	0.039	98	70-130	
Cobalt	mg/L	0.0017	.04	0.039	94	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

MATRIX SPIKE SAMPLE:	1905592						
		60237510004	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Molybdenum	mg/L	0.042	.04	0.084	106	70-130	
Selenium	mg/L	< 0.0010	.04	0.039	97	70-130	
Thallium	mg/L	<0.0010	.04	0.037	91	70-130	

SAMPLE DUPLICATE: 1909305						
		60237510003	Dup		Max	
Parameter	Units	Result	Result	RPD	RPD	Qualifiers
Antimony	mg/L	<0.0010	<0.0010		20	
Arsenic	mg/L	0.12	0.12	0	20	
Cadmium	mg/L	< 0.00050	< 0.00050		20	
Cobalt	mg/L	0.013	0.014	1	20	
Molybdenum	mg/L	0.0022	0.0022	2	20	
Selenium	mg/L	< 0.0010	< 0.0010		20	
Thallium	mg/L	<0.0010	< 0.0010		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Qualifiers



#### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

QC Batch: 465749 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

METHOD BLANK: 1906453 Matrix: Water

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

Blank Reporting

Parameter Units Result Limit Analyzed

Total Dissolved Solids mg/L <5.0 5.0 02/16/17 14:39

LABORATORY CONTROL SAMPLE: 1906454

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 967 97 80-120

SAMPLE DUPLICATE: 1906455

60237681003 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 977 0 **Total Dissolved Solids** 980 10 mg/L

SAMPLE DUPLICATE: 1906456

Date: 03/08/2017 03:05 PM

Parameter Units 60237753003 Dup Max Result RPD Qualifiers
Total Dissolved Solids mg/L 4080 4040 1 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

 QC Batch:
 465627
 Analysis Method:
 SM 4500-H+B

 QC Batch Method:
 SM 4500-H+B
 Analysis Description:
 4500H+B pH

 Associated Lab Samples:
 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

SAMPLE DUPLICATE: 1905773

Date: 03/08/2017 03:05 PM

60237753001 Dup Max Parameter Units Result Result **RPD** RPD Qualifiers 7.2 pH at 25 Degrees C 7.2 5 H6 Std. Units 0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

 QC Batch:
 465470
 Analysis Method:
 EPA 300.0

 QC Batch Method:
 EPA 300.0
 Analysis Description:
 300.0 IC Anions

 Associated Lab Samples:
 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

METHOD BLANK: 1905076 Matrix: Water

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 02/14/17 18:08

LABORATORY CONTROL SAMPLE: 1905077

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.7 107 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1905078 1905079

MS MSD 60237510001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Fluoride mg/L 0.32 2.5 2.5 3.0 3.0 106 106 80-120 15

MATRIX SPIKE SAMPLE: 1905080 MS 60237510002 Spike MS % Rec Parameter Units Result Conc. Result % Rec Limits Qualifiers 0.47 3.1 105 80-120 Fluoride mg/L 2.5

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Parameter

Chloride

Sulfate

Sulfate

Date: 03/08/2017 03:05 PM

 QC Batch:
 465543
 Analysis Method:
 EPA 300.0

 QC Batch Method:
 EPA 300.0
 Analysis Description:
 300.0 IC Anions

 Associated Lab Samples:
 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

METHOD BLANK: 1905374 Matrix: Water

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

Blank Reporting Limit Qualifiers Parameter Units Result Analyzed <1.0 02/15/17 10:46 mg/L 1.0 mg/L <1.0 1.0 02/15/17 10:46

LABORATORY CONTROL SAMPLE: 1905375

Spike LCS LCS % Rec

Conc.

 Chloride
 mg/L
 5
 5.0
 99
 90-110

 Sulfate
 mg/L
 5
 5.0
 100
 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1905376 1905377

mg/L

Units

MS MSD 60237510002 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Chloride mg/L 235 100 100 329 332 94 97 80-120 15 Sulfate mg/L 165 100 100 260 263 96 99 80-120 15

Result

% Rec

Limits

223

Qualifiers

80-120

102

MATRIX SPIKE SAMPLE: 1905378 MS MS 60237510003 % Rec Spike Qualifiers Parameter Units Result Conc. Result % Rec Limits Chloride 186 100 287 101 80-120 mg/L

122

100

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Sample: FAA-5-021017 PWS:	<b>Lab ID: 6023775</b> Site ID:	<b>Collected:</b> 02/10/17 08:03 Sample Type:	Received:	02/11/17 09:05	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.824 ± 0.576 (0.695) C:NA T:87%	pCi/L	03/06/17 12:45	13982-63-3	
Radium-228	EPA 904.0	0.733 ± 0.593 (1.17) C:52% T:76%	pCi/L	03/07/17 11:42	2 15262-20-1	
Total Radium	Total Radium Calculation	1.56 ± 1.17 (1.87)	pCi/L	03/07/17 20:54	1 7440-14-4	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Sample: FAA-4-021017 PWS:	<b>Lab ID: 6023775</b> Site ID:	2002 Collected: 02/10/17 08:51 Sample Type:	Received:	02/11/17 09:05	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.233 ± 0.356 (0.572) C:NA T:80%	pCi/L	03/06/17 13:04	13982-63-3	
Radium-228	EPA 904.0	-0.0461 ± 0.367 (0.882) C:53% T:82%	pCi/L	03/07/17 15:52	2 15262-20-1	
Total Radium	Total Radium Calculation	0.233 ± 0.723 (1.45)	pCi/L	03/07/17 20:54	7440-14-4	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Sample: FAA-3-021017 PWS:	<b>Lab ID: 602377</b> 5 Site ID:	52003 Collected: 02/10/17 09:36 Sample Type:	Received:	02/11/17 09:05	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.201 ± 0.307 (0.806) C:NA T:98%	pCi/L	03/06/17 13:05	13982-63-3	
Radium-228	EPA 904.0	0.986 ± 0.456 (0.726) C:56% T:86%	pCi/L	03/07/17 15:52	2 15262-20-1	
Total Radium	Total Radium Calculation	0.986 ± 0.763 (1.53)	pCi/L	03/07/17 20:54	1 7440-14-4	



Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60237752

Sample: FAA-2-021017 Lab ID: 60237752004 Collected: 02/10/17 10:35 Received: 02/11/17 09:05 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.508 \pm 0.381 \quad (0.197)$ Radium-226 pCi/L 03/06/17 13:05 13982-63-3 C:NA T:86% EPA 904.0 0.824 ± 0.412 (0.685) Radium-228 pCi/L 03/07/17 15:52 15262-20-1 C:61% T:86% Total Radium **Total Radium** 1.33 ± 0.793 (0.882) pCi/L 03/07/17 20:54 7440-14-4



Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Sample: DUP-021017 PWS:	<b>Lab ID: 6023775</b> Site ID:	2005 Collected: 02/10/17 06:00 Sample Type:	Received:	02/11/17 09:05	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.462 (0.958) C:NA T:94%	pCi/L	03/06/17 13:05	13982-63-3	
Radium-228	EPA 904.0	0.712 ± 0.562 (1.11) C:50% T:76%	pCi/L	03/07/17 15:52	2 15262-20-1	
Total Radium	Total Radium Calculation	0.712 ± 1.02 (2.07)	pCi/L	03/07/17 20:54	1 7440-14-4	



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

 QC Batch:
 250470
 Analysis Method:
 EPA 904.0

 QC Batch Method:
 EPA 904.0
 Analysis Description:
 904.0 Radium 228

 Associated Lab Samples:
 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

METHOD BLANK: 1232539 Matrix: Water

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.158 ± 0.276 (0.596) C:68% T:93%
 pCi/L
 03/07/17 11:43

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

QC Batch: 250469 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226 Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

METHOD BLANK: 1232538 Matrix: Water

Associated Lab Samples: 60237752001, 60237752002, 60237752003, 60237752004, 60237752005

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.000 ± 0.321 (0.654) C:NA T:91%
 pCi/L
 03/06/17 12:09

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 03/08/2017 03:05 PM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60237752001	FAA-5-021017	EPA 200.7	465590	EPA 200.7	465696
60237752002	FAA-4-021017	EPA 200.7	465590	EPA 200.7	465696
60237752003	FAA-3-021017	EPA 200.7	465590	EPA 200.7	465696
60237752004	FAA-2-021017	EPA 200.7	465590	EPA 200.7	465696
60237752005	DUP-021017	EPA 200.7	465590	EPA 200.7	465696
60237752001	FAA-5-021017	EPA 200.8	465593	EPA 200.8	465698
60237752002	FAA-4-021017	EPA 200.8	465593	EPA 200.8	465698
60237752003	FAA-3-021017	EPA 200.8	465593	EPA 200.8	465698
60237752004	FAA-2-021017	EPA 200.8	465593	EPA 200.8	465698
60237752005	DUP-021017	EPA 200.8	465593	EPA 200.8	465698
60237752001	FAA-5-021017	EPA 245.1	465533	EPA 245.1	465636
60237752002	FAA-4-021017	EPA 245.1	465533	EPA 245.1	465636
60237752003	FAA-3-021017	EPA 245.1	465533	EPA 245.1	465636
60237752004	FAA-2-021017	EPA 245.1	465533	EPA 245.1	465636
60237752005	DUP-021017	EPA 245.1	465533	EPA 245.1	465636
60237752001	FAA-5-021017	EPA 903.1	250469		
60237752002	FAA-4-021017	EPA 903.1	250469		
60237752003	FAA-3-021017	EPA 903.1	250469		
60237752004	FAA-2-021017	EPA 903.1	250469		
60237752005	DUP-021017	EPA 903.1	250469		
60237752001	FAA-5-021017	EPA 904.0	250470		
60237752002	FAA-4-021017	EPA 904.0	250470		
60237752003	FAA-3-021017	EPA 904.0	250470		
60237752004	FAA-2-021017	EPA 904.0	250470		
60237752005	DUP-021017	EPA 904.0	250470		
60237752001	FAA-5-021017	Total Radium Calculation	251399		
60237752002	FAA-4-021017	Total Radium Calculation	251399		
60237752003	FAA-3-021017	Total Radium Calculation	251399		
60237752004	FAA-2-021017	Total Radium Calculation	251399		
60237752005	DUP-021017	Total Radium Calculation	251399		
60237752001	FAA-5-021017	SM 2540C	465749		
60237752002	FAA-4-021017	SM 2540C	465749		
60237752003	FAA-3-021017	SM 2540C	465749		
60237752004	FAA-2-021017	SM 2540C	465749		
60237752005	DUP-021017	SM 2540C	465749		
60237752001	FAA-5-021017	SM 4500-H+B	465627		
60237752002	FAA-4-021017	SM 4500-H+B	465627		
60237752003	FAA-3-021017	SM 4500-H+B	465627		
60237752004	FAA-2-021017	SM 4500-H+B	465627		
60237752005	DUP-021017	SM 4500-H+B	465627		
60237752001	FAA-5-021017	EPA 300.0	465470		
60237752001	FAA-5-021017	EPA 300.0	465543		
60237752002	FAA-4-021017	EPA 300.0	465470		



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60237752

Date: 03/08/2017 03:05 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytica Batch
60237752002	FAA-4-021017	EPA 300.0	465543		
60237752003	FAA-3-021017	EPA 300.0	465470		
60237752003	FAA-3-021017	EPA 300.0	465543		
60237752004	FAA-2-021017	EPA 300.0	465470		
60237752004	FAA-2-021017	EPA 300.0	465543		
60237752005	DUP-021017	EPA 300.0	465470		
60237752005	DUP-021017	EPA 300.0	465543		



# Sample Condition Upon Receipt



Client Name: Nestar			
Courier: FedEx □ UPS □ VIA 🛍 Clay □ PE	X B ECI B	Pace □ Xroads □	Client ☐ Other □
Tracking #: Pace	Shipping Label Used	d? Yes □ No □	
Custody Seal on Cooler/Box Present: Yes   No □	Seals intact: Yes		
Packing Material: Bubble Wrap □ Bubble Bags □	Foam □		er 🗆
Thermometer Used: (CF+1.5) CF+0.9 (T-239) Type of le	Wet Blue No	ne	4hu
2	CF +1.5 CF +0.9 Correct	ted 4.0	Date and initials of person examining contents: JB 2/11/13
Temperature should be above freezing to 6°C			
Chain of Custody present:	Ø[Yes □No □N/A		
Chain of Custody relinquished:	Mary See See See See See See See See See Se		
Samples arrived within holding time:	ØYes □No □N/A		
Short Hold Time analyses (<72hr):	Maryes □No □N/A	pH	
Rush Turn Around Time requested:	□Yes <b>Ú</b> No □N/A		
Sufficient volume:	ØYes □No □N/A		
Correct containers used:	Mayes □No □N/A		
Pace containers used:	LÉYes □No □N/A		
Containers intact:	rade de la la la la la la la la la la la la la		
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No <b>M</b> N/A		
Filtered volume received for dissolved tests?	□Yes □No KNA		
Sample labels match COC: Date / time / ID / analyses	Mary Yes □No □N/A		
Samples contain multiple phases? Matrix: 🌡 🏹	□Yes PNo □N/A		
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	Mayes □No □N/A		
Cyanide water sample checks: ₹N/A	Eu Eu		
Lead acetate strip turns dark? (Record only)	□Yes □No		
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No		
Trip Blank present:	□Yes □No ℚN/A		
Headspace in VOA vials ( >6mm):	□Yes □No MIN/A		
Samples from USDA Regulated Area: State:	□Yes □No ØN/A		
Additional labels attached to 5035A / TX1005 vials in the field?			
Client Notification/ Resolution: Copy COC to		Field Data Required	? Y / N
Person Contacted: Date/Tir	me:		
Comments/ Resolution:			
Project Manager Review:  REVIEWED  By hwilson at 9:11 am, 2/13/17		e:	



# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required P	roject Ir	nforma	ation:					Section Invoice	on C e Inform	nation:													Page:	/		of	1	
Company: WESTAR ENERG	SY	Report To:	Brand	lon G	Griffin					Attenti	on:	Jar	ed Mo	orriso	on															
Address: 818 Kansas Ave		Сору То:	Jared	Mor	rison, He	eath Hor	nya			Compa	any Nai	me:	WES	TAR	ENEF	RGY				REG	SULA	TOR	Y AGE	NCY		12- N	B.			
Topeka, KS 6661	2									Addre	ss:		SEE S	SEC	TION	A				<b>~</b>	NPD	ES	Г G	ROUN	D WAT	ER [	DI	RINKING	WATER	
Email To: brandon.l.griffin@	westarenergy.com	Purchase O	rder No	D <sub>a</sub> :						Pace O Referei										Γ	UST		┌ R	CRA		Γ	01	THER		_
Phone: (785) 575-8135 Fax	c <sub>1</sub>	Project Nam	ne: J	JEC (	CCR Gro	oundwate	er			Pace P Manage	roject	He	ather	Wils	on, 91	3-56	3-140	)7		Site	e Loc	ation		I/C						
Requested Due Date/TAT: 7 D.	AY	Project Num	nber:	т							rofile #:	965	7, 1	П							ST	ATE:	-	KS	_					
																	Re	que	sted /	Anal	ysis	Filter	ed (Y	N)						
Section D Required Client Information	Valid Matrix C MATRIX DRINKING WATER WATER	Codes CODE DW WT WW	(see valid codes to left)	C=COMP)	COMPC		ECTED	SITE	NOIT			Pre	serva	tives		N/A					-				<u> </u>			1257		
SAMPLE II  (A-Z, 0-9 / ,-)  Sample IDs MUST BE U	OTHER	WW P SL OL WP AR OT TS	ш	SAMPLE TYPE (G=GRAB	STAR	RT	END/G	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	HNO <sub>3</sub>	HCI	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol Other	Analysis Test	200.7 Total Metals*	200.8 Total Metals**	300.0 Cl, Fl, SO4	4500 H+B	2540C TDS	Radium 228			Residual Chlorine (Y/N)			7-752 roject N		l.D.
- PAA 5-12	1017		WT	_	DATE	TIME	2/10	0803		U	1	3	-	+	-	F		2 10	4 63	4	NI	-	$\vdash$		+			BPIN	-	001
1 FAA-5-02 2 FAA-4-0 3 FAA-3-	22017			6			2/10	0851		4	1	3		$^{\dagger}$			H									TVIC.	4	Ì		200
3 FAA-3-	0)1/17		WT			7	2/10	0936	,	4	ì	3		T			П	Ŧ												003
4 FAA-	2-62-1017			6			2/10	1035		N	İ	3				1										4		4	4	00Y
5																														
6																														
7																	Ш				4		1	$\perp$	_	-				
8														1	3						_	_	$\perp$	+	+	-				
9							100				$\perp$			_	1	-	Н	-	-	Н	-	-	$\vdash$	+	$\dashv$	1				0.6
10	021017		VT	6			2/10	0600	1	4	11	3	-	-	H		H	-	+	H	+	-	$\vdash$	+	+	7		+	-	Dos
- 11				_				-	+		H	-		+	+	-	H	+	+	H	+	+	+	+	+	+				-
12			5511		UED DV (	ACCILIAN	TON	DAT	<u> </u>	_	IME	+	_	۸۵	CEPTE	n RV	/AFE	LIATE	ON		D/	ATE	TI	ME		SA	AMPLE	CONDIT	ONS	
*200.7 Total Metals: Ba, Be, B, Ca, C		10	KELIF	NUUIS	SHED BY	rest		-				-			1		7	7		-	-		090		4.0	1 4	Т	V	V	
**200.8 Total Metals: Co, As, Se, Mo		1/2	y	8	10	J 437	1,4	1710	/17	17	100		-	J	1		H	gla-	Ī		2/11	1+	040	J	410	y	-	y	,	
P age																												D.	*	
у́е 4						SAMPL	ER NAME	215				,		,	.,,			-		-1					n °C	no be		Seale (Y/N)	Intac	<del>2</del>
40 of 42							PRINT Na	me of SAM RE of SAM		125	Car	V	2	6	n'H	70	DA (M	TE Si	igned /YY):	02	No	1/1	7		Temp In °C	Received on		Custody Sealed Cooler (Y/N)	Samples	(A/N)

# Chain of Custody

# WO#:30210712





Workorder: 60237752 Workorder Name: JEC CCR GROUNDWATER Owner Received Date: 2/11/2017 Results Requested By: 3/7/2017 Report To Subcontract To Requested Analysis Heather Wilson Pace Analytical Pittsburgh Pace Analytical Kansas 1638 Roseytown Road 9608 Loiret Blvd. Suites 2,3, & 4 Lenexa, KS 66219 Greensburg, PA 15601 Phone (913)599-5665 Radium-226 & Total Sum Radium Phone (724)850-5600 Preserved Containers HN03 Sample Collect Item | Sample ID Date/Time Lab ID Matrix LAB USE ONLY FAA-5-021017 PS 2/10/2017 08:03 60237752001 Water 2 Χ 2 FAA-4-021017 PS 2/10/2017 08:51 60237752002 Water 2 Х Х FAA-3-021017 PS 2/10/2017 09:36 60237752003 Water 2 Χ Χ FAA-2-021017 PS 2/10/2017 10:35 60237752004 2 Water Х Х DUP-021017 PS 2/10/2017 06:00 60237752005 Water 2 X Х Comments Transfers Released By Date/Time Received By Date/Time 2/13/17 1700 2-14-17 10:130 2 Cooler Temperature on Receipt N/A°C Custody Seal (Y) or N Received on Ice Y or N Samples Intact (Y) or N

<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

# Sample Condition Upon Receipt Pittsburgh

BLN

<b>5</b>					Action	~	
Pace Analytical Client Name:		P	ac	e Kansas	Project # 3	02107	1
	_						
Courier: Fed Ex UPS USPS C		Com	merci	al Pace Othe	r		
Tracking #: 7044 6654 55		_	_				
Custody Seal on Cooler/Box Present:  y		no		als intact: 🔟 yes	: [_] no		
Thermometer Used	Type	of Ice				_	_
Cooler Temperature Observed Temp	N/H	- °C	Co.	rrection Factor <u>:</u>	°C Final Tem	p <u>:</u>	С
Temp should be above freezing to 6°C					Date and Initial	s of person examini	na
Comments:	Yes	No	N/	4	contents: R	LM 2-14-1	Ĩ
Chain of Custody Present:	17			1.		4	,=-77
Chain of Custody Filled Out:	17			2.			
Chain of Custody Relinquished:	1		1	3.			
Sampler Name & Signature on COC:		1		4.			
Sample Labels match COC:	1/			5.			
-Includes date/time/ID Matrix:	V	UT		7			
Samples Arrived within Hold Time:	7		Ī	6.			
Short Hold Time Analysis (<72hr remaining):		1		7.			
Rush Turn Around Time Requested:		/		8.			
Sufficient Volume:	1/	7		9.			
Correct Containers Used:	1/			10.			
-Pace Containers Used:							
Containers Intact:				11.			
Orthophosphate field filtered			1	12.			
Organic Samples checked for dechlorination:			1	13.			
Filtered volume received for Dissolved tests			/	14.			
All containers have been checked for preservation.	/		:	15.			
All containers needing preservation are found to be in	7			l Ph	12		
compliance with EPA recommendation.							
exceptions: VOA, coliform, TOC, O&G, Phenolics	;			Initial when completed BU	Date/time of preservation		
			,	Lot # of added	,		
Headspace in VOA Vials ( >6mm):	TT			preservative 16.			
rip Blank Present:			$\sim$	17.			
inp Blank Custody Seals Present			$\mathcal{H}$	17.			
Rad Aqueous Samples Screened > 0.5 mrem/hr	+	7		Initial when completed:	1 0-111	-17	
Nicos Alexico et au I Dans Luttura		4		completed: [5()	1 Date: 2 - 14		
Elient Notification/ Resolution:		_	hata /T	loo o	O-Marie I B		
Person Contacted:Comments/ Resolution:			ale/ i	ime:	Contacted By:	<u> </u>	—
Commonitor (Coolunor)	.,, . <u></u>						_
							_

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen,

ATTACHMENT 1-6
April 2017 Sampling Event
Laboratory Analytical Report





May 04, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

# Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on April 12, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Danson Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683

Georgia Certification #: C040

Guam Certification Hawaii Certification

Idaho Certification

Illinois Certification
Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14

Nevada Certification #: PA014572015-1

New Jersey/TNI Certification #: PA 051

New Hampshire/TNI Certification #: 2976

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 460198 Washington Certification #: C868 West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Lab ID	Sample ID	Matrix	Date Collected	Date Received	
60241789001	FAA-5-041017	Water	04/10/17 15:57	04/12/17 07:20	
60241789002	FAA-4-041117	Water	04/11/17 09:08	04/12/17 07:20	
60241789003	FAA-3-041117	Water	04/11/17 10:08	04/12/17 07:20	
60241789004	FAA-2-041117	Water	04/11/17 11:19	04/12/17 07:20	



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60241789001	FAA-5-041017	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	TDS	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JJY	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K
60241789002	FAA-4-041117	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	TDS	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JJY	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K
0241789003	FAA-3-041117	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	TDS	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K
0241789004	FAA-2-041117	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	TDS	1	PASI-K
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JJY	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method: EPA 200.7

**Description:** 200.7 Metals, Total **Client:** WESTAR ENERGY **Date:** May 04, 2017

#### **General Information:**

4 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: May 04, 2017

#### **General Information:**

4 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: May 04, 2017

#### **General Information:**

4 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** May 04, 2017

#### **General Information:**

4 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method: EPA 904.0

**Description:** 904.0 Radium 228 **Client:** WESTAR ENERGY **Date:** May 04, 2017

#### **General Information:**

4 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:May 04, 2017

#### **General Information:**

4 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY
Date: May 04, 2017

#### **General Information:**

4 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: May 04, 2017

#### **General Information:**

4 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

FAA-2-041117 (Lab ID: 60241789004)
FAA-3-041117 (Lab ID: 60241789003)
FAA-4-041117 (Lab ID: 60241789002)
FAA-5-041017 (Lab ID: 60241789001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: May 04, 2017

#### **General Information:**

4 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

Sample: FAA-5-041017	Lab ID: 602	241789001	Collected: 04/10/1	7 15:57	Received: 04	/12/17 07:20 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	<0.0050	mg/L	0.0050	1	04/21/17 11:35	04/24/17 14:50	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/24/17 14:50	7440-41-7	
Boron, Total Recoverable	1.7	mg/L	0.10	1	04/21/17 11:35	04/24/17 14:50	7440-42-8	
Calcium, Total Recoverable	526	mg/L	0.10	1	04/21/17 11:35	04/24/17 14:50	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	04/21/17 11:35	04/24/17 14:50	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1		04/24/17 14:50		
ithium	0.15	mg/L	0.010	1	04/21/17 11:35	04/24/17 14:50	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:26	7440-36-0	
Arsenic, Total Recoverable	0.0024	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:26	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	04/21/17 11:35	04/28/17 10:26	7440-43-9	
Cobalt, Total Recoverable	0.0036	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:26	7440-48-4	
Molybdenum, Total Recoverable	0.067	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:26	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:26	7782-49-2	
Гhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:26	7440-28-0	
45.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	04/13/17 08:30	04/13/17 11:59	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	3730	mg/L	5.0	1		04/13/17 12:53		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	6.9	Std. Units	0.10	1		04/17/17 12:42		H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	88.9	mg/L	10.0	10		04/13/17 18:00	16887-00-6	
Fluoride	1.0	mg/L	0.20	1		04/13/17 17:45	16984-48-8	
Sulfate	2130	mg/L	200	200		04/13/17 18:15	14808-79-8	



## **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

Sample: FAA-4-041117	Lab ID: 602	241789002	Collected: 04/11/1	7 09:08	Received: 04	1/12/17 07:20 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.051	mg/L	0.0050	1	04/21/17 11:35	04/24/17 14:54	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/24/17 14:54	7440-41-7	
Boron, Total Recoverable	0.40	mg/L	0.10	1		04/24/17 14:54		
Calcium, Total Recoverable	223	mg/L	0.10	1		04/24/17 14:54		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	04/21/17 11:35	04/24/17 14:54	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		04/24/17 14:54		
_ithium	0.012	mg/L	0.010	1	04/21/17 11:35	04/24/17 14:54	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:30	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:30	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	04/21/17 11:35	04/28/17 10:30	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:30	7440-48-4	
Molybdenum, Total Recoverable	0.0033	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:30	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:30	7782-49-2	
Гhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:30	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	04/13/17 08:30	04/13/17 12:01	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC					
Total Dissolved Solids	1190	mg/L	5.0	1		04/14/17 12:40		
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	O-H+B					
oH at 25 Degrees C	7.3	Std. Units	0.10	1		04/17/17 12:47		H6
800.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	84.7	mg/L	10.0	10		04/13/17 18:44	16887-00-6	
Fluoride	0.36	mg/L	0.20	1		04/13/17 18:30	16984-48-8	
Sulfate	516	mg/L	50.0	50		04/13/17 18:59	14808-70-8	



## **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

Sample: FAA-3-041117	Lab ID: 602	241789003	Collected: 04/11/1	7 10:08	Received: 04	l/12/17 07:20	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.034	mg/L	0.0050	1	04/21/17 11:35	04/24/17 14:58	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/24/17 14:58	7440-41-7	
Boron, Total Recoverable	0.93	mg/L	0.10	1	04/21/17 11:35	04/24/17 14:58	7440-42-8	
Calcium, Total Recoverable	242	mg/L	0.10	1	04/21/17 11:35	04/24/17 14:58	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	04/21/17 11:35	04/24/17 14:58	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1		04/24/17 14:58		
ithium	0.014	mg/L	0.010	1	04/21/17 11:35	04/24/17 14:58	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:45	7440-36-0	
Arsenic, Total Recoverable	0.0011	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:45	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	04/21/17 11:35	04/28/17 10:45	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:45	7440-48-4	
Molybdenum, Total Recoverable	0.012	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:45	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	05/03/17 14:51	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:45	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	04/13/17 08:30	04/13/17 12:03	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	1460	mg/L	5.0	1		04/14/17 12:40	)	
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		04/17/17 12:49	)	H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	82.9	mg/L	10.0	10		04/13/17 20:14	16887-00-6	
Fluoride	0.33	mg/L	0.20	1		04/13/17 19:59	16984-48-8	
Sulfate	818	mg/L	50.0	50		04/13/17 19:14		



## **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

Sample: FAA-2-041117	Lab ID: 602	241789004	Collected: 04/11/1	7 11:19	Received: 04	/12/17 07:20 <b>N</b>	//atrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.031	mg/L	0.0050	1	04/21/17 11:35	04/24/17 15:02	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/24/17 15:02	7440-41-7	
Boron, Total Recoverable	3.1	mg/L	0.10	1		04/24/17 15:02		
Calcium, Total Recoverable	316	mg/L	0.10	1	04/21/17 11:35	04/24/17 15:02	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	04/21/17 11:35	04/24/17 15:02	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	04/21/17 11:35	04/24/17 15:02	7439-92-1	
ithium	0.015	mg/L	0.010	1	04/21/17 11:35	04/24/17 15:02	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:49	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	05/02/17 12:01	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	04/21/17 11:35	04/28/17 10:49	7440-43-9	
Cobalt, Total Recoverable	0.0012	mg/L	0.0010	1	04/21/17 11:35	05/02/17 12:01	7440-48-4	
Molybdenum, Total Recoverable	0.18	mg/L	0.0010	1	04/21/17 11:35	04/28/17 10:49	7439-98-7	
Selenium, Total Recoverable	0.0061	mg/L	0.0010	1	04/21/17 11:35	05/03/17 14:53	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	04/21/17 11:35	05/02/17 12:01	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	04/13/17 08:30	04/13/17 12:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	3210	mg/L	5.0	1		04/14/17 12:41		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.5	Std. Units	0.10	1		04/17/17 12:51		H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	72.4	mg/L	5.0	5		04/13/17 20:44	16887-00-6	
Fluoride	0.84	mg/L	0.20	1		04/13/17 20:29	16984-48-8	
Sulfate	2060	mg/L	200	200		04/13/17 20:59	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

MATRIX SPIKE SAMPLE:

Date: 05/04/2017 03:20 PM

QC Batch: 472511 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

METHOD BLANK: 1934867 Matrix: Water
Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 04/13/17 11:20

LABORATORY CONTROL SAMPLE: 1934868

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0053 106 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1934869 1934870

1934871

MS MSD 60241856001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0046 70-130 20 Mercury mg/L <0.20 ug/L .005 .005 0.0046 92 91

60241857001 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers <0.20 ug/L 70-130 Mercury mg/L .005 0.0047 94

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

QC Batch: 473694 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

METHOD BLANK: 1939836 Matrix: Water
Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	04/24/17 13:51	
Beryllium	mg/L	< 0.0010	0.0010	04/24/17 13:51	
Boron	mg/L	<0.10	0.10	04/24/17 13:51	
Calcium	mg/L	<0.10	0.10	04/24/17 13:51	
Chromium	mg/L	< 0.0050	0.0050	04/24/17 13:51	
Lead	mg/L	< 0.0050	0.0050	04/24/17 13:51	
Lithium	mg/L	< 0.010	0.010	04/24/17 13:51	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	103	85-115	
Beryllium	mg/L	1	1.0	102	85-115	
Boron	mg/L	1	0.98	98	85-115	
Calcium	mg/L	10	10.3	103	85-115	
Chromium	mg/L	1	1.0	103	85-115	
Lead	mg/L	1	1.1	107	85-115	
Lithium	mg/L	1	1.0	100	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 19398	40		1939841							
Parameter	6 Units	0241636001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.31	1	1	1.3	1.3	102	102	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	1.0	1.0	102	101	70-130	1	20	
Boron	mg/L	<0.10	1	1	1.1	1.1	104	102	70-130	1	20	
Calcium	mg/L	98.2	10	10	106	105	83	71	70-130	1	20	
Chromium	mg/L	< 0.0050	1	1	1.0	1.0	102	101	70-130	1	20	
Lead	mg/L	< 0.0050	1	1	1.0	1.0	102	102	70-130	1	20	
Lithium	mg/L	0.011	1	1	1.0	1.0	102	101	70-130	1	20	

MATRIX SPIKE SAMPLE:	1939842						
		60241636002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.089	1	1.1	103	70-130	
Beryllium	mg/L	< 0.0010	1	1.0	101	70-130	
Boron	mg/L	0.22	1	1.3	104	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

MATRIX SPIKE SAMPLE:	1939842						
Parameter	Units	60241636002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium		150	10	160	96	70-130	
Chromium	mg/L	< 0.0050	1	1.0	103	70-130	
Lead	mg/L	< 0.0050	1	1.0	103	70-130	
Lithium	mg/L	< 0.010	1	1.0	102	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

QC Batch: 473696 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

METHOD BLANK: 1939849 Matrix: Water
Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	04/28/17 09:17	
Arsenic	mg/L	< 0.0010	0.0010	04/28/17 09:17	
Cadmium	mg/L	< 0.00050	0.00050	04/28/17 09:17	
Cobalt	mg/L	< 0.0010	0.0010	04/28/17 09:17	
Molybdenum	mg/L	< 0.0010	0.0010	04/28/17 09:17	
Selenium	mg/L	< 0.0010	0.0010	04/28/17 09:17	
Thallium	mg/L	< 0.0010	0.0010	04/28/17 09:17	

LABORATORY CONTROL SAMPLE:	1939851					
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	.04	0.039	97	85-115	
Arsenic	mg/L	.04	0.037	93	85-115	
Cadmium	mg/L	.04	0.039	97	85-115	
Cobalt	mg/L	.04	0.040	100	85-115	
Molybdenum	mg/L	.04	0.042	106	85-115	
Selenium	mg/L	.04	0.035	88	85-115	
Thallium	mg/L	.04	0.039	98	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 19398	52 MS	MSD	1939853							
Parameter	6 Units	0241636003 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	 mg/L	<0.0010	.04	.04	0.038	0.038	96	95	70-130	1	20	
Arsenic	mg/L	< 0.0010	.04	.04	0.037	0.037	92	90	70-130	3	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.037	0.036	92	90	70-130	2	20	
Cobalt	mg/L	< 0.0010	.04	.04	0.038	0.037	94	93	70-130	1	20	
Molybdenum	mg/L	0.0058	.04	.04	0.048	0.048	106	104	70-130	2	20	
Selenium	mg/L	< 0.0010	.04	.04	0.034	0.034	86	84	70-130	3	20	
Thallium	mg/L	< 0.0010	.04	.04	0.042	0.041	106	103	70-130	2	20	

MATRIX SPIKE SAMPLE:	1939854						
		60241636004	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	.04	0.038	95	70-130	
Arsenic	mg/L	< 0.0010	.04	0.036	90	70-130	
Cadmium	mg/L	< 0.00050	.04	0.036	89	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

MATRIX SPIKE SAMPLE:	1939854						
Doromotor	Units	60241636004 Result	Spike	MS Popult	MS % Rec	% Rec Limits	Qualifiers
Parameter	Units	Result	Conc.	Result	% Kec	Limits	Qualifiers
Cobalt	mg/L	<0.0010	.04	0.037	92	70-130	
Molybdenum	mg/L	0.0039	.04	0.045	103	70-130	
Selenium	mg/L	< 0.0010	.04	0.034	84	70-130	
Thallium	mg/L	< 0.0010	.04	0.042	106	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

QC Batch: 472660 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60241789001

METHOD BLANK: 1935328 Matrix: Water

Associated Lab Samples: 60241789001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 04/13/17 12:38

LABORATORY CONTROL SAMPLE: 1935329

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 998 100 80-120

SAMPLE DUPLICATE: 1935330

60241131007 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 1670 2 10 H3 **Total Dissolved Solids** 1710 mg/L

SAMPLE DUPLICATE: 1935331

Date: 05/04/2017 03:20 PM

Parameter Units 60241741002 Dup Max Result RPD Qualifiers
Total Dissolved Solids mg/L 204 207 1 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

QC Batch: 472848

472848 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60241789002, 60241789003, 60241789004

METHOD BLANK: 1935989 Matrix: Water

Associated Lab Samples: 60241789002, 60241789003, 60241789004

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 04/14/17 12:38

LABORATORY CONTROL SAMPLE: 1935990

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 971 97 80-120

SAMPLE DUPLICATE: 1935991

60242027001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 1440 0 10 **Total Dissolved Solids** 1440 mg/L

SAMPLE DUPLICATE: 1935992

Date: 05/04/2017 03:20 PM

60241925004 Dup Max RPD RPD Parameter Units Result Result Qualifiers 10100 **Total Dissolved Solids** mg/L 9770 3 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

(913)599-5665



#### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

QC Batch: 473026 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

SAMPLE DUPLICATE: 1937171

Date: 05/04/2017 03:20 PM

 Parameter
 Units
 60241131014 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.7
 7.7
 0
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

QC Batch: 472609 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

METHOD BLANK: 1935059 Matrix: Water

Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

Blank Reporting Qualifiers Parameter Units Result Limit Analyzed Chloride mg/L <1.0 1.0 04/13/17 08:48 Fluoride mg/L < 0.20 0.20 04/13/17 08:48 Sulfate 1.0 04/13/17 08:48 mg/L <1.0

LABORATORY CONTROL SAMPLE: 1935060

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	95	90-110	
Fluoride	mg/L	2.5	2.3	91	90-110	
Sulfate	mg/L	5	5.0	99	90-110	

MATRIX SPIKE & MATRIX SPIR	KE DUPLICA	ATE: 19350	61		1935062							
			MS	MSD								
	6	60241829001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	3030	1250	1250	4300	4400	101	110	80-120	2	15	
Fluoride	mg/L	ND	625	625	653	667	98	101	80-120	2	15	
Sulfate	mg/L	ND	1250	1250	1420	1430	98	100	80-120	1	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Sample: FAA-5-041017 Lab ID: 60241789001 Collected: 04/10/17 15:57 Received: 04/12/17 07:20 Matrix: Water PWS: Site ID: Sample Type: Method Act ± Unc (MDC) Carr Trac **Parameters** Units Analyzed CAS No. Qual EPA 903.1  $0.668 \pm 0.699$  (1.10) Radium-226 pCi/L 04/28/17 21:00 13982-63-3 C:NA T:96% EPA 904.0  $0.955 \pm 0.417 \quad (0.676)$ Radium-228 pCi/L 04/28/17 10:46 15262-20-1 C:74% T:84% Total Radium Total Radium 1.62 ± 1.12 (1.78) pCi/L 05/04/17 13:38 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

<b>Sample: FAA-4-041117</b> PWS:	<b>Lab ID: 6024178</b> Site ID:	99002 Collected: 04/11/17 09:08 Sample Type:	Received:	04/12/17 07:20	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.528 ± 0.495 (0.701) C:NA T:97%	pCi/L	04/28/17 21:00	13982-63-3	
Radium-228	EPA 904.0	0.432 ± 0.326 (0.639) C:81% T:82%	pCi/L	04/28/17 10:46	5 15262-20-1	
Total Radium	Total Radium Calculation	$0.960 \pm 0.821  (1.34)$	pCi/L	05/04/17 13:38	3 7440-14-4	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Sample: FAA-3-041117 Lab ID: 60241789003 Collected: 04/11/17 10:08 Received: 04/12/17 07:20 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.495 \pm 0.649$  (1.08) Radium-226 pCi/L 04/28/17 21:00 13982-63-3 C:NA T:100% EPA 904.0 -0.124 ± 0.290 (0.703) Radium-228 pCi/L 04/28/17 12:00 15262-20-1 C:80% T:88% Total Radium Total Radium  $0.495 \pm 0.939 \quad (1.78)$ pCi/L 05/04/17 13:38 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Sample: FAA-2-041117 Lab ID: 60241789004 Collected: 04/11/17 11:19 Received: 04/12/17 07:20 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.433 \pm 0.512 \quad (0.804)$ Radium-226 pCi/L 04/28/17 21:00 13982-63-3 C:NA T:84% 0.406 ± 0.388 (0.797) EPA 904.0 Radium-228 pCi/L 04/28/17 10:46 15262-20-1 C:74% T:81% Total Radium Total Radium  $0.839 \pm 0.900 \quad (1.60)$ pCi/L 05/04/17 13:38 7440-14-4 Calculation



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

QC Batch: 255861 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60241789001, 60241789002, 60241789004

METHOD BLANK: 1260080 Matrix: Water

Associated Lab Samples: 60241789001, 60241789002, 60241789004

Parameter Act ± Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-228 0.187 ± 0.333 (0.729) C:79% T:80% pCi/L 04/28/17 10:43

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

QC Batch: 255863 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60241789003

METHOD BLANK: 1260085 Matrix: Water

Associated Lab Samples: 60241789003

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.369 ± 0.333 (0.672) C:81% T:76%
 pCi/L
 04/28/17 11:58

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

QC Batch: 255860 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

METHOD BLANK: 1260077 Matrix: Water

Associated Lab Samples: 60241789001, 60241789002, 60241789003, 60241789004

Parameter Act ± Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-226 0.221 ± 0.480 (0.886) C:NA T:96% pCi/L 04/28/17 20:30

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 05/04/2017 03:20 PM

H3 Sample was received or analysis requested beyond the recognized method holding time.

H6 Analysis initiated outside of the 15 minute EPA required holding time.



## **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60241789

Date: 05/04/2017 03:20 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60241789001	FAA-5-041017	EPA 200.7	473694	EPA 200.7	473746
60241789002	FAA-4-041117	EPA 200.7	473694	EPA 200.7	473746
60241789003	FAA-3-041117	EPA 200.7	473694	EPA 200.7	473746
60241789004	FAA-2-041117	EPA 200.7	473694	EPA 200.7	473746
60241789001	FAA-5-041017	EPA 200.8	473696	EPA 200.8	473747
60241789002	FAA-4-041117	EPA 200.8	473696	EPA 200.8	473747
60241789003	FAA-3-041117	EPA 200.8	473696	EPA 200.8	473747
60241789004	FAA-2-041117	EPA 200.8	473696	EPA 200.8	473747
60241789001	FAA-5-041017	EPA 245.1	472511	EPA 245.1	472570
60241789002	FAA-4-041117	EPA 245.1	472511	EPA 245.1	472570
60241789003	FAA-3-041117	EPA 245.1	472511	EPA 245.1	472570
60241789004	FAA-2-041117	EPA 245.1	472511	EPA 245.1	472570
60241789001	FAA-5-041017	EPA 903.1	255860		
60241789002	FAA-4-041117	EPA 903.1	255860		
60241789003	FAA-3-041117	EPA 903.1	255860		
60241789004	FAA-2-041117	EPA 903.1	255860		
60241789001	FAA-5-041017	EPA 904.0	255861		
60241789002	FAA-4-041117	EPA 904.0	255861		
60241789003	FAA-3-041117	EPA 904.0	255863		
60241789004	FAA-2-041117	EPA 904.0	255861		
60241789001	FAA-5-041017	Total Radium Calculation	257426		
60241789002	FAA-4-041117	Total Radium Calculation	257426		
60241789003	FAA-3-041117	Total Radium Calculation	257426		
60241789004	FAA-2-041117	Total Radium Calculation	257426		
60241789001	FAA-5-041017	SM 2540C	472660		
60241789002	FAA-4-041117	SM 2540C	472848		
60241789003	FAA-3-041117	SM 2540C	472848		
60241789004	FAA-2-041117	SM 2540C	472848		
60241789001	FAA-5-041017	SM 4500-H+B	473026		
60241789002	FAA-4-041117	SM 4500-H+B	473026		
60241789003	FAA-3-041117	SM 4500-H+B	473026		
60241789004	FAA-2-041117	SM 4500-H+B	473026		
60241789001	FAA-5-041017	EPA 300.0	472609		
60241789002	FAA-4-041117	EPA 300.0	472609		
60241789003	FAA-3-041117	EPA 300.0	472609		
60241789004	FAA-2-041117	EPA 300.0	472609		



# Sample Condition Upon Receipt



Client Name: Nestar	
Courier: FedEx □ UPS □ VIA   Clay □ P	PEX □ ECI □ Pace □ Xroads □ Client □ Other □
Tracking #: Pace	e Shipping Label Used? Yes,  No □
Custody Seal on Cooler/Box Present: Yes No 🗆	Seals intact: Yeş ☑ No □
Cooler Temperature (°C): As-read 0.8 Corr. Facto	Foam None Other Discussion None Other Date and initials of person examining contents:
Temperature should be above freezing to 6°C	
Chain of Custody present:	□Ves □No □N/A
Chain of Custody relinquished:	ØYes □No □N/A
Samples arrived within holding time:	□Yes □No □N/A
Short Hold Time analyses (<72hr):	ØYes □No □N/A <b>//</b>
Rush Turn Around Time requested:	□Yes ☑No □N/A
Sufficient volume:	ØYes □No □N/A
Correct containers used:	✓Yes □No □N/A
Pace containers used:	⊠Yes □No □N/A
Containers intact:	Xyes □No □N/A
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No ØÑ/A
Filtered volume received for dissolved tests?	□Yes □No ØN/A
Sample labels match COC: Date / time / ID / analyses	□xés □no □n/A
Samples contain multiple phases? Matrix:	□Yes □Mo □N/A
Containers requiring pH preservation in compliance? (HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	EYes □No □N/A
Cyanide water sample checks:	□Yes □No
Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No
Trip Blank present:	□Yes □Mo □N/A
Headspace in VOA vials ( >6mm):	□Yes □No ☑N/A
Samples from USDA Regulated Area: State:	□Yes □No □N/A
Additional labels attached to 5035A / TX1005 vials in the field?	? □Yes □No □M/A
Client Notification/ Resolution: Copy COC to	Client? Y / N Field Data Required? Y / N
Person Contacted: Date/Ti Comments/ Resolution:	ime:
Project Manager Review:	Date: 4/12/17



## **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

Section Required	A I Client Information:			Section B Required P		Informa	ation:					Invoid	ion C e Infor											_4			Pag	je;	1	of		2
ompany	: WESTAR EN	IERGY		Report To:	Branc	don C	Griffin					Atten	tion:	Jar	ed Mo	orriso	n															
ddress:	818 Kansas /	Ave		Сору То:	Jareo	d Mor	rison, He	ath Hor	nya			Comp	any Na	ime:	WES	TAR	ENEF	RGY				REG	ULA	TOR	Y AG	ENCY						
	Topeka, KS	66612										Addre	ess:		SEE S	SECT	rion ,	A				<b>V</b>	NPD	ES	Г	ROUN	ID W	ATER	Г	RINKING	WATE	₹
mail To:	brandon.l.grif	ffin@westaren	nergy.com	Purchase C	order N	0.:						Pace (										UST F RCRA					ПС	THER				
hone:	(785) 575-8135	Fax:		Project Nan	ne: ,	JEC (	CCR Gro	undwate	er				Project	Hea	ather	Wilso	on, 91	3-563	3-140	7	T	Site	e Loc	ation		140						
lequest	ed Due Date/TAT:	7 DAY		Project Nun	nber:								Profile #	965	57, 1								ST	ATE:	_	KS						
																			Re	ques	sted /	Anal	ysis	Filter	red (Y	/N)						
	Section D Required Client Informati	ion	Valid Matrix C	CODE	s to left)	C=COMP)		COLL	ECTED					Pre:	serva	tives		N/A														
ITEM#	<b>SAMPL</b> (A-Z, 0-9 Sample IDs MUST	E ID	WATER	DW WT WW P SL OL WP AR OT TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=C)	COMPOSTAR		COMPIENDIX	OSITE SPAB	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	HNO <sub>3</sub>	HCI	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol Other	Analysis Test	200.7 Total Metals*	200.6 Total Mercury	300.0 Cl, Fl, SO4	4500 H+B	2540C TDS	Radium 228	0			Residual Chlorine (Y/N)		7417		1.D.
1	FAA-5	-04101	7		-	6			4/10	1557		4	1	3													$\neg$	882	W RP	as no	PIN	W
2		4-0411			WT	6			4/11	0908		ч	17	3																1	_	as
3	FAA-	3-0411	17			G			4/11	1008		4	11	3				1 1	V													03
4	FAA-	2-04	1117		WT				4/11	1119		4	I	3		П		1 1												1		ay
5	1.1/-											1																				
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12												_																				
		AL COMMENTS	1 2		RELI	NQUIS	SHED BY /	AFFILIAT	ION	DAT	ΓE	_	TIME			AC	CEPTE	D BY	AFFI	LIATIO	NC			TE		ME			SAMPL	E CONDITI		
	otal Metals: Ba, Be, B,			13/	2)	1	/w	estro		4/11	/17	13	300	)	\$c	en/s	N		1	~	_ /	//	12//	12	0;	20	7	.3	7	У	7	
	Page																													9		
	ge 37 of 39							SAMPL	PRINT Na	me of SAM	PLER	Ê	11	nde M	-	6	iff	17	DAT (MI	TE Sig	gned YY): (	14,	/ <sub>1</sub> (	/1	7		Temp in °C		Ice (Y/N)	Custody Sealed Cooler (Y/N)	Setul solumes	(N/A)

# Chain of Custody



30216040

***************************************	rkorder: 60241789	Workorder	Name:JEC CC	R GROUNDW	/ATER			Owr	ıer Re	ceiv	ed [	Date:	4/12/20	17	Resu	lts Re	quested By:	5/4/2017
Rep	ort To		Subcontra	ct To				moderation							Analys		quoetta Dy.	0/4/2017
Pac 960 Len	ther Wilson e Analytical Kansas 8 Loiret Blvd. exa, KS 66219 ne 1(913)563-1407		1638 Suites Greer	Analytical Pittst Roseytown Roa s 2,3, & 4 nsburg, PA 156 e (724)850-560	ad 01		?reserve	ed Co	ntainem	Marian Company	Radiun	-226 & Total Radium						
Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	HN03					·	Radium						LAB USE ONLY
1	FAA-5-041017	PS	4/10/2017 15:57	60241789001	Water	2					X	X				++		771
2	FAA-4-041117	PS	4/11/2017 09:08	60241789002	Water	2						$\frac{x}{x}$			_	++		<del>~~</del>
3	FAA-3-041117	PS	4/11/2017 10:08	60241789003	Water	2						$\frac{x}{x}$		_	_	++		<u>,02</u> :03
4	FAA-2-041117	PS .	4/11/2017 11:19	60241789004	Water	2						X				++		<del>20</del> 2
5											$\neg$							<u> </u>
1 2 3	sfers Released By		Date/Time	Received E	Big		Pac		Date/	3/17	)	092				Comme	nts	
Coc	ler Temperature on R	eceipt NA	°C Cus	stody Seal \	Y or N			Rec	eived	on l	ce	<u>Y o</u>	<u>r (Ñ)</u>			3ampl	es Intact(Y	or N

<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.



Sample Condition Upon Receipt Pittsburgh Pace Analytical Pace KS Client Name: Courier: X Fed Ex UPS USPS Client Commercial Pace Other 6591 5559 Tracking #: 7285 Custody Seal on Cooler/Box Present: yes X no Seals intact: Thermometer Used Type of ice: Wet Blue None N/A °C Correction Factor: N/A °C Final Temp: N/A Observed Temp **Cooler Temperature** Temp should be above freezing to 6°C Date and Initials of person examining contents: RTB 4/13/17 No N/A Comments: × Chain of Custody Present: X 2. Chain of Custody Filled Out: X Chain of Custody Relinquished: × Sampler Name & Signature on COC: X 5. Sample Labels match COC: WT -Includes date/time/ID Matrix: × Samples Arrived within Hold Time: X Short Hold Time Analysis (<72hr remaining): X 8. Rush Turn Around Time Requested: X 9. Sufficient Volume: × 10. Correct Containers Used: × -Pace Containers Used: Containers Intact: 12. Orthophosphate field filtered X 13. Organic Samples checked for dechlorination: Filtered volume received for Dissolved tests × 14. All containers have been checked for preservation. × 15. pH62 All containers needing preservation are found to be in compliance with EPA recommendation. 4/13/17 Date/time of Initial when preservation exceptions: VOA, coliform, TOC, O&G, Phenolics completed Lot # of added preservative × 16. Headspace in VOA Vials (>6mm): × 17. Trip Blank Present: X Trip Blank Custody Seals Present Initial when Date: 4/13/17 Rad Aqueous Samples Screened > 0.5 mrem/hr X ATB completed: Client Notification/ Resolution: Date/Time: Contacted By: Person Contacted: Comments/ Resolution:

☐ A check in this box indicates that additional information has been stored in ereports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ATTACHMENT 1-7
May 2017 Sampling Event
Laboratory Analytical Report



August 22, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

### Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on May 31, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Revised Report\_rev.1 Per the client's request, the samples 60245348-001 and -005 were reevaluated down to the MDL.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

dianton m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification

Hawaii Certification

Idaho Certification
Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Montana Certification #: Cert 0082 Nebraska Certification #: NE-05-29-14

Nevada Certification #: PA014572015-1

New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051

New Jersey/TNI Certification #: PA 051 New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Oregon/TNI Certification #: PA200002

Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457

Phone Island Contition #: PAU1457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5

USDA Soil Permit #: P330-14-00213

JSDA Soil Permit #: P330-14-00213

Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 460198

Washington Certification #: C868

West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407

Utah Certification #: KS00021 Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



## **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Lab ID	Sample ID	Matrix	Date Collected	Date Received	
60245348001	FAA-5-053017	Water	05/30/17 07:53	05/31/17 07:40	
60245348002	FAA-4-053017	Water	05/30/17 09:12	05/31/17 07:40	
60245348003	FAA-3-053017	Water	05/30/17 10:02	05/31/17 07:40	
60245348004	FAA-2-053017	Water	05/30/17 11:02	05/31/17 07:40	
60245348005	DUP-053017	Water	05/30/17 06:00	05/31/17 07:40	



## **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60245348001	FAA-5-053017	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	JRS	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K
0245348002	FAA-4-053017	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	JRS	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K
0245348003	FAA-3-053017	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	JRS	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	RAD	3	PASI-K
0245348004	FAA-2-053017	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	JRS	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	НММ	1	PASI-K
		EPA 300.0	RAD	3	PASI-K
0245348005	DUP-053017	EPA 200.7	TDS	7	PASI-K

(913)599-5665



## **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	JRS	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: August 22, 2017

#### **General Information:**

5 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 479127

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60245129001,60245129002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1962385)
  - Calcium
- MS (Lab ID: 1962387)
  - Boron
  - Calcium
- MSD (Lab ID: 1962386)
  - Calcium

## **Additional Comments:**



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: August 22, 2017

#### **General Information:**

5 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method:EPA 245.1Description:245.1 MercuryClient:WESTAR ENERGYDate:August 22, 2017

#### **General Information:**

5 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** August 22, 2017

#### **General Information:**

5 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method: EPA 904.0

**Description:** 904.0 Radium 228 **Client:** WESTAR ENERGY **Date:** August 22, 2017

#### **General Information:**

5 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:August 22, 2017

#### **General Information:**

5 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY

Date: August 22, 2017

#### **General Information:**

5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

# **Additional Comments:**



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: August 22, 2017

#### **General Information:**

5 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

DUP-053017 (Lab ID: 60245348005)
FAA-2-053017 (Lab ID: 60245348004)
FAA-3-053017 (Lab ID: 60245348003)
FAA-4-053017 (Lab ID: 60245348002)

• FAA-5-053017 (Lab ID: 60245348001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

#### Additional Comments:



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: August 22, 2017

#### **General Information:**

5 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

Sample: FAA-5-053017	Lab ID: 602	245348001	Collected: 05/30/1	7 07:53	Received: 05	/31/17 07:40 N	Matrix: Water	
Parameters	Results	Units	PQL	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.013	mg/L	0.010	2	06/01/17 09:44	06/08/17 13:09	7440-39-3	
Beryllium, Total Recoverable	0.00081J	mg/L	0.0020	2	06/01/17 09:44	06/08/17 13:09	7440-41-7	
Boron, Total Recoverable	0.85	mg/L	0.10	1	06/01/17 09:44	06/08/17 13:43	7440-42-8	
Calcium, Total Recoverable	261	mg/L	0.20	2	06/01/17 09:44	06/08/17 13:09	7440-70-2	
Chromium, Total Recoverable	<0.00072	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:43	7440-47-3	
Lead, Total Recoverable	<0.0024	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:43	7439-92-1	
Lithium	0.061	mg/L	0.020	2	06/01/17 09:44	06/08/17 13:09	7439-93-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	0.00022J	mg/L	0.0010	1	06/09/17 16:50	06/14/17 15:40	7440-36-0	
Arsenic, Total Recoverable	0.00081J	mg/L	0.0010	1	06/09/17 16:50	06/14/17 15:40	7440-38-2	
Cadmium, Total Recoverable	0.000045J	mg/L	0.00050	1	06/09/17 16:50	06/14/17 15:40	7440-43-9	
Cobalt, Total Recoverable	0.00048J	mg/L	0.0010	1	06/09/17 16:50	06/14/17 15:40	7440-48-4	
Molybdenum, Total Recoverable	0.012	mg/L	0.0010	1	06/09/17 16:50	06/14/17 15:40	7439-98-7	
Selenium, Total Recoverable	0.0020	mg/L	0.0010	1	06/09/17 16:50	06/14/17 15:40	7782-49-2	
Thallium, Total Recoverable	0.00014J	mg/L	0.0010	1	06/09/17 16:50	06/14/17 15:40	7440-28-0	
245.1 Mercury	Analytical Met	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.000083	mg/L	0.00020	1	06/09/17 16:43	06/12/17 12:01	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	OC					
Total Dissolved Solids	1810	mg/L	5.0	1		06/01/17 11:18		
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.3	Std. Units	0.10	1		06/06/17 12:00		H6
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	0.0					
Chloride	178	mg/L	10.0	10		06/01/17 02:53	16887-00-6	
Fluoride	0.68	mg/L	0.20	1		06/01/17 03:08	16984-48-8	
Sulfate	912	mg/L	100	100		06/01/17 17:18	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

Sample: FAA-4-053017	Lab ID: 602	45348002	Collected: 05/30/1	7 09:12	Received: 05	5/31/17 07:40 <b>I</b>	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.050	mg/L	0.010	2	06/01/17 09:44	06/08/17 13:12	7440-39-3	
Beryllium, Total Recoverable	<0.0020	mg/L	0.0020	2	06/01/17 09:44	06/08/17 13:12	7440-41-7	
Boron, Total Recoverable	0.40	mg/L	0.10	1	06/01/17 09:44	06/08/17 13:45	7440-42-8	
Calcium, Total Recoverable	200	mg/L	0.20	2	06/01/17 09:44	06/08/17 13:12	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:45	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:45	7439-92-1	
Lithium	<0.020	mg/L	0.020	2	06/01/17 09:44	06/08/17 13:12	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:14	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:14	7440-38-2	
Cadmium, Total Recoverable	< 0.00050	mg/L	0.00050	1	06/09/17 16:50	06/14/17 16:14	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:14	7440-48-4	
Molybdenum, Total Recoverable	0.0031	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:14	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:14	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:14	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	06/09/17 16:43	06/12/17 12:02	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC .					
Total Dissolved Solids	1140	mg/L	5.0	1		06/01/17 11:19	)	
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	0-H+B					
pH at 25 Degrees C	7.2	Std. Units	0.10	1		06/06/17 12:00	)	H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	80.6	mg/L	10.0	10		06/01/17 03:37	16887-00-6	
Fluoride	0.35	mg/L	0.20	1		06/01/17 03:23	16984-48-8	
Sulfate	518	mg/L	50.0	50		06/01/17 03:52	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

Sample: FAA-3-053017	Lab ID: 602	45348003	Collected: 05/30/1	7 10:02	Received: 05	5/31/17 07:40 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	0.7 Preparation Met	hod: EF	PA 200.7			
Barium, Total Recoverable	0.033	mg/L	0.010	2	06/01/17 09:44	06/08/17 13:14	7440-39-3	
Beryllium, Total Recoverable	<0.0020	mg/L	0.0020	2	06/01/17 09:44	06/08/17 13:14	7440-41-7	
Boron, Total Recoverable	0.91	mg/L	0.10	1	06/01/17 09:44	06/08/17 13:48	7440-42-8	
Calcium, Total Recoverable	208	mg/L	0.20	2	06/01/17 09:44	06/08/17 13:14	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:48	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:48	7439-92-1	
Lithium	<0.020	mg/L	0.020	2	06/01/17 09:44	06/08/17 13:14	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EF	PA 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:20	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:20	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	06/09/17 16:50	06/14/17 16:20	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:20	7440-48-4	
Molybdenum, Total Recoverable	0.013	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:20	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:20	7782-49-2	
Γhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:20	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 24	5.1 Preparation Met	hod: EF	PA 245.1			
Mercury	<0.00020	mg/L	0.00020	1	06/09/17 16:43	06/12/17 12:03	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 254	0C					
Total Dissolved Solids	1450	mg/L	5.0	1		06/01/17 11:19	ı	
1500H+ pH, Electrometric	Analytical Met	hod: SM 450	0-H+B					
oH at 25 Degrees C	7.2	Std. Units	0.10	1		06/07/17 00:00	)	H6
800.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	82.7	mg/L	10.0	10		06/01/17 04:22	16887-00-6	
Fluoride	0.35	mg/L	0.20	1		06/01/17 04:07	16984-48-8	
Sulfate	778	mg/L	50.0	50		06/01/17 04:37	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

Sample: FAA-2-053017	Lab ID: 602	45348004	Collected: 05/30/1	7 11:02	Received: 05	/31/17 07:40	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.036	mg/L	0.010	2	06/01/17 09:44	06/08/17 13:16	7440-39-3	
Beryllium, Total Recoverable	<0.0020	mg/L	0.0020	2	06/01/17 09:44	06/08/17 13:16	7440-41-7	
Boron, Total Recoverable	3.7	mg/L	0.10	1	06/01/17 09:44	06/08/17 13:50	7440-42-8	
Calcium, Total Recoverable	310	mg/L	0.20	2	06/01/17 09:44	06/08/17 13:16	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:50	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:50	7439-92-1	
Lithium	<0.020	mg/L	0.020	2	06/01/17 09:44	06/08/17 13:16	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:27	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:27	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	06/09/17 16:50	06/14/17 16:27	7440-43-9	
Cobalt, Total Recoverable	0.0013	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:27	7440-48-4	
Molybdenum, Total Recoverable	0.38	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:27	7439-98-7	
Selenium, Total Recoverable	0.0013	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:27	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:27	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	06/09/17 16:43	06/12/17 12:05	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC .					
Total Dissolved Solids	3510	mg/L	5.0	1		06/01/17 11:20		
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	)-H+B					
pH at 25 Degrees C	7.8	Std. Units	0.10	1		06/07/17 00:00	)	H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	.0					
Chloride	66.0	mg/L	5.0	5		06/01/17 05:52	16887-00-6	
Fluoride	0.61	mg/L	0.20	1		06/01/17 04:52		
Sulfate	2430	mg/L	200	200		06/01/17 05:07		



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

Sample: DUP-053017	Lab ID: 602	245348005	Collected: 05/30/1	7 06:00	Received: 05	5/31/17 07:40 N	Matrix: Water	
Parameters	Results	Units	PQL	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.014	mg/L	0.010	2	06/01/17 09:44	06/08/17 13:19	7440-39-3	
Beryllium, Total Recoverable	0.0013J	mg/L	0.0020	2	06/01/17 09:44	06/08/17 13:19	7440-41-7	
Boron, Total Recoverable	0.88	mg/L	0.10	1		06/08/17 13:52		
Calcium, Total Recoverable	251	mg/L	0.20	2	06/01/17 09:44	06/08/17 13:19	7440-70-2	
Chromium, Total Recoverable	<0.00072	mg/L	0.0050	1	06/01/17 09:44	06/08/17 13:52	7440-47-3	
Lead, Total Recoverable	<0.0024	mg/L	0.0050	1		06/08/17 13:52		
∟ithium	0.061	mg/L	0.020	2	06/01/17 09:44	06/08/17 13:19	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	0.00019J	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:33	7440-36-0	
Arsenic, Total Recoverable	0.00074J	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:33	7440-38-2	
Cadmium, Total Recoverable	0.000041J	mg/L	0.00050	1	06/09/17 16:50	06/14/17 16:33	7440-43-9	
Cobalt, Total Recoverable	0.00041J	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:33	7440-48-4	
Molybdenum, Total Recoverable	0.010	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:33	7439-98-7	
Selenium, Total Recoverable	0.0020	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:33	7782-49-2	
Thallium, Total Recoverable	<0.000036	mg/L	0.0010	1	06/09/17 16:50	06/14/17 16:33	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.000083	mg/L	0.00020	1	06/09/17 16:43	06/12/17 12:09	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	oc					
Total Dissolved Solids	1700	mg/L	5.0	1		06/01/17 11:20		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	O-H+B					
oH at 25 Degrees C	7.2	Std. Units	0.10	1		06/06/17 12:00		H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	177	mg/L	10.0	10		06/01/17 06:21	16887-00-6	
Fluoride	0.50	mg/L	0.20	1		06/01/17 06:06	16984-48-8	
Sulfate	827	mg/L	100	100		06/01/17 06:36	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

 QC Batch:
 479800
 Analysis Method:
 EPA 245.1

 QC Batch Method:
 EPA 245.1
 Analysis Description:
 245.1 Mercury

 Associated Lab Samples:
 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

METHOD BLANK: 1965095 Matrix: Water

Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

Blank Reporting

 Parameter
 Units
 Result
 Limit
 Analyzed
 Qualifiers

 Mercury
 mg/L
 <0.000083</td>
 0.00020
 06/12/17 11:26

LABORATORY CONTROL SAMPLE: 1965096

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0053 105 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1965097 1965098

MS MSD 60245491002 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual ND 0.0050 70-130 20 Mercury mg/L .005 .005 0.0048 96 100 3

MATRIX SPIKE SAMPLE: 1965099

60245292001 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers < 0.00020 70-130 Mercury mg/L .005 0.0049 97

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

 QC Batch:
 479127
 Analysis Method:
 EPA 200.7

 QC Batch Method:
 EPA 200.7
 Analysis Description:
 200.7 Metals, Total

 Associated Lab Samples:
 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

METHOD BLANK: 1962383 Matrix: Water

Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.00091	0.0050	06/07/17 17:40	
Beryllium	mg/L	0.00038J	0.0010	06/07/17 17:40	
Boron	mg/L	0.016J	0.10	06/07/17 17:40	
Calcium	mg/L	< 0.036	0.10	06/07/17 17:40	
Chromium	mg/L	0.00091J	0.0050	06/07/17 17:40	
Lead	mg/L	< 0.0024	0.0050	06/07/17 17:40	
Lithium	mg/L	< 0.0029	0.010	06/07/17 17:40	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	100	85-115	
Beryllium	mg/L	1	1.0	100	85-115	
Boron	mg/L	1	0.99	99	85-115	
Calcium	mg/L	10	10	100	85-115	
Chromium	mg/L	1	1.0	100	85-115	
Lead	mg/L	1	1.0	100	85-115	
Lithium	mg/L	1	1.0	100	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	TE: 19623	85		1962386							
			MS	MSD								
	6	0245129001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	0.072	1	1	1.0	1.0	95	95	70-130	0	20	
Beryllium	mg/L	< 0.0010	1	1	0.96	0.97	96	97	70-130	1	20	
Boron	mg/L	0.70	1	1	1.7	1.6	95	94	70-130	1	20	
Calcium	mg/L	152	10	10	158	158	62	58	70-130	0	20	M1
Chromium	mg/L	< 0.0050	1	1	0.94	0.95	94	95	70-130	1	20	
Lead	mg/L	< 0.0050	1	1	0.91	0.91	91	91	70-130	0	20	
Lithium	mg/L	0.023	1	1	1.0	1.0	99	99	70-130	1	20	

MATRIX SPIKE SAMPLE:	1962387						
		60245129002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.28	1	1.0	71	70-130	
Beryllium	mg/L	< 0.0010	1	0.98	98	70-130	
Boron	mg/L	0.26	1	2.3	205	70-130 N	Л1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

MATRIX SPIKE SAMPLE:	1962387						
Parameter	Units	60245129002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
						Limito	- <del>Q</del> ualificis
Calcium	mg/L	177	10	224	471	70-130	) M1
Chromium	mg/L	< 0.0050	1	1.0	102	70-130	)
Lead	mg/L	< 0.0050	1	0.96	96	70-130	)
Lithium	mg/L	<0.010	1	0.98	98	70-130	)



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

 QC Batch:
 480479
 Analysis Method:
 EPA 200.8

 QC Batch Method:
 EPA 200.8
 Analysis Description:
 200.8 MET

 Associated Lab Samples:
 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

METHOD BLANK: 1968228 Matrix: Water

Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.000026	0.0010	06/14/17 15:33	
Arsenic	mg/L	0.000070J	0.0010	06/14/17 15:33	
Cadmium	mg/L	<0.000018	0.00050	06/14/17 15:33	
Cobalt	mg/L	0.000029J	0.0010	06/14/17 15:33	
Molybdenum	mg/L	<0.000058	0.0010	06/14/17 15:33	
Selenium	mg/L	<0.000086	0.0010	06/14/17 15:33	
Thallium	mg/L	0.000054J	0.0010	06/14/17 15:33	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.040	99	85-115	
Arsenic	mg/L	.04	0.039	98	85-115	
Cadmium	mg/L	.04	0.040	100	85-115	
Cobalt	mg/L	.04	0.041	103	85-115	
Molybdenum	mg/L	.04	0.042	104	85-115	
Selenium	mg/L	.04	0.038	94	85-115	
Thallium	mg/L	.04	0.038	94	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 19682:	30		1968231							
			MS	MSD								
	6	0245348001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	0.00022J	.04	.04	0.039	0.038	97	95	70-130	1	20	
Arsenic	mg/L	0.00081J	.04	.04	0.036	0.036	88	87	70-130	2	20	
Cadmium	mg/L	0.000045J	.04	.04	0.036	0.035	90	88	70-130	2	20	
Cobalt	mg/L	0.00048J	.04	.04	0.037	0.037	91	91	70-130	0	20	
Molybdenum	mg/L	0.012	.04	.04	0.054	0.054	106	105	70-130	1	20	
Selenium	mg/L	0.0020	.04	.04	0.036	0.035	84	84	70-130	1	20	
Thallium	mg/L	0.00014J	.04	.04	0.034	0.034	85	85	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

QC Batch: 479182 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

METHOD BLANK: 1962626 Matrix: Water

Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

Blank Reporting

Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 06/01/17 11:17

LABORATORY CONTROL SAMPLE: 1962627

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 973 97 80-120

SAMPLE DUPLICATE: 1962628

Date: 08/22/2017 11:09 AM

60245348001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers **Total Dissolved Solids** 1810 1860 3 10 mg/L



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

QC Batch: 479836 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60245348001, 60245348002, 60245348005

SAMPLE DUPLICATE: 1965272

Date: 08/22/2017 11:09 AM

 Parameter
 Units
 Result
 Dup Result
 RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.6
 7.6
 0
 5 H6



# **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

QC Batch: 479848 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60245348003, 60245348004

SAMPLE DUPLICATE: 1965341

Date: 08/22/2017 11:09 AM

 Parameter
 Units
 Result Result
 Result RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.2
 7.3
 1
 5 H6



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

 QC Batch:
 479004
 Analysis Method:
 EPA 300.0

 QC Batch Method:
 EPA 300.0
 Analysis Description:
 300.0 IC Anions

 Associated Lab Samples:
 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

METHOD BLANK: 1961999 Matrix: Water

Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.50	1.0	06/01/17 00:24	
Fluoride	mg/L	<0.10	0.20	06/01/17 00:24	
Sulfate	mg/L	< 0.50	1.0	06/01/17 00:24	

LABORATORY CONTROL SAMPLE:	1962000	Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L	5	5.0	100	90-110	
Fluoride	mg/L	2.5	2.6	105	90-110	
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE & MATRIX SPI	KE DUPLICA	TE: 19620	01		1962002							
			MS	MSD								
	60	0245373001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	327	125	125	463	467	109	112	80-120	1	15	
Fluoride	mg/L	ND	62.5	62.5	60.3	61.0	96	98	80-120	1	15	
Sulfate	mg/L	66.1	125	125	195	198	103	105	80-120	1	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.:

60245348

QC Batch: QC Batch Method:

Sulfate

Sulfate

479186

EPA 300.0

Analysis Method:

< 0.50

EPA 300.0

Analysis Description:

300.0 IC Anions

Associated Lab Samples: 60245348001

METHOD BLANK: 1962661

Associated Lab Samples: 60245348001

Blank

Reporting

Parameter

Units mg/L

Units

mg/L

Result

Matrix: Water

Limit

Analyzed 1.0 06/01/17 09:12

105

Qualifiers

LABORATORY CONTROL SAMPLE:

Parameter

Parameter

1962662

Units

mg/L

Spike Conc.

LCS Result

LCS % Rec % Rec Limits

90-110

Qualifiers

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

1962663

1962664

5.2

MSD

60245358001 Spike Result Conc. ND

MS

MSD MS Result % Rec

53.8

MSD % Rec % Rec Max Limits RPD

RPD

MS Spike Conc. 50

Result

107

108

80-120

Qual 0 15

Sulfate

50 53.6

Date: 08/22/2017 11:09 AM

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60245348

Sample: FAA-5-053017 Lab ID: 60245348001 Collected: 05/30/17 07:53 Received: 05/31/17 07:40 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 1.10 ± 0.599 (0.657) Radium-226 pCi/L 06/12/17 22:51 13982-63-3 C:NA T:94% EPA 904.0 0.747 ± 0.378 (0.661) 06/15/17 11:26 15262-20-1 Radium-228 pCi/L C:79% T:86% Total Radium Total Radium  $1.85 \pm 0.977$  (1.32) pCi/L 06/20/17 07:55 7440-14-4



Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60245348

Sample: FAA-4-053017 Lab ID: 60245348002 Collected: 05/30/17 09:12 Received: 05/31/17 07:40 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.190 ± 0.290 (0.466) Radium-226 pCi/L 06/12/17 22:51 13982-63-3 C:NA T:97% EPA 904.0  $0.502 \pm 0.354 \quad (0.690)$ Radium-228 pCi/L 06/15/17 11:22 15262-20-1 C:81% T:87% Total Radium Total Radium  $0.692 \pm 0.644$  (1.16) pCi/L 06/20/17 07:55 7440-14-4



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Sample: FAA-3-053017 Lab ID: 60245348003 Collected: 05/30/17 10:02 Received: 05/31/17 07:40 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.419 \pm 0.435 \quad (0.648)$ Radium-226 pCi/L 06/12/17 22:51 13982-63-3 C:NA T:91% EPA 904.0 0.794 ± 0.386 (0.673) Radium-228 pCi/L 06/15/17 11:22 15262-20-1 C:80% T:89% Total Radium Total Radium 1.21 ± 0.821 (1.32) pCi/L 06/20/17 07:55 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Sample: FAA-2-053017 Lab ID: 60245348004 Collected: 05/30/17 11:02 Received: 05/31/17 07:40 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.379 \pm 0.447 \quad (0.703)$ Radium-226 pCi/L 06/12/17 23:09 13982-63-3 C:NA T:80% EPA 904.0 1.61 ± 0.511 (0.673) Radium-228 pCi/L 06/15/17 11:22 15262-20-1 C:80% T:85% Total Radium **Total Radium**  $1.99 \pm 0.958 \quad (1.38)$ pCi/L 06/20/17 07:55 7440-14-4 Calculation



Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Sample: DUP-053017 Lab ID: 60245348005 Collected: 05/30/17 06:00 Received: 05/31/17 07:40 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.188 ± 0.326 (0.582) Radium-226 pCi/L 06/12/17 23:09 13982-63-3 C:NA T:93% EPA 904.0 1.13 ± 0.429 (0.655) Radium-228 pCi/L 06/15/17 11:23 15262-20-1 C:80% T:87% Total Radium **Total Radium**  $1.32 \pm 0.755$  (1.24) pCi/L 06/20/17 07:55 7440-14-4 Calculation



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

 QC Batch:
 261066
 Analysis Method:
 EPA 904.0

 QC Batch Method:
 EPA 904.0
 Analysis Description:
 904.0 Radium 228

 Associated Lab Samples:
 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

METHOD BLANK: 1285467 Matrix: Water

Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.195 ± 0.278 (0.596) C:78% T:86%
 pCi/L
 06/15/17 11:24

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

QC Batch: 260857 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226 Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

METHOD BLANK: 1284591 Matrix: Water

Associated Lab Samples: 60245348001, 60245348002, 60245348003, 60245348004, 60245348005

Parameter Act  $\pm$  Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-226 -0.069  $\pm$  0.317 (0.747) C:NA T:95% pCi/L 06/12/17 22:21

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

# **ANALYTE QUALIFIERS**

Date: 08/22/2017 11:09 AM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

60245348001         FAA.5-053017         EPA 200.7         479127         EPA 201           60245348002         FAA.4-053017         EPA 200.7         479127         EPA 201           60245348003         FAA.3-053017         EPA 200.7         479127         EPA 201           60245348004         FAA.2-053017         EPA 200.7         479127         EPA 200           60245348005         DUP-053017         EPA 200.8         480479         EPA 201           60245348002         FAA.3-053017         EPA 200.8         480479         EPA 201           60245348003         FAA.3-053017         EPA 200.8         480479         EPA 201           60245348004         FAA.3-053017         EPA 200.8         480479         EPA 201           60245348004         FAA.3-053017         EPA 200.8         480479         EPA 201           60245348005         DUP-053017         EPA 200.8         480479         EPA 201           60245348001         FAA.3-053017         EPA 245.1         479800         EPA 245           60245348002         FAA.4-053017         EPA 245.1         479800         EPA 245           60245348003         FAA.3-053017         EPA 245.1         479800         EPA 245           60245348003	0.7     479269       0.7     479269       0.7     479269       0.7     479269       0.8     480594       0.8     480594
60245348003         FAA-3-053017         EPA 200.7         479127         EPA 200           60245348004         FAA-2-053017         EPA 200.7         479127         EPA 200           60245348005         DUP-053017         EPA 200.7         479127         EPA 200           60245348001         FAA-5-053017         EPA 200.8         480479         EPA 200           60245348002         FAA-4-053017         EPA 200.8         480479         EPA 200           60245348003         FAA-3-053017         EPA 200.8         480479         EPA 200           60245348004         FAA-2-053017         EPA 200.8         480479         EPA 200           60245348005         DUP-053017         EPA 200.8         480479         EPA 200           60245348001         FAA-2-053017         EPA 200.8         480479         EPA 200           60245348002         FAA-4-053017         EPA 245.1         479800         EPA 245           60245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           60245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           60245348003         FAA-3-053017         EPA 903.1         260857           60245348001         FAA-3-053017	0.7     479269       0.7     479269       0.7     479269       0.7     479269       0.8     480594       0.8     480594
60245348003         FAA-3-053017         EPA 200.7         479127         EPA 200           60245348004         FAA-2-053017         EPA 200.7         479127         EPA 200           60245348005         DUP-053017         EPA 200.8         480479         EPA 200           60245348001         FAA-5-053017         EPA 200.8         480479         EPA 200           60245348002         FAA-4-053017         EPA 200.8         480479         EPA 200           60245348003         FAA-3-053017         EPA 200.8         480479         EPA 200           60245348004         FAA-2-053017         EPA 200.8         480479         EPA 200           60245348005         DUP-053017         EPA 200.8         480479         EPA 200           60245348001         FAA-3-053017         EPA 200.8         480479         EPA 200           60245348002         FAA-4-053017         EPA 245.1         479800         EPA 245           60245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           60245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           60245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           60245348001	0.7     479269       0.7     479269       0.7     479269       0.8     480594       0.8     480594
80245348005         DUP-053017         EPA 200.7         479127         EPA 200           80245348001         FAA-5-053017         EPA 200.8         480479         EPA 200           80245348002         FAA-4-053017         EPA 200.8         480479         EPA 200           80245348003         FAA-3-053017         EPA 200.8         480479         EPA 200           80245348005         DUP-053017         EPA 200.8         480479         EPA 200           80245348005         DUP-053017         EPA 200.8         480479         EPA 200           80245348001         FAA-5-053017         EPA 200.8         480479         EPA 200           80245348002         FAA-4-053017         EPA 245.1         479800         EPA 245           80245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           80245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           80245348005         DUP-053017         EPA 245.1         479800         EPA 245           80245348001         FAA-5-053017         EPA 903.1         260857           80245348002         FAA-4-053017         EPA 903.1         260857           80245348003         FAA-3-053017         EPA 904.0	0.7     479269       0.8     480594       0.8     480594
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60245348003         FAA-3-053017         EPA 200.8         480479         EPA 200           60245348004         FAA-2-053017         EPA 200.8         480479         EPA 200           60245348005         DUP-053017         EPA 200.8         480479         EPA 200           60245348001         FAA-5-053017         EPA 245.1         479800         EPA 245           60245348002         FAA-4-053017         EPA 245.1         479800         EPA 245           60245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           60245348004         FAA-2-053017         EPA 245.1         479800         EPA 245           60245348005         DUP-053017         EPA 245.1         479800         EPA 245           60245348005         DUP-053017         EPA 903.1         260857           60245348001         FAA-5-053017         EPA 903.1         260857           60245348002         FAA-3-053017         EPA 903.1         260857           60245348003         FAA-3-053017         EPA 903.1         260857           60245348004         FAA-2-053017         EPA 904.0         261066           60245348003         FAA-3-053017         EPA 904.0         261066           60245348004	
60245348004         FAA-2-053017         EPA 200.8         480479         EPA 200           60245348005         DUP-053017         EPA 200.8         480479         EPA 200           60245348001         FAA-5-053017         EPA 245.1         479800         EPA 245           60245348002         FAA-4-053017         EPA 245.1         479800         EPA 245           60245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           60245348004         FAA-2-053017         EPA 245.1         479800         EPA 245           60245348005         DUP-053017         EPA 245.1         479800         EPA 245           60245348001         FAA-5-053017         EPA 903.1         260857         EPA 245           60245348002         FAA-4-053017         EPA 903.1         260857         EDA 245           60245348003         FAA-3-053017         EPA 903.1         260857         EDA 245           60245348004         FAA-2-053017         EPA 903.1         260857         EDA 245           60245348005         DUP-053017         EPA 904.0         261066         EDA 245           60245348001         FAA-3-053017         EPA 904.0         261066         EDA 245           60245348003 <t< td=""><td>0.8 480594</td></t<>	0.8 480594
80245348005         DUP-053017         EPA 200.8         480479         EPA 200           80245348001         FAA-5-053017         EPA 245.1         479800         EPA 245           80245348002         FAA-4-053017         EPA 245.1         479800         EPA 245           80245348003         FAA-3-053017         EPA 245.1         479800         EPA 245           80245348004         FAA-2-053017         EPA 245.1         479800         EPA 245           80245348005         DUP-053017         EPA 245.1         479800         EPA 245           80245348001         FAA-5-053017         EPA 903.1         260857         260857           80245348002         FAA-4-053017         EPA 903.1         260857         260857           80245348003         FAA-3-053017         EPA 903.1         260857         260857           80245348004         FAA-2-053017         EPA 903.1         260857         260857           80245348005         DUP-053017         EPA 904.0         261066         261066         261066         261066         26245348002         FAA-3-053017         EPA 904.0         261066         261066         26245348003         FAA-2-053017         EPA 904.0         261066         261066         26245348003         FAA-3-053017 </td <td></td>	
60245348001         FAA-5-053017         EPA 245.1         479800         EPA 245.1           60245348002         FAA-4-053017         EPA 245.1         479800         EPA 245.0           60245348003         FAA-3-053017         EPA 245.1         479800         EPA 245.0           60245348004         FAA-2-053017         EPA 245.1         479800         EPA 245.0           60245348005         DUP-053017         EPA 245.1         479800         EPA 245.0           60245348005         DUP-053017         EPA 903.1         260857         260857           60245348001         FAA-5-053017         EPA 903.1         260857         260857           60245348002         FAA-3-053017         EPA 903.1         260857         260857           60245348004         FAA-2-053017         EPA 903.1         260857         260857           60245348005         DUP-053017         EPA 904.0         261066         261066         261066           60245348001         FAA-5-053017         EPA 904.0         261066         261066         261066         261066         261066         261066         261066         261066         261066         261066         261066         261066         261066         261066         261066         261066	0.8 480594
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## FAA-2-053017	5.1 480611
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50245348005         DUP-053017         EPA 903.1         260857           50245348001         FAA-5-053017         EPA 904.0         261066           50245348002         FAA-4-053017         EPA 904.0         261066           50245348003         FAA-3-053017         EPA 904.0         261066           50245348004         FAA-2-053017         EPA 904.0         261066           50245348005         DUP-053017         EPA 904.0         261066           50245348001         FAA-5-053017         Total Radium Calculation         262156           50245348002         FAA-4-053017         Total Radium Calculation         262156           50245348003         FAA-3-053017         Total Radium Calculation         262156           50245348004         FAA-2-053017         Total Radium Calculation         262156           50245348005         DUP-053017         Total Radium Calculation         262156           50245348001         FAA-5-053017         SM 2540C         479182           50245348002         FAA-4-053017         SM 2540C         479182           50245348003         FAA-3-053017         SM 2540C         479182           50245348004         FAA-2-053017         SM 2540C         479182	
60245348001       FAA-5-053017       EPA 904.0       261066         60245348002       FAA-4-053017       EPA 904.0       261066         60245348003       FAA-3-053017       EPA 904.0       261066         60245348004       FAA-2-053017       EPA 904.0       261066         60245348005       DUP-053017       EPA 904.0       261066         60245348001       FAA-5-053017       Total Radium Calculation       262156         60245348002       FAA-4-053017       Total Radium Calculation       262156         60245348003       FAA-3-053017       Total Radium Calculation       262156         60245348004       FAA-2-053017       Total Radium Calculation       262156         60245348005       DUP-053017       Total Radium Calculation       262156         60245348001       FAA-5-053017       SM 2540C       479182         60245348002       FAA-4-053017       SM 2540C       479182         60245348003       FAA-3-053017       SM 2540C       479182         60245348004       FAA-2-053017       SM 2540C       479182         60245348004       FAA-2-053017       SM 2540C       479182	
60245348002       FAA-4-053017       EPA 904.0       261066         60245348003       FAA-3-053017       EPA 904.0       261066         60245348004       FAA-2-053017       EPA 904.0       261066         60245348005       DUP-053017       EPA 904.0       261066         60245348001       FAA-5-053017       Total Radium Calculation       262156         60245348002       FAA-4-053017       Total Radium Calculation       262156         60245348003       FAA-3-053017       Total Radium Calculation       262156         60245348004       FAA-2-053017       Total Radium Calculation       262156         60245348005       DUP-053017       Total Radium Calculation       262156         60245348001       FAA-5-053017       SM 2540C       479182         60245348002       FAA-4-053017       SM 2540C       479182         60245348003       FAA-3-053017       SM 2540C       479182         60245348004       FAA-2-053017       SM 2540C       479182         60245348004       FAA-2-053017       SM 2540C       479182	
60245348003       FAA-3-053017       EPA 904.0       261066         60245348004       FAA-2-053017       EPA 904.0       261066         60245348005       DUP-053017       EPA 904.0       261066         60245348001       FAA-5-053017       Total Radium Calculation       262156         60245348002       FAA-4-053017       Total Radium Calculation       262156         60245348003       FAA-3-053017       Total Radium Calculation       262156         60245348004       FAA-2-053017       Total Radium Calculation       262156         60245348005       DUP-053017       Total Radium Calculation       262156         60245348001       FAA-5-053017       SM 2540C       479182         60245348002       FAA-4-053017       SM 2540C       479182         60245348003       FAA-3-053017       SM 2540C       479182         60245348004       FAA-2-053017       SM 2540C       479182	
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<b>60245348001 FAA-5-053017</b> EPA 300.0 479186	
<b>60245348002 FAA-4-053017</b> EPA 300.0 479004	

# **REPORT OF LABORATORY ANALYSIS**

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# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60245348

Date: 08/22/2017 11:09 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60245348003	FAA-3-053017	EPA 300.0	479004		
60245348004	FAA-2-053017	EPA 300.0	479004		
60245348005	DUP-053017	EPA 300.0	479004		



# Sample Condition Upon Receipt



Client Name: Wester Energy		
Courier: FedEx □ UPS □ VIA   Clay □ F	PEX 🗆 ECI 🗆	Pace □ Xroads □ Client □ Other □
Tracking #: Pace	e Shipping Label Used	d? Yes□ Nor⊡
Custody Seal on Cooler/Box Present: Yes ✓ No □	Seals intact: Yes	Í No□
Packing Material: Bubble Wrap ☐ Bubble Bags ☐	Foam 🗆	None ☐ Other □
Thermometer Used: T-266 / T-239 Type of	Ice: Wet Blue No	Date and initials of person
Cooler Temperature (°C): As-read	Or CF +2.9 Cettle Correct	ted 4.6 examining contents:
Temperature should be above freezing to 6°C		245/31/17
Chain of Custody present:	Yes □No □N/A	
Chain of Custody relinquished:	Yes □No □N/A	
Samples arrived within holding time:	Yes No N/A	
Short Hold Time analyses (<72hr):	Yes ONO ON/A	pH
Rush Turn Around Time requested:	□Yes □No □N/A	
Sufficient volume:	Yes No N/A	
Correct containers used:	Yes ONO ON/A	
Pace containers used:	Yes ONO ON/A	
Containers intact:	Yes No N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No ☑N/A	
Filtered volume received for dissolved tests?	□Yes □No □N/A	
Sample labels match COC: Date / time / ID / analyses	Yes □No □N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☐No ☐N/A	
Containers requiring pH preservation in compliance?	☐Yes ☐No ☐N/A	
(HNO₃, H₂SO₄, HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)		
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	□Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	
Trip Blank present:	□Yes □No □N/A	
Headspace in VOA vials ( >6mm):	□Yes □No □N/A	
Samples from USDA Regulated Area: State:	□Yes □No □N/A	
Additional labels attached to 5035A / TX1005 vials in the field?  Client Notification/ Resolution: Copy COC to		Field Data Required? Y / N
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# **CHAIN-OF-CUSTODY / Analytical Request Document**

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<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

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Chain of Custody Filled Out:		1		2.	
Chain of Custody Relinquished:		1		3.	
Sampler Name & Signature on COC:				4.	
Sample Labels match COC:	17			5.	
-Includes date/time/ID Matrix:	+	.1	<u> </u>	1	
Samples Arrived within Hold Time:	1/	1	Ī	6.	
Short Hold Time Analysis (<72hr remaining):	1			7.	
Rush Turn Around Time Requested:	1			8.	
Sufficient Volume:	1/			9.	
Correct Containers Used:	$\Box$			10.	
-Pace Containers Used:				]	
Containers Intact:				11.	
Orthophosphate field filtered				12.	
Organic Samples checked for dechlorination:				13.	
Filtered volume received for Dissolved tests	-	i		14.	
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All containers needing preservation are found to be in				- P 2   O Z	
compliance with EPA recommendation.				Initial when	Date/time of
exceptions: VOA, coliform, TOC, O&G, Phenolics				completed XH	preservation
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Trip Błank Custody Seals Present					
Rad Aqueous Samples Screened > 0.5 mrem/hr		/		Initial when completed: XX	Date: 6/1/17
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Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ATTACHMENT 1-8
June 2017 Sampling Event
Laboratory Analytical Report





July 13, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR Groundwater

Pace Project No.: 60246928

# Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on June 20, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Starton M. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY







#### **CERTIFICATIONS**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification Missouri Certification #: 235

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219 WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055 Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976 New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002

Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60246928001	MW-FAA-6-061717	Water	06/17/17 10:30	06/20/17 15:25
60246928002	MW-BAA-7-061717	Water	06/17/17 14:00	06/20/17 15:25



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60246928001	MW-FAA-6-061717	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	JRS	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K
60246928002	MW-BAA-7-061717	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	JRS	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	RAD	3	PASI-K



## **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method: EPA 200.7

**Description:** 200.7 Metals, Total **Client:** WESTAR ENERGY **Date:** July 13, 2017

#### **General Information:**

2 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

## Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: July 13, 2017

#### **General Information:**

2 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

## Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: July 13, 2017

#### **General Information:**

2 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

## Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** July 13, 2017

#### **General Information:**

2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method: EPA 904.0

Description:904.0 Radium 228Client:WESTAR ENERGYDate:July 13, 2017

#### **General Information:**

2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:July 13, 2017

#### **General Information:**

2 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method: SM 2540C

**Description:** 2540C Total Dissolved Solids

Client: WESTAR ENERGY
Date: July 13, 2017

#### **General Information:**

2 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: July 13, 2017

#### **General Information:**

2 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

MW-BAA-7-061717 (Lab ID: 60246928002)
 MW-FAA-6-061717 (Lab ID: 60246928001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



## **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: July 13, 2017

#### **General Information:**

2 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Date: 07/13/2017 02:57 PM

Sample: MW-FAA-6-061717	Lab ID: 602	246928001	Collected: 06/17/1	7 10:30	Received: 06	5/20/17 15:25 <b>I</b>	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.065	mg/L	0.0050	1	06/30/17 11:00	07/10/17 18:05	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/10/17 18:05	7440-41-7	
Boron, Total Recoverable	2.2	mg/L	0.10	1		07/10/17 18:05		
Calcium, Total Recoverable	145	mg/L	0.10	1	06/30/17 11:00	07/10/17 18:05	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	06/30/17 11:00	07/10/17 18:05	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1		07/10/17 18:05		
ithium	<0.010	mg/L	0.010	1	06/30/17 11:00	07/10/17 18:05	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/03/17 11:47	7440-36-0	
Arsenic, Total Recoverable	0.0049	mg/L	0.0010	1	06/30/17 11:00	07/03/17 11:47	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	06/30/17 11:00	07/03/17 11:47	7440-43-9	
Cobalt, Total Recoverable	0.0018	mg/L	0.0010	1	06/30/17 11:00	07/03/17 11:47	7440-48-4	
Molybdenum, Total Recoverable	0.31	mg/L	0.0010	1	06/30/17 11:00	07/03/17 11:47	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/03/17 11:47	7782-49-2	
Γhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/03/17 11:47	7440-28-0	
45.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	07/07/17 14:00	07/10/17 09:59	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	2020	mg/L	5.0	1		06/21/17 11:58		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.3	Std. Units	0.10	1		06/22/17 15:47	•	H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	65.7	mg/L	10.0	10		06/22/17 16:24	16887-00-6	
Fluoride	0.81	mg/L	0.20	1		06/21/17 22:21	16984-48-8	
Sulfate	1120	mg/L	100	100		06/21/17 22:51	14808-79-8	



# **ANALYTICAL RESULTS**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Date: 07/13/2017 02:57 PM

Sample: MW-BAA-7-061717	Lab ID: 602	246928002	Collected: 06/17/1	7 14:00	Received: 06	6/20/17 15:25 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.051	mg/L	0.0050	1	06/30/17 11:00	07/10/17 18:08	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/10/17 18:08	7440-41-7	
Boron, Total Recoverable	0.79	mg/L	0.10	1	06/30/17 11:00	07/10/17 18:08	7440-42-8	
Calcium, Total Recoverable	260	mg/L	0.10	1	06/30/17 11:00	07/10/17 18:08	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	06/30/17 11:00	07/10/17 18:08	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1		07/10/17 18:08		
ithium	0.037	mg/L	0.010	1	06/30/17 11:00	07/10/17 18:08	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/12/17 12:14	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/12/17 12:14	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	06/30/17 11:00	07/12/17 12:14	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/12/17 12:14	7440-48-4	
Molybdenum, Total Recoverable	0.018	mg/L	0.0010	1	06/30/17 11:00	07/12/17 12:14	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/12/17 12:14	7782-49-2	
Γhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	06/30/17 11:00	07/12/17 12:14	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	07/07/17 14:00	07/10/17 10:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC					
Total Dissolved Solids	1760	mg/L	5.0	1		06/21/17 11:58		
4500H+ pH, Electrometric	Analytical Met	hod: SM 4500	O-H+B					
oH at 25 Degrees C	7.1	Std. Units	0.10	1		06/22/17 15:49	)	H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	98.5	mg/L	10.0	10		06/22/17 16:39	16887-00-6	
Fluoride	0.64	mg/L	0.20	1		06/21/17 23:06	16984-48-8	
Sulfate	859	mg/L	100	100		06/21/17 23:20	14808-79-8	



Project: JEC CCR Groundwater

Pace Project No.: 60246928

MATRIX SPIKE SAMPLE:

Date: 07/13/2017 02:57 PM

QC Batch: 484318 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60246928001, 60246928002

METHOD BLANK: 1983721 Matrix: Water

Associated Lab Samples: 60246928001, 60246928002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 07/10/17 09:55

LABORATORY CONTROL SAMPLE: 1983722

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0051 102 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1983723 1983724

1983725

MS MSD 60246928001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0049 70-130 20 Mercury mg/L < 0.00020 .005 .005 0.0048 97 98

60247606001 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers ND 70-130 Mercury mg/L .005 0.0049 98

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60246928

Date: 07/13/2017 02:57 PM

QC Batch: 483470 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60246928001, 60246928002

METHOD BLANK: 1980483 Matrix: Water

Associated Lab Samples: 60246928001, 60246928002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	07/10/17 18:03	
Beryllium	mg/L	< 0.0010	0.0010	07/10/17 18:03	
Boron	mg/L	<0.10	0.10	07/10/17 18:03	
Calcium	mg/L	<0.10	0.10	07/10/17 18:03	
Chromium	mg/L	< 0.0050	0.0050	07/10/17 18:03	
Lead	mg/L	< 0.0050	0.0050	07/10/17 18:03	
Lithium	mg/L	< 0.010	0.010	07/10/17 18:03	

LABORATORY CONTROL SAMPLE:	1980484					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		0.98	98	85-115	
Beryllium	mg/L	1	1.0	100	85-115	
Boron	mg/L	1	0.97	97	85-115	
Calcium	mg/L	10	10.5	105	85-115	
Chromium	mg/L	1	1.0	102	85-115	
Lead	mg/L	1	1.0	101	85-115	
Lithium	mg/L	1	0.96	96	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	ATE: 19804	35		1980486							
Parameter	6 Units	0246928002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.051	1	1	1.0	1.0	100	99	70-130		20	
Beryllium	mg/L	< 0.0010	1	1	1.0	0.99	100	99	70-130	1	20	
Boron	mg/L	0.79	1	1	1.8	1.8	101	102	70-130	0	20	
Calcium	mg/L	260	10	10	269	270	90	103	70-130	0	20	
Chromium	mg/L	< 0.0050	1	1	1.0	1.0	101	100	70-130	1	20	
Lead	mg/L	< 0.0050	1	1	0.98	0.97	98	97	70-130	1	20	
Lithium	mg/L	0.037	1	1	1.1	1.1	103	103	70-130	0	20	

MATRIX SPIKE SAMPLE:	1980487						
		60247365006	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.12	1	1.1	100	70-130	
Beryllium	mg/L	< 0.0010	1	0.98	98	70-130	
Boron	mg/L	2.0	1	3.0	102	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60246928

Date: 07/13/2017 02:57 PM

MATRIX SPIKE SAMPLE:	1980487					_	
Parameter	Units	60247365006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	227	10	236	87	70-130	
Chromium	mg/L	< 0.0050	1	0.97	97	70-130	
Lead	mg/L	< 0.0050	1	0.89	88	70-130	
Lithium	mg/L	0.22	1	1.3	113	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60246928

Date: 07/13/2017 02:57 PM

QC Batch: 483371 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60246928001, 60246928002

METHOD BLANK: 1980101 Matrix: Water

Associated Lab Samples: 60246928001, 60246928002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	07/03/17 11:39	
Arsenic	mg/L	< 0.0010	0.0010	07/03/17 11:39	
Cadmium	mg/L	< 0.00050	0.00050	07/03/17 11:39	
Cobalt	mg/L	< 0.0010	0.0010	07/03/17 11:39	
Molybdenum	mg/L	< 0.0010	0.0010	07/03/17 11:39	
Selenium	mg/L	< 0.0010	0.0010	07/03/17 11:39	
Thallium	mg/L	< 0.0010	0.0010	07/03/17 11:39	

LABORATORY CONTROL SAMPLE:	1980102					
5		Spike	LCS	LCS	% Rec	0 ""
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.039	97	85-115	
Arsenic	mg/L	.04	0.039	97	85-115	
Cadmium	mg/L	.04	0.038	95	85-115	
Cobalt	mg/L	.04	0.039	99	85-115	
Molybdenum	mg/L	.04	0.040	99	85-115	
Selenium	mg/L	.04	0.037	93	85-115	
Thallium	mg/L	.04	0.036	89	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 198010	03		1980104							
Parameter	6 Units	0246928001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	<0.0010	.04	.04	0.037	0.037	90	91	70-130	1	20	
Arsenic	mg/L	0.0049	.04	.04	0.040	0.040	88	88	70-130	0	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.031	0.031	78	78	70-130	0	20	
Cobalt	mg/L	0.0018	.04	.04	0.038	0.038	89	90	70-130	0	20	
Molybdenum	mg/L	0.31	.04	.04	0.36	0.36	116	105	70-130	1	20	
Selenium	mg/L	< 0.0010	.04	.04	0.034	0.033	83	81	70-130	3	20	
Thallium	mg/L	< 0.0010	.04	.04	0.033	0.033	82	82	70-130	0	20	

MATRIX SPIKE SAMPLE:	1980105						
		60247365005	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0050	.04	0.037	91	70-130	
Arsenic	mg/L	< 0.0050	.04	0.037	86	70-130	
Cadmium	mg/L	< 0.0025	.04	0.032	79	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60246928

Date: 07/13/2017 02:57 PM

MATRIX SPIKE SAMPLE:	1980105						
Parameter	Units	60247365005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	 mg/L	<0.0050	.04	0.036	88	70-130	
Molybdenum	mg/L	0.0054	.04	0.046	101	70-130	
Selenium	mg/L	< 0.0050	.04	0.030	76	70-130	
Thallium	mg/L	< 0.0050	.04	0.033	80	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60246928

QC Batch: 481991 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60246928001, 60246928002

METHOD BLANK: 1974212 Matrix: Water

Associated Lab Samples: 60246928001, 60246928002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 06/21/17 11:50

LABORATORY CONTROL SAMPLE: 1974213

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 964 96 80-120

SAMPLE DUPLICATE: 1974214

60246884001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 2070 0 10 **Total Dissolved Solids** 2060 mg/L

SAMPLE DUPLICATE: 1974215

Date: 07/13/2017 02:57 PM

60246832003 Dup Max RPD RPD Parameter Units Result Result Qualifiers 100 **Total Dissolved Solids** mg/L 98.5 2 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60246928

QC Batch: 482225 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60246928001, 60246928002

SAMPLE DUPLICATE: 1975265

Date: 07/13/2017 02:57 PM

 Parameter
 Units
 60245949001 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 6.8
 7.1
 4
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Qualifiers



#### **QUALITY CONTROL DATA**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

LABORATORY CONTROL SAMPLE:

Date: 07/13/2017 02:57 PM

QC Batch: 482018 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60246928001, 60246928002

METHOD BLANK: 1974342 Matrix: Water

1974343

Associated Lab Samples: 60246928001, 60246928002

ParameterUnitsBlank ResultReporting LimitAnalyzedQualifiersFluoridemg/L<0.20</td>0.2006/21/17 08:21

Sulfate mg/L <1.0 1.0 06/21/17 08:21

Spike LCS LCS % Rec
Parameter Units Conc. Result % Rec Limits

Fluoride mg/L 2.5 2.5 100 90-110 Sulfate mg/L 5 4.6 93 90-110

MATRIX SPIKE SAMPLE: 1974346

60246965001 Spike MS MS % Rec Parameter Units Result Conc. Result % Rec Limits Qualifiers ND Fluoride mg/L 62.5 63.0 101 80-120 57.1 Sulfate mg/L 125 177 96 80-120

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60246928

Date: 07/13/2017 02:57 PM

QC Batch: 482164 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60246928001, 60246928002

METHOD BLANK: 1974902 Matrix: Water

Associated Lab Samples: 60246928001, 60246928002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Chloride mg/L <1.0 1.0 06/22/17 08:34

LABORATORY CONTROL SAMPLE: 1974903

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Chloride mg/L 5.1 101 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1974904 1974905

MS MSD 60247044001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Chloride 2880 80-120 0 mg/L 1750 1000 1000 2880 112 113 15

MATRIX SPIKE SAMPLE: 1974906

MS 60246963002 Spike MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers Chloride 90.7 146 110 80-120 mg/L 50

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Sample: MW-FAA-6-061717 PWS:	<b>Lab ID: 6024692</b> Site ID:	8001 Collected: 06/17/17 10:30 Sample Type:	Received:	06/20/17 15:25	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.246 ± 0.772 (1.43) C:NA T:93%	pCi/L	06/30/17 10:16	13982-63-3	
Radium-228	EPA 904.0	0.401 ± 0.411 (0.840) C:79% T:81%	pCi/L	07/07/17 15:51	15262-20-1	
Total Radium	Total Radium Calculation	0.647 ± 1.18 (2.27)	pCi/L	07/13/17 11:40	7440-14-4	



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Sample: MW-BAA-7-061717 PWS:	<b>Lab ID: 6024692</b> Site ID:	8002 Collected: 06/17/17 14:00 Sample Type:	Received:	06/20/17 15:25	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.301 ± 0.711 (1.32) C:NA T:84%	pCi/L	06/30/17 10:16	13982-63-3	
Radium-228	EPA 904.0	1.00 ± 0.518 (0.900) C:79% T:85%	pCi/L	07/07/17 15:51	15262-20-1	
Total Radium	Total Radium Calculation	1.30 ± 1.23 (2.22)	pCi/L	07/13/17 11:40	7440-14-4	



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

QC Batch: 262895 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60246928001, 60246928002

METHOD BLANK: 1294659 Matrix: Water

Associated Lab Samples: 60246928001, 60246928002

Parameter Act  $\pm$  Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-226 0.162  $\pm$  0.371 (0.598) C:NA T:92% pCi/L 06/30/17 10:16

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

QC Batch: 262906 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60246928001, 60246928002

METHOD BLANK: 1294682 Matrix: Water

Associated Lab Samples: 60246928001, 60246928002

Parameter Act ± Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-228 0.444  $\pm$  0.415 (0.840) C:79% T:86% pCi/L 07/07/17 15:51

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

## **ANALYTE QUALIFIERS**

Date: 07/13/2017 02:57 PM

H6 Analysis initiated outside of the 15 minute EPA required holding time.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR Groundwater

Pace Project No.: 60246928

Date: 07/13/2017 02:57 PM

ab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60246928001	MW-FAA-6-061717	EPA 200.7	483470	EPA 200.7	483561
0246928002	MW-BAA-7-061717	EPA 200.7	483470	EPA 200.7	483561
0246928001	MW-FAA-6-061717	EPA 200.8	483371	EPA 200.8	483560
0246928002	MW-BAA-7-061717	EPA 200.8	483371	EPA 200.8	483560
0246928001	MW-FAA-6-061717	EPA 245.1	484318	EPA 245.1	484436
0246928002	MW-BAA-7-061717	EPA 245.1	484318	EPA 245.1	484436
0246928001	MW-FAA-6-061717	EPA 903.1	262895		
0246928002	MW-BAA-7-061717	EPA 903.1	262895		
0246928001	MW-FAA-6-061717	EPA 904.0	262906		
0246928002	MW-BAA-7-061717	EPA 904.0	262906		
0246928001	MW-FAA-6-061717	Total Radium Calculation	264856		
0246928002	MW-BAA-7-061717	Total Radium Calculation	264856		
0246928001	MW-FAA-6-061717	SM 2540C	481991		
0246928002	MW-BAA-7-061717	SM 2540C	481991		
0246928001	MW-FAA-6-061717	SM 4500-H+B	482225		
0246928002	MW-BAA-7-061717	SM 4500-H+B	482225		
0246928001	MW-FAA-6-061717	EPA 300.0	482018		
60246928001	MW-FAA-6-061717	EPA 300.0	482164		
60246928002	MW-BAA-7-061717	EPA 300.0	482018		
0246928002	MW-BAA-7-061717	EPA 300.0	482164		



# Sample Condition Upon Receipt



Client Name: VChar	
Courier: FedEx  UPS VIA Clay P	EX □ ECI □ Pace 🎢 Xroads □ Client □ Other □
Tracking #: Pace	Shipping Label Used? Yes □ No □
Custody Seal on Cooler/Box Present: Yes ₩ No □	Seals intact: Yes ☑ No □
Packing Material:  Thermometer Used:  Bubble Wrap Bubble Bags True Free Free Free Free Free Free Free F	
	Date and initials of person examining contents:
Temperature should be above freezing to 6°C	w
Chain of Custody present:	ØYes □No □N/A
Chain of Custody relinquished:	ØYes □No □N/A
Samples arrived within holding time:	ØYes □No □N/A
Short Hold Time analyses (<72hr):	SEYes □No □N/A D 14
Rush Turn Around Time requested:	□Yes 120No □N/A
Sufficient volume:	ØYes □No □N/A
Correct containers used:	Maryes □No □N/A
Pace containers used:	M2Yes □No □N/A
Containers intact:	ØYes □No □N/A
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No IØN/A
Filtered volume received for dissolved tests?	□Yes □No (\$\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\exititt{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\
Sample labels match COC: Date / time / ID / analyses	KLYes □No □N/A
Samples contain multiple phases? Matrix: \n\	□Yes MANO □N/A
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	To Pes □No □N/A
Cyanide water sample checks:  Lead acetate strip turns dark? (Record only)  Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No
Trip Blank present:	□Yes □No ØN/A
Headspace in VOA vials ( >6mm):	□Yes □No KIN/A
Samples from USDA Regulated Area: State:	□Yes □No ŒN/A
Additional labels attached to 5035A / TX1005 vials in the field?	□Yes □No <b>L</b> N/A
Client Notification/ Resolution: Copy COC to	Client? Y / N Field Data Required? Y / N
Person Contacted: Date/Tir Comments/ Resolution:	me:
Project Manager Review:	Date: 42117



# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

1																														
Section Require	n A d Client Information:	Section E Required		ormation:						ction ace In	n <b>C</b> nforma	ation:													P.	age:	Ì	of	1	
Compan	WESTAR ENERGY	Report To:	Brando	n Griffin	***************************************				Atter	ntion:		Jare	d Mor	rison						1					-					
Address	818 Kansas Ave	Сору То:	Jared N	Morrison, F	Heath Hor	пуа			Com	трапу	y Nam	e: V	/EST	AR E	NEF	RGY				REGULATORY AGENCY										
	Topeka, KS 66612								Addr	ress:		S	EE SI	ECT	ON,	A				NPDES GROU				GROL	JND V	NATE	ER (T	DRINKIN	IG WA	TER
Email To	brandon.l.griffin@westarenergy.com	Purchase (	Order No.:							Quet rence:										-	UST			RCRA	(		·	OTHER		
Phone:	(785) 575-8135 Fax:	Project Nar	me: JE	C CCR G	roundwat	er			Pace	Proje		Heat	her V	Vilsor	1, 91	3-56	3-140	7		Site Location				_		T		///////	//////	///////////////////////////////////////
Request	ed Due Date/TAT: 7 DAY	Project Nur	mber:						Mana Pace		le #:	9657	, 1				-	_	-			ATE:		K	S	F				
								_	_	-	-			-			Re	aues	sted	Anal	_	_	red ()	(/N)		m				
	Section D Valid Matrix C Required Client Information MATRIX	CODE	les to left)		COLL	ECTED					ŀ	Prese	rvativ	/es		N /A							Ī		П					
	WATER	DW WT WW P SL CL WP AR	E (see valid cod	COMF STA	POSITE	OOMPC END/G	DSITE SRAB	AT COLLECTION	VERS								Metals*	Mercury	SO4							orine (Y/N)	60:	246	7 <i>2</i> 4	?
ITEM #	Sample IDs MUST BE UNIQUE TISSUE	OT TS	MATRIX CODE SAMPLE TYPE	DATE	TIME	DATE	TIME	SAMPLE TEMP	# OF CONTAINERS	Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO	NaOH	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Other	#Analysis 1	200.7 Total Metals*	245.1 Total I	300.0 CI, FI,	4500 H+B	2540C TDS Radium 226	Radium 228				Residual Chlorine		Project		
1	MW-FAA-6-061717		WI G	617-17	1030	_	-		4	X		X				Ε,						X					Boin	(3) BA 11	N2-P	001
2	MW-BAA-7-061717		WIG	11	1400	-	_		4	X		X				9 4						X					1	1		202
3																														
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5				-				-		-		_		_	Ш		4	1	_					_	Ш	$\dashv$				
6				-				-		+	H	4		4	Н			_			+	1			$\sqcup$	1				
7			$\vdash$	-			-	1	_	-	$\vdash$		$\vdash$	-	Н		+	+	1	$\vdash$	+	1_		+	$\sqcup$	4				
8		-					-	$\vdash$	-	+	Н	+	H	+	Н		+	+	-	$\vdash$	+	+	H	+	$\vdash$	$\dashv$				
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11	1							1		t	H	+		+	Н		+	+	$\vdash$	H	+	+	$\vdash$	+	+	+				
12					F			1		T	H		Ħ	+	Н	9-		+		$\vdash$	+	1		+	$\forall$	$\dashv$				
	ADDITIONAL COMMENTS	-	RELINQ	JISHED BY	AFFILIATI	ON	DAT	E	9	TIME	201	a	51.17	ACCE	PTEG	DYT	AFFIL	IATIO	ON		DAT	ΓE	TI	ME	Т		SAMP	LE CONDIT	TIONS	
*200 7 To	tal Metals: Ba, Be, B, Ca, Cr, Pb, Li	VE	DOA	FORD	H+A		6-17-	-17	15	20		n	1	1	1	7u	105	tai	/	6	/17	117	152	26)		T			Ī	
	otal Metals: Co, As, Se, Mo, Cd, Sb, Tl	119	20		ester		6-19-1		08			Y	n	1	-/	2	ر	1 . /	50	_	0/2	-	_		25	$^{+}$	V	У	У	
SEE	LABELL ON CONTAINERS	-	1	/								4	1							7	1	1	17		1	1	-/			
FOH	2 ANALYSIS										$\neg$	V								$\forall$					$\vdash$	$\dashv$				
age	4				SAMPLE	R NAME /	AND SIGN	ATUR	E		-1	CN,	- 7				III A			1						+	_	) led		act
32					PRINT Name of SAMPLER: Kendra Ford								Temp in °C		ved o	y Sea r (Y/IN		N)												
of 36	CAPACAZIZ.							AMALES FOR Kendra Ford DATE Signed (MM/DD/YY): 06/17/17						Temp	-	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)		Samples Intact (Y/N)											

# Chain of Custody -

Pace Analytical www.pacelabs.com

Pac 960 Len	ather Wilson de Analytical Kansas 8 Loiret Blvd. exa, KS 66219 de 1(913)563-1407		1638 Suites Greer	Analytica! Pitts Roseytown Ros s 2,3, & 4 nsburg, PA 156 e (724)850-560	ad 601			litino a fait			5	6 & Total Radlım	Requested Analysis
tem	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Pr Pi Pi Pi	eserved	Соп	itainers		Ra	Radium-226	30000513
	MW-FAA-6-061717	PS	6/17/2017 10:30	60246928001	Water	2	11/	N.F	$\vdash$	+	<del>,</del>	+	LAB USE ON
	MW-BAA-7-061717	PS	6/17/2017 14:00	60246928002	Water	2	4					X X	
rans	sfers Released By  Ray (  Ball Man  Ber Temperature on Receipt	) ki ilin	Date/Time 2//2 /7t0 6-28-17	Received to	N N			الحال	Date/T	7 10		57	Comments

\*\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

Sample Condition Upon Rece	eipt F	ittsb	ourgl	'n	30222311				
Client Name:	QA	Œ.	-161	elau.	Project #				
Courter: Fed Ex UPS USPS Cle	nt 🗆	Comm	nercial	Pace Other					
Custody Seal on Cooler/Box Present:  yes		no	Seals	intact:  ves	☐ no				
Thermometer Used NA			Wet	Blue (None					
,	-			ection Factor:	°C Final Temp: °C				
Temp should be above freezing to 6°C		•			p description of the second				
					Date and Initials of person examining contents: 714 (a/27113				
Comments:	Yes	No	N/A						
Chain of Custody Present:	1			1.					
Chain of Custody Filled Out:	Ľ_			2.	44)(604)				
Chain of Custody Relinquished:	/			3.					
Sampler Name & Signature on COC:		/		4.					
Sample Labels match COC:	/			5,					
-Includes date/time/ID Matrix: U	NT								
Samples Arrived within Hold Time:				6,					
Short Hold Time Analysis (<72hr remaining):		/		7.	2 2 2				
Rush Turn Around Time Requested:		/		8.					
Sufficient Valume:	_			9.					
Correct Containers Used:	/			10.					
-Pace Containers Used:		/			300				
				11.					
Containers Intact:	-		3,2	12.	AND RESTREET OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY O				
Orthophosphate field filtered	-		SE SUES	13.					
Organic Samples checked for dechlorination:			-	14.					
Filtered volume received for Dissolved lests All containers have been checked for preservation.				15.					
	$\vdash$		65	15.					
All containers needing preservation are found to be in compliance with EPA recommendation.				Inillal when 71 1	Date/time of				
exceptions: VOA, coliform, TOC, O&G, Phenolics				completed ( )	preservation				
				Lot # of added					
A A I CA I II A CA CANANA	1 1			16.					
Headspace In VOA Vlals (>6mm):			/	17.					
Trip Blank Present:				17.					
Trip Blank Custody Seals Present Rad Aqueous Samples Screened > 0.5 mrem/hr	-			Initial when	Date: ( 2 (77) 17				
		$\sqrt{}$		completed: ( +	Date: (p   22   17				
Client Notification/ Resolution:					a a debut				
Person Contacted:			Date/	lime:	Contacted By:				
Comments/ Resolution:									
		-							
<del></del>									
A check in this box indicates that addi	tional	infor	natio	n has been stored	in ereports.				
Note: Whenever there is a discrepancy affecting North Ca	rojina co	mplian	ce sam	ples, a copy of this form (	will be sent to the North Carolina DEHNR				
iote: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR beriffication Office ( i.e. out of hold, incorrect preservative, out of temp, Incorrect containers) PM review is documented efectronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.									

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-4 15Dec2016)

# **Chain of Custody**



Workorder: 60246928 Report To	Subcontract To								ived	Date	// // // // // // // // // // // // //
Heather Wilson Pace Analytical Kansas 9608 Loiret Blvd. Lenexa, KS 66219 Phone 1(913)563-1407		Pace 1638 Suite Greei	Analytical Pittsk Roseytown Roa s 2,3, & 4 nsburg, PA 156 e (724)850-5600	ad - 01		served (		eneuseall	Radium-228	226 & Total Radium	Requested Analysis  WO井: 30222311
tem   Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	HNO3	>e≀veQ	Sontair	ners		Radium-226	
MW-FAA-6-061717	PS	6/17/2017 10:30	60246928001	Water	2						LAB USE ONLY
MW-BAA-7-061717	PS	6/17/2017 14:00	60246928002	Water	2				X	Х	
				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					X	X	002
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\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

િ ોગાં Condition Upon Rece	h	30222311	: - t			
Pace Client Name:	<u> </u>	Œ	-14	AUSIS	Project # 21	<u> 1.                                    </u>
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Custody Seal on Cooler/Box Present:		no	Seals	s intact:	no	
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Cooler Temperature Observed Temp	- خاندین	°C	Corr	ection Factor:	°C Final Temp: °	C
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Chain of Custody Present:	/		ļ	1.		-
Chain of Custody Filled Out:	<u> </u>		-	2.		
Chain of Custody Relinquished:				3.		
Sampler Name & Signature on COC:				4.		$\dashv$
Sample Labels match COC:				5,		
-Includes date/time/ID Matrix:	NI		<del></del>			
Samples Arrived within Hold Time:				6.		
Short Hold Time Analysis (<72hr remaining):				7.		
Rush Turn Around Time Requested:		/		8.		
Sufficient Volume:	<i></i>			9.		
Correct Containers Used:				10.		
-Pace Containers Used:		_/				
Containers Intact:				11.		
Orthophosphate field filtered				12		
Organic Samples checked for dechlorination:			/	13.		
Filtered volume received for Dissolved tests	-		/	14.		
All containers have been checked for preservation.				15.		Ì
All containers needing preservation are found to be in compliance with EPA recommendation.						
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed Lot # of added	Date/lime of preservation	
	· · · · · · · · · · · · · · · · · · ·			preservative		
Headspace in VOA Vials ( >6mm):				16.		
Trip Blank Present:				17.		
Trip Blank Custody Seals Present			,	7		
Rad Aqueous Samples Screened > 0.5 mrem/hr				Initial when completed:	Date: (p(ZZ)(7-	
Client Notification/ Resolution:						
Person Contacted:			Date/	Time:	Contacted By:	
Comments/ Resolution:				, - MA		
A check in this box indicates that addi	tional	infor	natio	n has been stored it	n ereports.	

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.





July 25, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

## Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on July 01, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Danie M. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY







## **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification Idaho Certification Illinois Certification

Indiana Certification lowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219 WY STR Certification #: 2456.01

Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976

New Jersey/TNI Certification #: PA 051 New Mexico Certification #: PA01457

New York/TNI Certification #: 10888 North Carolina Certification #: 42706

North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 460198 Washington Certification #: C868 West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C Wisconsin Certification

Wyoming Certification #: 8TMS-L

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60247862001	FAA-5-063017	Water	06/30/17 12:25	07/01/17 09:00
60247862002	FAA-4-063017	Water	06/30/17 13:18	07/01/17 09:00



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60247862001	FAA-5-063017	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	SMW	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60247862002	FAA-4-063017	EPA 200.7	SMW, TDS	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	SMW	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	JSS	1	PASI-K
		EPA 300.0	OL	3	PASI-K



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method: EPA 200.7

**Description:** 200.7 Metals, Total **Client:** WESTAR ENERGY **Date:** July 25, 2017

#### **General Information:**

2 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 484970

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60247861001,60247926002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1986117)
  - Calcium
- MSD (Lab ID: 1986118)
  - Calcium



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: July 25, 2017

#### **General Information:**

2 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: July 25, 2017

#### **General Information:**

2 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** July 25, 2017

#### **General Information:**

2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method: EPA 904.0

**Description:** 904.0 Radium 228 **Client:** WESTAR ENERGY **Date:** July 25, 2017

#### **General Information:**

2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

**Analyte Comments:** 

QC Batch: 264520

1e: Ra-228 activity in the MB is greater than the associated MDC and RL of 1.0 pCi/L. Samples with activity results below their sample specific MDC or the RL are reportable without qualification.

- BLANK (Lab ID: 1302880)
  - Radium-228

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:July 25, 2017

#### **General Information:**

2 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Additional Comments:**



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY
Date: July 25, 2017

#### **General Information:**

2 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: July 25, 2017

#### **General Information:**

2 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

FAA-4-063017 (Lab ID: 60247862002)
FAA-5-063017 (Lab ID: 60247862001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

(913)599-5665



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: July 25, 2017

#### **General Information:**

2 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



## **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

Sample: FAA-5-063017	Lab ID: 602	247862001	Collected: 06/30/1	7 12:25	Received: 07	7/01/17 09:00 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	<0.0050	mg/L	0.0050	1	07/12/17 16:35	07/15/17 14:02	7440-39-3	
Beryllium, Total Recoverable	0.0018	mg/L	0.0010	1	07/12/17 16:35	07/15/17 14:02	7440-41-7	
Boron, Total Recoverable	1.6	mg/L	0.10	1		07/15/17 14:02		
Calcium, Total Recoverable	446	mg/L	0.10	1		07/15/17 14:02		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1		07/15/17 14:02		
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		07/15/17 14:02		
Lithium	0.14	mg/L	0.010	1	07/12/17 16:35	07/15/17 14:02	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:13	7440-36-0	
Arsenic, Total Recoverable	0.0018	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:13	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	07/12/17 16:35	07/16/17 15:13	7440-43-9	
Cobalt, Total Recoverable	0.0012	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:13	7440-48-4	
Molybdenum, Total Recoverable	0.041	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:13	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:13	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:13	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	07/17/17 16:19	07/19/17 10:25	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	C					
Total Dissolved Solids	3360	mg/L	5.0	1		07/06/17 16:27		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	-H+B					
pH at 25 Degrees C	7.0	Std. Units	0.10	1		07/05/17 12:23		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	94.0	mg/L	10.0	10		07/23/17 17:52	16887-00-6	
Fluoride	0.83	mg/L	0.20	1		07/22/17 18:28	16984-48-8	
Sulfate	1970	mg/L	200	200		07/23/17 18:08	1/808-70-8	



## **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

Sample: FAA-4-063017	Lab ID: 602	247862002	Collected: 06/30/1	7 13:18	Received: 07	7/01/17 09:00 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	thod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.049	mg/L	0.0050	1	07/12/17 16:35	07/16/17 16:38	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 16:38	7440-41-7	
Boron, Total Recoverable	0.39	mg/L	0.10	1	07/12/17 16:35	07/15/17 14:06	7440-42-8	
Calcium, Total Recoverable	199	mg/L	0.10	1	07/12/17 16:35	07/16/17 16:38	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	07/12/17 16:35	07/15/17 14:06	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1		07/15/17 14:06		
Lithium	<0.010	mg/L	0.010	1	07/12/17 16:35	07/16/17 16:38	7439-93-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:17	7440-36-0	
Arsenic, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:17	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	07/12/17 16:35	07/16/17 15:17	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:17	7440-48-4	
Molybdenum, Total Recoverable	0.0027	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:17	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:17	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:17	7440-28-0	
245.1 Mercury	Analytical Met	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	07/17/17 16:19	07/19/17 10:27	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	OC					
Total Dissolved Solids	1170	mg/L	5.0	1		07/06/17 16:28		
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500	)-H+B					
pH at 25 Degrees C	7.0	Std. Units	0.10	1		07/05/17 12:27		H6
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	0.0					
Chloride	78.5	mg/L	10.0	10		07/23/17 18:56	16887-00-6	
Fluoride	0.32	mg/L	0.20	1		07/22/17 18:42	16984-48-8	
Sulfate	486	mg/L	50.0	50		07/23/17 19:12	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

QC Batch: 485719 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60247862001, 60247862002

METHOD BLANK: 1989430 Matrix: Water

Associated Lab Samples: 60247862001, 60247862002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 07/19/17 09:59

LABORATORY CONTROL SAMPLE: 1989431

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0050 101 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1989432 1989433

MS MSD 60248711001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual ND 0.0050 70-130 2 20 H3 Mercury mg/L .005 .005 0.0050 99 101

MATRIX SPIKE SAMPLE: 1989434

60247863005 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers < 0.00020 70-130 Mercury mg/L .005 0.0049 98

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

QC Batch: 484970 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60247862001, 60247862002

METHOD BLANK: 1986115 Matrix: Water

Associated Lab Samples: 60247862001, 60247862002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	07/15/17 13:25	
Beryllium	mg/L	< 0.0010	0.0010	07/15/17 13:25	
Boron	mg/L	<0.10	0.10	07/15/17 13:25	
Calcium	mg/L	<0.10	0.10	07/15/17 13:25	
Chromium	mg/L	< 0.0050	0.0050	07/15/17 13:25	
Lead	mg/L	< 0.0050	0.0050	07/15/17 13:25	
Lithium	mg/L	<0.010	0.010	07/15/17 13:25	

LABORATORY CONTROL SAMPLE:	1986116					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		0.96	96	85-115	
Beryllium	mg/L	1	0.94	94	85-115	
Boron	mg/L	1	0.95	95	85-115	
Calcium	mg/L	10	9.3	93	85-115	
Chromium	mg/L	1	0.96	96	85-115	
Lead	mg/L	1	1.0	105	85-115	
Lithium	mg/L	1	0.99	99	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	TE: 19861	17		1986118							
	6	0247861001	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD		Qual
Barium	mg/L	0.29	1	1	1.3	1.2	97	96	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	0.93	0.92	93	92	70-130	1	20	
Boron	mg/L	0.11	1	1	1.1	1.1	99	97	70-130	2	20	
Calcium	mg/L	90.4	10	10	96.4	96.3	60	59	70-130	0	20	M1
Chromium	mg/L	< 0.0050	1	1	0.96	0.94	96	94	70-130	2	20	
Lead	mg/L	< 0.0050	1	1	1.0	1.0	103	101	70-130	2	20	
Lithium	mg/L	0.015	1	1	1.0	1.0	102	100	70-130	1	20	

MATRIX SPIKE SAMPLE:	1986119						
		60247926002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.032	1	1.1	102	70-130	
Beryllium	mg/L	0.0011	1	0.97	97	70-130	
Boron	mg/L	3.6	1	4.6	98	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

MATRIX SPIKE SAMPLE:	1986119		0 "			0.5	
Parameter	Units	60247926002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	289	10	302	129	70-130	
Chromium	mg/L	< 0.0050	1	0.99	99	70-130	
Lead	mg/L	< 0.0050	1	0.94	94	70-130	
Lithium	mg/L	0.015	1	1.1	111	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

QC Batch: 484967 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60247862001, 60247862002

METHOD BLANK: 1986099 Matrix: Water

Associated Lab Samples: 60247862001, 60247862002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	07/13/17 20:33	
Arsenic	mg/L	< 0.0010	0.0010	07/13/17 20:33	
Cadmium	mg/L	< 0.00050	0.00050	07/13/17 20:33	
Cobalt	mg/L	< 0.0010	0.0010	07/13/17 20:33	
Molybdenum	mg/L	< 0.0010	0.0010	07/13/17 20:33	
Selenium	mg/L	< 0.0010	0.0010	07/13/17 20:33	
Thallium	mg/L	< 0.0010	0.0010	07/13/17 20:33	

LABORATORY CONTROL SAMPLE:	1986100					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.041	102	85-115	
Arsenic	mg/L	.04	0.040	100	85-115	
Cadmium	mg/L	.04	0.038	96	85-115	
Cobalt	mg/L	.04	0.038	95	85-115	
Molybdenum	mg/L	.04	0.040	101	85-115	
Selenium	mg/L	.04	0.039	96	85-115	
Thallium	mg/L	.04	0.040	99	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 198610	• •	MOD	1986102							
Parameter	6 Units	0248127001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	4.3 ug/L	.04	.04	0.045	0.044	101	100	70-130		20	
Arsenic	mg/L	8.5 ug/L	.04	.04	0.047	0.046	96	94	70-130	2	20	
Cadmium	mg/L	<1.0 ug/L	.04	.04	0.034	0.033	86	83	70-130	3	20	
Cobalt	mg/L	<2.0 ug/L	.04	.04	0.036	0.035	89	87	70-130	3	20	
Molybdenum	mg/L	47.9 ug/L	.04	.04	0.090	0.089	104	102	70-130	1	20	
Selenium	mg/L	4.3 ug/L	.04	.04	0.042	0.040	94	90	70-130	4	20	
Thallium	mg/L	<2.0 ug/L	.04	.04	0.037	0.036	91	90	70-130	2	20	

MATRIX SPIKE SAMPLE:	1986103						
		60247926001	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	.04	0.036	90	70-130	
Arsenic	mg/L	< 0.0010	.04	0.038	93	70-130	
Cadmium	mg/L	< 0.00050	.04	0.033	83	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

MATRIX SPIKE SAMPLE:	1986103						
Doromotor	Units	60247926001 Result	Spike	MS	MS % Rec	% Rec Limits	Qualifiers
Parameter	Units	Result	Conc.	Result	% KeC	Limits	Qualifiers
Cobalt	mg/L	<0.0010	.04	0.034	83	70-130	
Molybdenum	mg/L	0.011	.04	0.049	96	70-130	
Selenium	mg/L	< 0.0010	.04	0.035	88	70-130	
Thallium	mg/L	< 0.0010	.04	0.033	83	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Qualifiers



#### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

QC Batch: 484210 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60247862001, 60247862002

METHOD BLANK: 1983434 Matrix: Water

Associated Lab Samples: 60247862001, 60247862002

Blank Reporting
Parameter Units Result Limit Analyzed

Total Dissolved Solids mg/L <5.0 5.0 07/06/17 16:11

LABORATORY CONTROL SAMPLE: 1983435

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 982 98 80-120

SAMPLE DUPLICATE: 1983436

60248024001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 440 10 **Total Dissolved Solids** 434 1 mg/L

SAMPLE DUPLICATE: 1983437

Date: 07/25/2017 09:20 AM

60247926001 Dup Max RPD RPD Parameter Units Result Result Qualifiers 688 **Total Dissolved Solids** mg/L 690 0 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

(913)599-5665



#### **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

QC Batch: 483969 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60247862001, 60247862002

SAMPLE DUPLICATE: 1982512

Date: 07/25/2017 09:20 AM

 Parameter
 Units
 60247835001 Result
 Dup Result
 Max RPD
 RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 8.3
 8.2
 1
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

QC Batch: 486562 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60247862001, 60247862002

METHOD BLANK: 1992836 Matrix: Water

Associated Lab Samples: 60247862001, 60247862002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 07/22/17 15:31

LABORATORY CONTROL SAMPLE: 1992837

Parameter Units Spike LCS LCS % Rec Limits Qualifiers

Fluoride mg/L 2.5 2.5 99 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1992838 1992839

MS MSD 60247861001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Fluoride 80-120 mg/L 0.35 2.5 2.5 3.0 3.0 106 107 15

 MATRIX SPIKE SAMPLE:
 1992840

 60247861002
 Spike
 MS
 MS
 % Rec

 Parameter
 Units
 Result
 Conc.
 Result
 % Rec
 Limits
 Qualifiers

Fluoride mg/L 0.31 2.5 2.5 87 80-120

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

QC Batch: 486575 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60247862001, 60247862002

METHOD BLANK: 1993281 Matrix: Water

Associated Lab Samples: 60247862001, 60247862002

ParameterUnitsBlank ResultReporting LimitAnalyzedQualifiersChloridemg/L<1.0</td>1.007/23/17 12:34

Sulfate mg/L <1.0 1.0 07/23/17 12:34

LABORATORY CONTROL SAMPLE: 1993282

Spike LCS LCS % Rec
Parameter Units Conc. Result % Rec Limits Qualifiers

 Chloride
 mg/L
 5
 4.8
 97
 90-110

 Sulfate
 mg/L
 5
 5.0
 100
 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1993283 1993284

MS MSD

60247861001 Spike Spike MS MSD MS MSD % Rec Max

Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Chloride mg/L 49.7 25 25 76.2 76.5 106 107 80-120 0 15 Sulfate mg/L 93.1 25 25 120 120 107 106 80-120 0 15

MATRIX SPIKE SAMPLE: 1993285 % Rec 60247861002 MS MS Spike Qualifiers Parameter Units Result Conc. Result % Rec Limits Chloride 35.6 25 61.0 102 80-120 mg/L 247 360 80-120 Sulfate mg/L 100 114

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



## **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Sample: FAA-5-063017 Lab ID: 60247862001 Collected: 06/30/17 12:25 Received: 07/01/17 09:00 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 1.31 ± 0.582 (0.169) Radium-226 pCi/L 07/17/17 12:41 13982-63-3 C:NA T:93% EPA 904.0 0.597 ± 0.505 (1.01) 07/19/17 18:39 15262-20-1 Radium-228 pCi/L C:76% T:80% Total Radium Total Radium 1.91 ± 1.09 (1.18) pCi/L 07/20/17 16:51 7440-14-4 Calculation



## **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Sample: FAA-4-063017 Lab ID: 60247862002 Collected: 06/30/17 13:18 Received: 07/01/17 09:00 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.859 \pm 0.573 \quad (0.737)$ Radium-226 pCi/L 07/17/17 12:41 13982-63-3 C:NA T:89% EPA 904.0 0.174 ± 0.377 (0.837) 07/19/17 18:39 15262-20-1 Radium-228 pCi/L C:76% T:89% Total Radium Total Radium  $1.03 \pm 0.950 \quad (1.57)$ pCi/L 07/20/17 16:51 7440-14-4 Calculation



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

QC Batch: 264358 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60247862001, 60247862002

METHOD BLANK: 1301994 Matrix: Water

Associated Lab Samples: 60247862001, 60247862002

Parameter Act  $\pm$  Unc (MDC) Carr Trac Units Analyzed Qualifiers

Radium-226 -0.062  $\pm$  0.285 (0.671) C:NA T:92% pCi/L 07/17/17 12:04

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

QC Batch: 264520 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60247862001, 60247862002

METHOD BLANK: 1302880 Matrix: Water

Associated Lab Samples: 60247862001, 60247862002

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 1.14 ± 0.453 (0.704) C:80% T:79%
 pCi/L
 07/19/17 11:38 1e

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

## **ANALYTE QUALIFIERS**

Date: 07/25/2017 09:20 AM

1e Ra-228 activity in the MB is greater than the associated MDC and RL of 1.0 pCi/L. Samples with activity results below their sample specific MDC or the RL are reportable without qualification.

H3 Sample was received or analysis requested beyond the recognized method holding time.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



## **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247862

Date: 07/25/2017 09:20 AM

ab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
0247862001	FAA-5-063017	EPA 200.7	484970	EPA 200.7	485208
0247862002	FAA-4-063017	EPA 200.7	484970	EPA 200.7	485208
0247862001	FAA-5-063017	EPA 200.8	484967	EPA 200.8	485209
0247862002	FAA-4-063017	EPA 200.8	484967	EPA 200.8	485209
0247862001	FAA-5-063017	EPA 245.1	485719	EPA 245.1	485787
0247862002	FAA-4-063017	EPA 245.1	485719	EPA 245.1	485787
0247862001	FAA-5-063017	EPA 903.1	264358		
0247862002	FAA-4-063017	EPA 903.1	264358		
0247862001	FAA-5-063017	EPA 904.0	264520		
0247862002	FAA-4-063017	EPA 904.0	264520		
0247862001	FAA-5-063017	Total Radium Calculation	265757		
0247862002	FAA-4-063017	Total Radium Calculation	265757		
0247862001	FAA-5-063017	SM 2540C	484210		
0247862002	FAA-4-063017	SM 2540C	484210		
0247862001	FAA-5-063017	SM 4500-H+B	483969		
0247862002	FAA-4-063017	SM 4500-H+B	483969		
0247862001	FAA-5-063017	EPA 300.0	486562		
0247862001	FAA-5-063017	EPA 300.0	486575		
0247862002	FAA-4-063017	EPA 300.0	486562		
0247862002	FAA-4-063017	EPA 300.0	486575		



# Sample Condition Upon Receipt



Client Name: Westor Energy			
Courier: FedEx □ UPS □ VIA □ Clay □	PEX 🗆 ECI 🗆	Pace □ Xroads □	Client □ Other □
Tracking #: Page Page Page Page Page Page Page Page	ce Shipping Label Used	d? Yes□ No□	
Custody Seal on Cooler/Box Present: Yes 🗹 No 🗆	Seals intact: Yes	No □	
Packing Material: Bubble Wrap ☐ Bubble Bags   GF+2.9 CF+027	- No.		her □
Thermometer Used: T-266 / T(239) Type o	fice: Wet Blue No	ne	Date and initials of person
Cooler Temperature (°C): As-read 4,4 Corr. Fact	tor CF +2.9 CF +0.2 Correct	ted <u>4.6</u>	examining contents:
Temperature should be above freezing to 6°C			pr 7/1/17
Chain of Custody present:	Yes □No □N/A		<u></u>
Chain of Custody relinquished:	Yes No N/A		
Samples arrived within holding time:	Yes No N/A		
Short Hold Time analyses (<72hr):	Yes No NA	PH	
Rush Turn Around Time requested:	□Yes ☑No □N/A		
Sufficient volume:	Yes No N/A		
Correct containers used:	Yes No N/A		
Pace containers used:	☐Yes ☐No ☐N/A		
Containers intact:	Yes No N/A		
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No ☑N/A		
Filtered volume received for dissolved tests?	□Yes □No ☑N/A		
Sample labels match COC: Date / time / ID / analyses	Yes No N/A		
Samples contain multiple phases? Matrix:	□Yes ☑No □N/A		
Containers requiring pH preservation in compliance? (HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	Yes No NA		
Cyanide water sample checks:  Lead acetate strip turns dark? (Record only)	□Yes □No		
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No		
Trip Blank present:	□Yes □No ☑N/A		
Headspace in VOA vials ( >6mm):	□Yes □No □N/A		=
Samples from USDA Regulated Area: State:	□Yes □No ☑N/A		
Additional labels attached to 5035A / TX1005 vials in the field	I? □Yes □No □N/A		
Client Notification/ Resolution: Copy COC t		Field Data Required	1? Y / N
Person Contacted: Date/	Time:		
Comments/ Resolution:			
X		7 7	
Project Manager Review:	Date	e: 7/3/14	



# **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

	Section B Required Project Information:	Section C Invoice Information:		Page: of
	Report To: Brandon Griffin	Attention: Jared Morrison		
ddress: 818 Kansas Ave	Copy To: Jared Morrison, Heath Hornya	Company Name: WESTAR ENERGY	REGULATORY AGENCY	
Topeka, KS 66612		Address: SEE SECTION A	₩ NPDES ☐ GROUN	ND WATER
mail To: brandon.l.griffin@westarenergy.com	Purchase Order No.:	Pace Quote Reference:	□ UST □ RCRA	П ОТНЕR
hone: (785) 575-8135 Fax:	Project Name: JEC CCR Groundwater	Pace Project Heather Wilson, 913-563-1407 Manager.	Site Location	
Requested Due Date/TAT: 7 DAY	Project Number.	Pace Profile #: 9657, 1	STATE: KS	— <i>VIIIIIIIIIIII</i>
		Requested A	Analysis Filtered (Y/N)	Villinininini
Section D Required Client Information  MATRIX DRINKING WATER	CODE COLLECTED	Preservatives >		
WATER WASTE WATER PRODUCT SOIL/SOLID OIL WIPE AIR (A-Z, 0-9 /,-) OTHER	ATRIX CODE (See valid of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control	# OF CONTAINERS Unpreserved H <sub>2</sub> SO <sub>4</sub> HNO <sub>3</sub> HCI NaOH Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> Methanol Other  LAnalysis Test 200.7 Total Metals** 220.8 Total Metals** 245.1 Total Mercury 300.0 Ci, Fi, SO <sub>4</sub>	4500 H+B 2540C TDS Radium 226 Radium 228	(VV)  Geryf862  Pace Project No./ Lab I.D.
E44 E 0(2417	≥ δ DATE TIME DATE TIME δ  •7 6 6/30 1225	4 1 3	4 2 1 1 1	1BMY 3BPIN @1
1 FAA-5-063017 2 FAA-4-063017	WT 6 6/30 1318	4 1 3		L L az
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ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION DATE	TIME ACCEPTED BY / AFFILIATION	DATE TIME	SAMPLE CONDITIONS
*200.7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Li	15/1/ VESKV 6/30/1	1600 myngs	7/1/12/0900	46 4 4 8
**200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl	0 11	/ /		
P				9 2
age 32 of 34	SAMPLER NAME AND SIGNATI PRINT Name of SAMPLE SIGNATURE of SAMPLE	R: Brandon Griffin	06/30/17	Temp in °C Received on Ice (Y/N) Custody Sealed Cooler (Y/N) Samples intact (Y/N)

# Chain of Custody



Report To	Workorder	Name:JEC CC Subcontra		/ATER	milionaesse	Ov	vner Re	ceive	d Date:		Results Red	quested By:	7/26/2017
Heather Wilson Pace Analytical Kansas 9608 Loiret Blvd. Lenexa, KS 66219 Phone 1(913)563-1407		Pace 1638 Suites Greer	Analytical Pittst Roseytown Roa s 2,3, & 4 nsburg, PA 156 e (724)850-5600	ad 0 01	e de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company		ontainers	Radium-228	-226 & Total Radium		30223		
Item Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	HNO3	xelved C	ontainers		Radíum-	3029 2 N.E			
1 FAA-5-063017	PS	6/30/2017 12:25	60247862001	Water	2	1		-	$\frac{1}{x}$				LAB USE ONLY
2 FAA-4-063017 3	PS	6/30/2017 13:18	60247862002	Water	2			X	<del></del>				001 007_
4 5													
			SVSS (SSISMIUS AUGOSE)		(SALVSSASSILISISTE	2000 Sinagaya	i pagga ngalayyan ka	0131A50033scrip	V20 1 22 3 3 3 1 1 1 1 1				
Transfers Released By		Date/Time	Received B	y Sy			DateЛ	Time			Commen	ts	
1 2 3		- 7/5/17 17	o ashl	ecztu	CALLE	da e	7-6		95	O			
Cooler Temperature on Re	eceipt N/A	c cus	tody Seal Y	or (N	7				<u> </u>				
***/p order to maintain alle -		i Ous	tody Jeal I	01 (14	السار	Ke	ceived (	on Ice	Y	or (N)	Sample	s Intac( Y)	or N

<sup>\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

Sample Condition Upon Rec	eipt i	rittst	our	gn	
Pace Analytical					30223452
Client Name:		P	) ](E	2, KS	Project #
<i>3</i>				•	
Courier: #Fed Ex UPS USPS UClie Tracking #: 7285 6593 230	nt □ 75	Comme	ercia	Pace Other	Label 1-111
Custody Seal on Cooler/Box Present:	 ∏ı	_	P.0	als intact: 🎵 yes	
Thermometer Used		of Ice		Long	∐no
Cooler Temperature Observed Temp	1910	° C			°C Final Temp: °C
Temp should be above freezing to 6°C			Co	rrection Factor:	*C Final Temp: *C
•					Date and initials of person examining
Comments:	Yes	No	N/	A	contents (19) 1 7-1-17
Chain of Custody Present:	X			1.	
Chain of Custody Filled Out:	X			2.	
Chain of Custody Relinquished:	X			3.	
Sampler Name & Signature on COC:	1	X		4.	
Sample Labels match COC:	X	,		5.	
-Includes date/time/ID Matrix:	NT				
Samples Arrived within Hold Time:	X			6.	
Short Hold Time Analysis (<72hr remaining):	1	X		7.	
Rush Turn Around Time Requested:		X		8.	
Sufficient Volume:	X			19.	
Correct Containers Used:	X			10.	
-Pace Containers Used:	X				
Containers Intact:	X			11.	7722-241
Orthophosphate field filtered	1		V	12.	
Organic Samples checked for dechlorination:		,	Z	13,	
illered volume received for Dissolved tests			$\overleftarrow{\times}$	14.	
li containers have been checked for preservation.	X			15.	
ill containers needing preservation are found to be in ompilance with EPA recommendation.	X	-		PHLZ	
xceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when (LG)	
Assistant Vol., Comorni, 100, Odd, Flieriblica				Lot # of added	preservation
			./	preservative	
eadspace in VOA Vials ( >6mm):			<u> </u>	16.	
ip Blank Present:		Λ̈́,		17	
ip Blank Custody Seals Present ad Aqueous Samples Screened > 0.5 mrem/hr			X	Initial when C	
au Aqueous Samples Screened > 0.5 mrem/nr		$\times$		Initial when Completed:	Date: 7-6-17
ient Notification/ Resolution:					<u> </u>
Person Contacted:		Da	ate/T	ime:	Contacted By:
Comments/ Resolution:					

A check in this box indicates that additional information has been stored in ereports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

ATTACHMENT 1-9
July 2017 Sampling Event
Laboratory Analytical Report



August 22, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

## Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on July 04, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Revised Report\_rev.1 Per the client's request, the samples 60247926-001 and -002 were reevaluated down to the MDL.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

diamon m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY







#### **CERTIFICATIONS**

JEC CCR GROUNDWATER Project:

Pace Project No.: 60247926

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

**Guam Certification** 

Hawaii Certification

Idaho Certification

Illinois Certification Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358

Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091

Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14

Nevada Certification #: PA014572015-1

New Hampshire/TNI Certification #: 2976

New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Oregon/TNI Certification #: PA200002

Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8

Utah/TNI Certification #: PA014572015-5

USDA Soil Permit #: P330-14-00213

Vermont Dept. of Health: ID# VT-0282

Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 460198

Washington Certification #: C868

West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0

Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



## **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60247926001	FAA-3-070317	Water	07/03/17 10:46	07/04/17 06:25
60247926002	FAA-2-070317	Water	07/03/17 11:55	07/04/17 06:25



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60247926001	FAA-3-070317	EPA 200.7	SMW, TDS	7	PASI-K
		EPA 200.8	SMW	7	PASI-K
		EPA 245.1	SMW	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60247926002	FAA-2-070317	EPA 200.7	SMW, TDS	7	PASI-K
		EPA 200.8	JGP, SMW	7	PASI-K
		EPA 245.1	SMW	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: August 22, 2017

## **General Information:**

2 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

## Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

## **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

## Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 484970

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60247861001,60247926002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1986117)
  - Calcium
- MSD (Lab ID: 1986118)
  - Calcium



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: August 22, 2017

## **General Information:**

2 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## **Sample Preparation:**

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

## Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

## **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### **Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

Analyte Comments:

QC Batch: 484967

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- FAA-2-070317 (Lab ID: 60247926002)
  - Thallium, Total Recoverable



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: August 22, 2017

## **General Information:**

2 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

## Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

## **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

## Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** August 22, 2017

## **General Information:**

2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

## Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method: EPA 904.0

Description: 904.0 Radium 228
Client: WESTAR ENERGY
Date: August 22, 2017

## **General Information:**

2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Additional Comments:**

**Analyte Comments:** 

QC Batch: 264520

1e: Ra-228 activity in the MB is greater than the associated MDC and RL of 1.0 pCi/L. Samples with activity results below their sample specific MDC or the RL are reportable without qualification.

• BLANK (Lab ID: 1302880)

• Radium-228



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:August 22, 2017

## **General Information:**

2 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY

Date: August 22, 2017

## **General Information:**

2 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: August 22, 2017

## **General Information:**

2 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

FAA-2-070317 (Lab ID: 60247926002)
FAA-3-070317 (Lab ID: 60247926001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



## **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: August 22, 2017

## **General Information:**

2 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

## **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

Sample: FAA-3-070317	Lab ID: 602	247926001	Collected: 07/03/1	7 10:46	Received: 07	/04/17 06:25 N	Matrix: Water	
Parameters	Results	Units	PQL	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	).7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.028	mg/L	0.0050	1	07/12/17 16:35	07/15/17 14:36	7440-39-3	
Beryllium, Total Recoverable	0.00079J	mg/L	0.0010	1	07/12/17 16:35	07/15/17 14:36	7440-41-7	
Boron, Total Recoverable	0.84	mg/L	0.10	1	07/12/17 16:35	07/15/17 14:36	7440-42-8	
Calcium, Total Recoverable	193	mg/L	0.10	1	07/12/17 16:35	07/15/17 14:36	7440-70-2	
Chromium, Total Recoverable	<0.00072	mg/L	0.0050	1	07/12/17 16:35	07/15/17 14:36	7440-47-3	
_ead, Total Recoverable	<0.0024	mg/L	0.0050	1	07/12/17 16:35	07/16/17 16:56	7439-92-1	
ithium	0.014	mg/L	0.010	1	07/12/17 16:35	07/15/17 14:36	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	0.000077J	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:52	7440-36-0	
Arsenic, Total Recoverable	0.00098J	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:52	7440-38-2	
Cadmium, Total Recoverable	<0.000018	mg/L	0.00050	1	07/12/17 16:35	07/16/17 15:52	7440-43-9	
Cobalt, Total Recoverable	0.00052J	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:52	7440-48-4	
Molybdenum, Total Recoverable	0.011	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:52	7439-98-7	
Selenium, Total Recoverable	<0.000086	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:52	7782-49-2	
Thallium, Total Recoverable	0.000057J	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:52	7440-28-0	
45.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.000024	mg/L	0.00020	1	07/17/17 16:19	07/19/17 10:43	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC .					
Total Dissolved Solids	688	mg/L	5.0	1		07/06/17 17:17		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	O-H+B					
oH at 25 Degrees C	7.1	Std. Units	0.10	1		07/06/17 14:59		H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	81.3	mg/L	10.0	10		07/23/17 22:39	16887-00-6	
Fluoride	0.30	mg/L	0.20	1		07/22/17 20:40	16984-48-8	
Sulfate	628	mg/L	100	100		07/23/17 22:54	14808-79-8	



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

Sample: FAA-2-070317	Lab ID: 602	247926002	Collected: 07/03/1	7 11:55	Received: 07	7/04/17 06:25 I	Matrix: Water	
Parameters	Results	Units	PQL	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.032	mg/L	0.0050	1	07/12/17 16:35	07/15/17 14:40	7440-39-3	
Beryllium, Total Recoverable	0.0011	mg/L	0.0010	1	07/12/17 16:35	07/15/17 14:40	7440-41-7	
Boron, Total Recoverable	3.6	mg/L	0.10	1	07/12/17 16:35	07/15/17 14:40	7440-42-8	
Calcium, Total Recoverable	289	mg/L	0.10	1	07/12/17 16:35	07/15/17 14:40	7440-70-2	
Chromium, Total Recoverable	0.00085J	mg/L	0.0050	1	07/12/17 16:35	07/15/17 14:40	7440-47-3	
_ead, Total Recoverable	0.0028J	mg/L	0.0050	1	07/12/17 16:35			
ithium	0.015	mg/L	0.010	1	07/12/17 16:35	07/15/17 14:40	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	0.00013J	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:57	7440-36-0	
Arsenic, Total Recoverable	0.00083J	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:57	7440-38-2	
Cadmium, Total Recoverable	<0.000018	mg/L	0.00050	1	07/12/17 16:35	07/16/17 15:57	7440-43-9	
Cobalt, Total Recoverable	0.0010	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:57	7440-48-4	
Molybdenum, Total Recoverable	0.30	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:57	7439-98-7	
Selenium, Total Recoverable	0.0011	mg/L	0.0010	1	07/12/17 16:35	07/16/17 15:57	7782-49-2	
Thallium, Total Recoverable	<0.00018	mg/L	0.0050	5	07/12/17 16:35	07/21/17 12:35	7440-28-0	D3
45.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.000024	mg/L	0.00020	1	07/17/17 16:19	07/19/17 10:45	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	271	mg/L	5.0	1		07/06/17 17:21		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	D-H+B					
oH at 25 Degrees C	6.7	Std. Units	0.10	1		07/06/17 15:01		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	61.7	mg/L	5.0	5		07/23/17 23:10	16887-00-6	
Fluoride	0.94	mg/L	0.20	1		07/22/17 20:55	16984-48-8	
Sulfate	2180	mg/L	200	200		07/23/17 23:26	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

QC Batch: 485719 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60247926001, 60247926002

METHOD BLANK: 1989430 Matrix: Water

Associated Lab Samples: 60247926001, 60247926002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.000024 0.00020 07/19/17 09:59

LABORATORY CONTROL SAMPLE: 1989431

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0050 101 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1989432 1989433

MS MSD 60248711001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual ND 0.0050 70-130 2 20 H3 Mercury mg/L .005 .005 0.0050 99 101

MATRIX SPIKE SAMPLE: 1989434

60247863005 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers < 0.000024 70-130 Mercury mg/L .005 0.0049 98

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

QC Batch: 484970 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60247926001, 60247926002

METHOD BLANK: 1986115 Matrix: Water

Associated Lab Samples: 60247926001, 60247926002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.00091	0.0050	07/15/17 13:25	<del></del>
Beryllium	mg/L	0.00048J	0.0010	07/15/17 13:25	
Boron	mg/L	< 0.0035	0.10	07/15/17 13:25	
Calcium	mg/L	< 0.036	0.10	07/15/17 13:25	
Chromium	mg/L	< 0.00072	0.0050	07/15/17 13:25	
Lead	mg/L	< 0.0024	0.0050	07/15/17 13:25	
Lithium	mg/L	< 0.0029	0.010	07/15/17 13:25	

LABORATORY CONTROL SAMPLE:	1986116					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	1	0.96	96	85-115	
Beryllium	mg/L	1	0.94	94	85-115	
Boron	mg/L	1	0.95	95	85-115	
Calcium	mg/L	10	9.3	93	85-115	
Chromium	mg/L	1	0.96	96	85-115	
Lead	mg/L	1	1.0	105	85-115	
Lithium	mg/L	1	0.99	99	85-115	

MATRIX SPIKE & MATRIX SP	IKE DUPLICA	ATE: 19861	17		1986118							
			MS	MSD								
	6	0247861001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	0.29	1	1	1.3	1.2	97	96	70-130	1	20	
Beryllium	mg/L	< 0.0010	1	1	0.93	0.92	93	92	70-130	1	20	
Boron	mg/L	0.11	1	1	1.1	1.1	99	97	70-130	2	20	
Calcium	mg/L	90.4	10	10	96.4	96.3	60	59	70-130	0	20	M1
Chromium	mg/L	< 0.0050	1	1	0.96	0.94	96	94	70-130	2	20	
Lead	mg/L	<0.0050	1	1	1.0	1.0	103	101	70-130	2	20	
Lithium	mg/L	0.015	1	1	1.0	1.0	102	100	70-130	1	20	

MATRIX SPIKE SAMPLE:	1986119						
		60247926002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	0.032		1.1	102	70-130	
Beryllium	mg/L	0.0011	1	0.97	97	70-130	
Boron	mg/L	3.6	1	4.6	98	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

MATRIX SPIKE SAMPLE:	1986119					_	
Parameter	Units	60247926002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	 mg/L	289	10	302	129	70-130	
Chromium	mg/L	0.00085J	1	0.99	99	70-130	
Lead	mg/L	0.0028J	1	0.94	94	70-130	
Lithium	mg/L	0.015	1	1.1	111	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

QC Batch: 484967 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60247926001, 60247926002

METHOD BLANK: 1986099 Matrix: Water

Associated Lab Samples: 60247926001, 60247926002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.000026	0.0010	07/13/17 20:33	
Arsenic	mg/L	< 0.000052	0.0010	07/13/17 20:33	
Cadmium	mg/L	<0.000018	0.00050	07/13/17 20:33	
Cobalt	mg/L	< 0.000014	0.0010	07/13/17 20:33	
Molybdenum	mg/L	<0.000058	0.0010	07/13/17 20:33	
Selenium	mg/L	<0.000086	0.0010	07/13/17 20:33	
Thallium	mg/L	0.000047J	0.0010	07/13/17 20:33	

LABORATORY CONTROL SAMPLE:	1986100					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.041	102	85-115	
Arsenic	mg/L	.04	0.040	100	85-115	
Cadmium	mg/L	.04	0.038	96	85-115	
Cobalt	mg/L	.04	0.038	95	85-115	
Molybdenum	mg/L	.04	0.040	101	85-115	
Selenium	mg/L	.04	0.039	96	85-115	
Thallium	mg/L	.04	0.040	99	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	ATE: 19861	01		1986102							
			MS	MSD					_			
	6	0248127001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	4.3 ug/L	.04	.04	0.045	0.044	101	100	70-130	1	20	
Arsenic	mg/L	8.5 ug/L	.04	.04	0.047	0.046	96	94	70-130	2	20	
Cadmium	mg/L	<1.0 ug/L	.04	.04	0.034	0.033	86	83	70-130	3	20	
Cobalt	mg/L	<2.0 ug/L	.04	.04	0.036	0.035	89	87	70-130	3	20	
Molybdenum	mg/L	47.9 ug/L	.04	.04	0.090	0.089	104	102	70-130	1	20	
Selenium	mg/L	4.3 ug/L	.04	.04	0.042	0.040	94	90	70-130	4	20	
Thallium	mg/L	<2.0 ug/L	.04	.04	0.037	0.036	91	90	70-130	2	20	

MATRIX SPIKE SAMPLE:	1986103						
		60247926001	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	0.000077J	.04	0.036	90	70-130	
Arsenic	mg/L	0.00098J	.04	0.038	93	70-130	
Cadmium	mg/L	<0.000018	.04	0.033	83	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

MATRIX SPIKE SAMPLE:	1986103						
		60247926001	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Cobalt	 mg/L	0.00052J	.04	0.034	83	70-130	
Molybdenum	mg/L	0.011	.04	0.049	96	70-130	
Selenium	mg/L	<0.000086	.04	0.035	88	70-130	
Thallium	mg/L	0.000057J	.04	0.033	83	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

QC Batch: 484210 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60247926001, 60247926002

METHOD BLANK: 1983434 Matrix: Water

Associated Lab Samples: 60247926001, 60247926002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 07/06/17 16:11

LABORATORY CONTROL SAMPLE: 1983435

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 982 98 80-120

SAMPLE DUPLICATE: 1983436

60248024001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 440 10 **Total Dissolved Solids** 434 1 mg/L

SAMPLE DUPLICATE: 1983437

Date: 08/22/2017 12:55 PM

60247926001 Dup Max RPD RPD Parameter Units Result Result Qualifiers 688 **Total Dissolved Solids** mg/L 690 0 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

QC Batch: 484080 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60247926001, 60247926002

SAMPLE DUPLICATE: 1982984

Date: 08/22/2017 12:55 PM

 Parameter
 Units
 60247546002 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.5
 7.5
 0
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

QC Batch: 486562 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60247926001, 60247926002

METHOD BLANK: 1992836 Matrix: Water

Associated Lab Samples: 60247926001, 60247926002

Parameter Units Blank Reporting
Result Limit Analyzed Qualifiers

Fluoride mg/L <0.10 0.20 07/22/17 15:31

LABORATORY CONTROL SAMPLE: 1992837

ParameterUnitsSpike Conc.LCS ResultLCS % Rec Limits% Rec LimitsQualifiersFluoridemg/L2.52.59990-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1992838 1992839

MS MSD 60247861001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Fluoride 80-120 mg/L 0.35 2.5 2.5 3.0 3.0 106 107 15

MATRIX SPIKE SAMPLE: 1992840 MS 60247861002 Spike MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers 0.31 2.5 87 80-120 Fluoride mg/L 2.5

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Sulfate

Date: 08/22/2017 12:55 PM

QC Batch: 486575 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60247926001, 60247926002

METHOD BLANK: 1993281 Matrix: Water

Associated Lab Samples: 60247926001, 60247926002

Blank Reporting Limit Qualifiers Parameter Units Result Analyzed Chloride < 0.50 07/23/17 12:34 mg/L 1.0 Sulfate mg/L < 0.50 1.0 07/23/17 12:34

LABORATORY CONTROL SAMPLE: 1993282

Spike LCS LCS % Rec
Parameter Units Conc. Result % Rec Limits Qualifiers

 Chloride
 mg/L
 5
 4.8
 97
 90-110

 Sulfate
 mg/L
 5
 5.0
 100
 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1993283 1993284

mg/L

MSD MS 60247861001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Chloride mg/L 49.7 25 25 76.2 76.5 106 107 80-120 0 15 Sulfate mg/L 93.1 25 25 120 120 107 106 80-120 0 15

MATRIX SPIKE SAMPLE: 1993285 % Rec 60247861002 MS MS Spike Qualifiers Parameter Units Result Conc. Result % Rec Limits Chloride 35.6 25 61.0 102 80-120 mg/L

247

100

360

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## **REPORT OF LABORATORY ANALYSIS**

80-120

114



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Sample: FAA-3-070317 PWS:	<b>Lab ID: 602479</b> Site ID:	<b>26001</b> Collected: 07/03/17 10:46 Sample Type:	Received:	07/04/17 06:25	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0688 ± 0.314 (0.639) C:NA T:86%	pCi/L	07/17/17 12:4	13982-63-3	
Radium-228	EPA 904.0	0.222 ± 0.420 (0.922) C:78% T:77%	pCi/L	07/19/17 18:39	9 15262-20-1	
Total Radium	Total Radium Calculation	0.291 ± 0.734 (1.56)	pCi/L	07/20/17 16:5	1 7440-14-4	



## **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Calculation

Pace Project No.: 60247926

Sample: FAA-2-070317 Lab ID: 60247926002 Collected: 07/03/17 11:55 Received: 07/04/17 06:25 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.0615 \pm 0.280 \quad (0.452)$ Radium-226 pCi/L 07/17/17 12:41 13982-63-3 C:NA T:96% EPA 904.0 0.887 ± 0.506 (0.919) 07/19/17 18:39 15262-20-1 Radium-228 pCi/L C:80% T:82% Total Radium **Total Radium**  $0.949 \pm 0.786 \quad (1.37)$ pCi/L 07/20/17 16:51 7440-14-4



## **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

QC Batch: 264358 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60247926001, 60247926002

METHOD BLANK: 1301994 Matrix: Water

Associated Lab Samples: 60247926001, 60247926002

ParameterAct  $\pm$  Unc (MDC) Carr TracUnitsAnalyzedQualifiersRadium-226-0.062  $\pm$  0.285 (0.671) C:NA T:92%pCi/L07/17/17 12:04

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



## **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

QC Batch: 264520 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60247926001, 60247926002

METHOD BLANK: 1302880 Matrix: Water

Associated Lab Samples: 60247926001, 60247926002

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 1.14 ± 0.453 (0.704) C:80% T:79%
 pCi/L
 07/19/17 11:38 1e

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



## **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

**RPD - Relative Percent Difference** 

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

## **ANALYTE QUALIFIERS**

Date: 08/22/2017 12:55 PM

1e	Ra-228 activity in the MB is greater than the associated MDC and RL of 1.0 pCi/L. Samples with activity results below
	their sample specific MDC or the RL are reportable without qualification.

D3 Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

H3 Sample was received or analysis requested beyond the recognized method holding time.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60247926

Date: 08/22/2017 12:55 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60247926001	FAA-3-070317	EPA 200.7	484970	EPA 200.7	485208
60247926002	FAA-2-070317	EPA 200.7	484970	EPA 200.7	485208
60247926001	FAA-3-070317	EPA 200.8	484967	EPA 200.8	485209
60247926002	FAA-2-070317	EPA 200.8	484967	EPA 200.8	485209
60247926001	FAA-3-070317	EPA 245.1	485719	EPA 245.1	485787
60247926002	FAA-2-070317	EPA 245.1	485719	EPA 245.1	485787
60247926001	FAA-3-070317	EPA 903.1	264358		
60247926002	FAA-2-070317	EPA 903.1	264358		
60247926001	FAA-3-070317	EPA 904.0	264520		
60247926002	FAA-2-070317	EPA 904.0	264520		
60247926001	FAA-3-070317	Total Radium Calculation	265757		
60247926002	FAA-2-070317	Total Radium Calculation	265757		
60247926001	FAA-3-070317	SM 2540C	484210		
60247926002	FAA-2-070317	SM 2540C	484210		
60247926001	FAA-3-070317	SM 4500-H+B	484080		
60247926002	FAA-2-070317	SM 4500-H+B	484080		
60247926001	FAA-3-070317	EPA 300.0	486562		
60247926001	FAA-3-070317	EPA 300.0	486575		
60247926002	FAA-2-070317	EPA 300.0	486562		
60247926002	FAA-2-070317	EPA 300.0	486575		



# Sample Condition Upon Receipt



Mme

Client Name: Wester			, Al	
	PEX 🗆 ECI 🗆	Pace □ >	Kroads □ Client □	Other □
	e Shipping Label Used	d? Yes ☑	No □	
Custody Seal on Cooler/Box Present: Yes \( \square\) No \( \square\)	Seals intact: Yes	/ •		
Packing Material: Bubble Wrap ☐ Bubble Bags ☐		None 🗇	/	3B Let 7/1/17
Cooler Temperature (°C): As-read <u>519</u> Corr. Facto	or CF +2.9 CF +0.2 Correct	ted 5 . 6	Date and examinin	g contents:
Temperature should be above freezing to 6°C				
Chain of Custody present:	✓ Yes □No □N/A			
Chain of Custody relinquished:	1 Yes □No □N/A			
Samples arrived within holding time:	Yes □No □N/A			
Short Hold Time analyses (<72hr):	☐Yes ☐N/A	PH		
Rush Turn Around Time requested:	□Yes ☑No □N/A	6		
Sufficient volume:	DYes □No □N/A			
Correct containers used:	□¥es □No □N/A			
Pace containers used:	✓Yes □No □N/A			₩.
Containers intact:	✓Yes □No □N/A			
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No □N/A			
Filtered volume received for dissolved tests?	□Yes □No ☑N/A			
Sample labels match COC: Date / time / ID / analyses	□Yes □No □N/A			
Samples contain multiple phases? Matrix:	S No ON/A			
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	Yes □No □N/A			
Cyanide water sample checks:  Lead acetate strip turns dark? (Record only)  Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No			
Trip Blank present:	□Yes ☑No □N/A			
Headspace in VOA vials ( >6mm):	□Yes □No □N/A			
Samples from USDA Regulated Area: State:	□Yes □No □N/A			
Additional labels attached to 5035A / TX1005 vials in the field?	? □Yes □No □N/A			
Client Notification/ Resolution: Copy COC to		Field Dat	a Required? Y /	N
Person Contacted: Date/T	ime:			
Comments/ Resolution:				
Project Manager Review:	Date	e: 7/5/1	7	-



# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

ection	A Client Information:			Section B Required P	roject	Inform	ation:					Secti Invoic	on C e Infon	mation	:							_						Pa	age:		of		76	
ompany:		IERGY		Report To:	Brar	don (	Griffin				7	Attent	ior:	Jai	ed M	orriso	on													1				_
ddress:	818 Kansas	Ave		Сору То:	Jare	d Mor	rison, He	ath Horr	nya			Comp	any Na	ame:	WES	TAR	ENE	RG	Y			R	REGI	JLAT	ORY	AGE	NCY	ſ						
	Topeka, KS	66612				_						Addre	SS:		SEE	SEC	TION	ΙΑ				Ī	V 1	NPDE:	s r	- GI	ROUI	ND V	VATER	R [	DRINK	ING W	ATER	
mail To:		fin@westarene	erav.com	Purchase C	rder N	lo,:						Pace C										7		JST	Γ	R	CRA			П	OTHER			
	(785) 575-8135	Fax:		Project Nan	ne:	JEC	CCR Gro	undwate	er			Pace F	roject	He	ather	Wils	on, 9	13-5	63-	1407			Site	Locat	ion									<i></i>
0.827789	d Due Date/TAT:	7 DAY		Project Nun	nber.							Manag Pace F	rofile #	÷ 96	57, 1									STA	TE:	_	KS		- 8					M
oquesto	Q D 00 Q 110 11 11 11				_			_		_	_	-		_	-		_	Т		Req	uest	ed A	naly	sis Fi	iltere	d (Y/	N)							777
				-4	_						П		T	_				NIA	*	T	П			П			T	П						
	Section D Required Client Informat		/alid Matrix C MATRIX	CODE	to left	(MP)		COLL	ECTED				_	Pre	serva	tives	- T	3	1	_	Н	_	-	_	$\vdash$	+	-	$\vdash$						
ITEM#	SAMPL (A-Z, 0-9 Sample IDs MUST	.E ID WA	RINKING WATER VATER VASTE WATER PRODUCT OILLSOULD OILL VIPE VIR OTHER TISSUE	DW WT WW P SL OL WP AR OT TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COMPC	रा	COMPO	TAB	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H₂SO₄ HNO₃	HOI	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol	Other	# Analysis Test#	Total	245.1 Total Mercury	300.0 Cl, Fl, SO4	4500 H+B	Radium 226	Radium 228				Residual Chlorine (Y/N)	602			() / Lab I.D	\$4°
트	100	074515	-			_	DATE	TIME	7/3	TIME	05	4	1	3		=  -	-	_	2 5	10	18	(6)	4 6	1	PP	2.	26					a	1	
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	ADDITION	IAL COMMENTS	- 77 15		RE	LINQU	ISHED BY	AFFILIAT	TION	DAT	E		TIME			A	CCEP	TED I	BY/	AFFIL	OTA	N		DAT	re .	TI	ME	$\perp$		SAMP	LE COI	OITIO	NS	
*200.7 1	otal Metals: Ba, Be, B	, Ca, Cr, Pb, Li		B	17	1	-/V	resta	3/	7/3/	17	13	33C		8	en 1	W	V				- ;	7/4	1/1:	7	06	25	3	6.6	7	_>		1	l)
**200.8	Total Metals: Co. As;	Se, Mo, Cd, Sb, Tl				-	/	• •		17					-	-7			/	_				7.2	0									
	Page							CAMPI	ER NAME	AND SIGN	ΙΔΤΙΙΙ	RF					W.												0	- 5 -	aled	2	lact	
	е 3 2							SAMPL		me of SAM	_	_	Bra	7	10	G	rif	En										7	Temp in °C	ived (Y/N)	ly Sei	1	es In	
	2 of 34												019	1		9	111	10		DAT	E Sig	ned	7	103	1	7	_	7	Tem	Received on Ice (Y/N)	Custody Sealed	Š	Samples Intact (Y/N)	
	34								SIGNATU	RE of SAM	PLEK	13	11	12	/					(MN	I/DD/Y	nea (Y): (		U	//	1	-				0		U)	_

# **Chain of Custody**



Workorder: 60247926	Workorder	Name:JEC CC	R GROUNDW	/ATER		Ow	ner Rec	eivec	Date:	7/4/2017	Poculto Poguante	- J D 7/00/0047
Report To		Subcontra			rii ole ole ole ole ole ole ole ole ole ole				Dute.		Results Requeste	ed By: 7/26/2017
Heather Wilson Pace Analytical Kansas 9608 Loiret Blvd. Lenexa, KS 66219 Phone 1(913)563-1407		1638 Suite Gree	Analytical Pittsb Roseytown Ros s 2,3, & 4 nsburg, PA 156 e (724)850-560	ad	Pres	served Co	ontainers	Radium-228	-226 & Total Radium		‡:302234	53
Item Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	HNO3			33333	Radium	2000	7/E3	LAB USE ONLY
1 FAA-3-070317	PS	7/3/2017 10:46	60247926001	Water	2			+	$\frac{1}{x}$			LAB USE ONLY
2 FAA-2-070317	PS	7/3/2017 11:55	60247926002	Water	2			$\frac{1}{x}$	$\frac{1}{x}$			
3			-					+^	$+^+$			LL 006
4					1 1		+	_				
5								_	<b></b>			
			Si de noi vervoir escot	ria (co godi	1000 400 600	(S) 1016 (128) 188		<b>!</b> !!?)!!!!!!!!!!	NE WWW.	SS(248)2244 U(0); (GS) USC(2	Comments	
Transfers Released By		Date/Time	Received E	 Зу			Date/T	ime			Collinents	
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2				<del></del>	WI HP			1//	44)(	<u>ر</u>		
3						***************************************			-			
Cooler Temperature on R	eceipt ∧//β	C Cus	stody Seal \	or/N		Red	ceived o	ın İca	- <del> </del>	or N	Carrolles Israel	<del></del>
***In order to maintain clien	t confidentiality				<i></i>				1 0	<u>" (                                   </u>	Samples Inta	ct(Y or N

<sup>\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

Sample Condition Upon Rece	eipt F	Pittsl	ourg	ıh	s.irva						
<b>,</b>	,				3022345						
Pace Analytical Client Name:		F	) ICE	·, KS	Project #						
Courier:	it [	bomm _	ercial	Pace Other	Label AM LIMS Login AM						
Custody Seal on Cooler/Box Present:		no	Sea	ls intact:	no						
Thermometer Used	Type	of Ice	: We	et Blue (None)							
Cooler Temperature Observed Temp		°C		rection Factor:	°C Final Temp: °C						
Temp should be above freezing to 6°C		_		,	<u> </u>						
					Date and Initials of person examining contents						
Comments:	Yes	No	N/A	<b>\</b>	contents 21 - F / T /						
Chain of Custody Present:	$\perp X$			1,							
Chain of Custody Filled Out:	X			2.							
Chain of Custody Relinquished:	×			3.							
Sampler Name & Signature on COC:		X		4,							
Sample Labels match COC:	X			5.							
-Includes date/time/ID Matrix:	VT		_								
Samples Arrived within Hold Time:	X			6.							
Short Hold Time Analysis (<72hr remaining):		X		7.							
Rush Turn Around Time Requested:		X		8.							
Sufficient Volume:	X			9.							
Correct Containers Used:	X			10.							
-Pace Containers Used:	$\times$										
Containers Intact:	$\times$			11.							
Orthophosphate field filtered			X	12.							
Organic Samples checked for dechlorination:			X	13.							
Flitered volume received for Dissolved tests			X	14.							
All containers have been checked for preservation.	X			15.							
All containers needing preservation are found to be in compliance with EPA recommendation.	X	-		Price							
exceptions: VOA, coliform, TOC, O&G, Phenolics	-			Initial when (1916)	Date/time of preservation						
				Lot # of added	[2,000,74,10.]						
			$\checkmark$	preservative							
Headspace in VOA Vials ( >6mm):		V	$\Delta$	16.							
Trip Blank Present:		$\triangle$		17.							
Frip Blank Custody Seals Present Rad Aqueous Samples Screened > 0,5 mrem/hr				Initial when(\(\alpha\) (\(\alpha\))							
Nad Aqueous Samples Scieened > 0.0 mieniam		$\angle$		completed:	Date: 7-6-17						
Client Notification/ Resolution:											
Person Contacted:				ime:	Contacted By:						
Comments/ Resolution:		····	····								
					_						

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

 $\square$  A check in this box indicates that additional information has been stored in ereports.

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.





August 10, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR Groundwater

Pace Project No.: 60248973

## Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on July 19, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

danson Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



## **CERTIFICATIONS**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification Idaho Certification Illinois Certification Indiana Certification

Iowa Certification #: 391 Kansas/TNI Certification #: E-10358

Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification Missouri Certification #: 235 Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976 New Jersey/TNI Certification #: PA 051 New Mexico Certification #: PA01457

New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification
Tennessee Certification #: TN2867

Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198

Washington Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

## **Kansas Certification IDs**

9608 Loiret Boulevard, Lenexa, KS 66219 WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097 Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60248973001	FAA-6-071817	Water	07/18/17 10:43	07/19/17 08:35



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60248973001	FAA-6-071817	EPA 200.7	JGP	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	SMW	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K



## **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method: EPA 200.7

**Description:** 200.7 Metals, Total **Client:** WESTAR ENERGY **Date:** August 10, 2017

## **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

## Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

## **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

## Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 487074

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60248973001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 1994911)
  - Calcium

## **Additional Comments:**



## **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: August 10, 2017

## **General Information:**

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

## Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

## Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

## **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### **Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

## Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

## **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 487056

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 7570332001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

• MSD (Lab ID: 1994804)

Molybdenum

## **Additional Comments:**



# **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: August 10, 2017

# **General Information:**

1 sample was analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

# Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

# **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 486931

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60248730001,60249386003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1994331)
  - Mercury



# **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** August 10, 2017

# **General Information:**

1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method: EPA 904.0

Description:904.0 Radium 228Client:WESTAR ENERGYDate:August 10, 2017

# **General Information:**

1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# PROJECT NARRATIVE

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:August 10, 2017

# **General Information:**

1 sample was analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method: SM 2540C

**Description:** 2540C Total Dissolved Solids

Client: WESTAR ENERGY

Date: August 10, 2017

# **General Information:**

1 sample was analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: August 10, 2017

# **General Information:**

1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

• FAA-6-071817 (Lab ID: 60248973001)

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: August 10, 2017

# **General Information:**

1 sample was analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Date: 08/10/2017 11:52 AM

Sample: FAA-6-071817	Lab ID: 602	248973001	Collected: 07/18/1	7 10:43	Received: 07	7/19/17 08:35 I	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.067	mg/L	0.0050	1	07/26/17 12:10	08/09/17 12:16	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/26/17 12:10	08/09/17 12:16	7440-41-7	
Boron, Total Recoverable	2.9	mg/L	0.10	1	07/26/17 12:10			
Calcium, Total Recoverable	137	mg/L	0.10	1	07/26/17 12:10	08/09/17 12:16	7440-70-2	M1
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	07/26/17 12:10	08/09/17 12:16	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	07/26/17 12:10			
ithium	0.012	mg/L	0.010	1	07/26/17 12:10	08/09/17 12:16	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	07/26/17 12:10	08/03/17 16:47	7440-36-0	
Arsenic, Total Recoverable	0.0056	mg/L	0.0010	1	07/26/17 12:10	08/03/17 16:47	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	07/26/17 12:10	08/03/17 16:47	7440-43-9	
Cobalt, Total Recoverable	0.0012	mg/L	0.0010	1	07/26/17 12:10	08/03/17 16:47	7440-48-4	
Molybdenum, Total Recoverable	0.55	mg/L	0.0010	1	07/26/17 12:10	08/03/17 16:47	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/26/17 12:10	08/03/17 16:47	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/26/17 12:10	08/03/17 16:47	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	07/25/17 17:15	07/26/17 16:03	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	2300	mg/L	5.0	1		07/20/17 13:31		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		07/21/17 17:13	;	H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	64.3	mg/L	5.0	5		08/05/17 20:25	16887-00-6	
Fluoride	0.74	mg/L	0.20	1		08/04/17 20:02	16984-48-8	
Sulfate	1360	mg/L	200	200		08/05/17 20:38	14808-79-8	



Project: JEC CCR Groundwater

Pace Project No.: 60248973

Date: 08/10/2017 11:52 AM

QC Batch: 486931 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60248973001

METHOD BLANK: 1994327 Matrix: Water

Associated Lab Samples: 60248973001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 07/26/17 15:23

LABORATORY CONTROL SAMPLE: 1994328

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0048 97 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1994329 1994330

MS MSD 60248730001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual ND 0.0050 70-130 2 20 Mercury mg/L .005 .005 0.0049 98 100

MATRIX SPIKE SAMPLE: 1994331 60249386003 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers ND 47 70-130 M1 Mercury mg/L .005 0.0024

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60248973

Date: 08/10/2017 11:52 AM

QC Batch: 487074 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60248973001

METHOD BLANK: 1994908 Matrix: Water

Associated Lab Samples: 60248973001

Parameter	Units	Blank Result	Reporting Limit	Analyzad	Qualifiers
Parameter	Units	Result		Analyzed	Quailliers
Barium	mg/L	< 0.0050	0.0050	08/09/17 12:09	
Beryllium	mg/L	< 0.0010	0.0010	08/09/17 12:09	
Boron	mg/L	<0.10	0.10	08/09/17 12:09	
Calcium	mg/L	<0.10	0.10	08/09/17 12:09	
Chromium	mg/L	< 0.0050	0.0050	08/09/17 12:09	
Lead	mg/L	< 0.0050	0.0050	08/09/17 12:09	
Lithium	mg/L	< 0.010	0.010	08/09/17 12:09	

LABORATORY CONTROL SAMPLE:	1994909					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		0.93	93	85-115	
Beryllium	mg/L	1	0.94	94	85-115	
Boron	mg/L	1	0.96	96	85-115	
Calcium	mg/L	10	9.5	95	85-115	
Chromium	mg/L	1	0.95	95	85-115	
Lead	mg/L	1	0.99	99	85-115	
Lithium	mg/L	1	0.96	96	85-115	

MATRIX SPIKE & MATRIX SP	IKE DUPLICA	ATE: 19949	10		1994911							
			MS	MSD								
	6	0248973001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	0.067	1	1	1.1	0.99	106	92	70-130	13	20	
Beryllium	mg/L	< 0.0010	1	1	1.0	0.95	103	95	70-130	8	20	
Boron	mg/L	2.9	1	1	4.1	3.8	115	85	70-130	8	20	
Calcium	mg/L	137	10	10	144	143	75	57	70-130	1	20	M1
Chromium	mg/L	< 0.0050	1	1	0.98	0.95	98	95	70-130	3	20	
Lead	mg/L	< 0.0050	1	1	0.97	0.93	97	92	70-130	5	20	
Lithium	mg/L	0.012	1	1	1.1	1.0	114	101	70-130	11	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60248973

Date: 08/10/2017 11:52 AM

QC Batch: 487056 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60248973001

METHOD BLANK: 1994801 Matrix: Water

Associated Lab Samples: 60248973001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antinon		0.0040	0.0040		
Antimony	mg/L	< 0.0010	0.0010	07/28/17 13:09	
Arsenic	mg/L	< 0.0010	0.0010	07/28/17 13:09	
Cadmium	mg/L	< 0.00050	0.00050	07/28/17 13:09	
Cobalt	mg/L	< 0.0010	0.0010	07/28/17 13:09	
Molybdenum	mg/L	< 0.0010	0.0010	07/28/17 13:09	
Selenium	mg/L	< 0.0010	0.0010	07/28/17 13:09	
Thallium	mg/L	<0.0010	0.0010	07/28/17 13:09	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
mony	mg/L	.04	0.039	97	85-115	
nic	mg/L	.04	0.039	97	85-115	
nium	mg/L	.04	0.038	96	85-115	
t	mg/L	.04	0.039	98	85-115	
denum	mg/L	.04	0.041	102	85-115	
ium	mg/L	.04	0.039	96	85-115	
um	mg/L	.04	0.038	95	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLIC	CATE: 19948	03		1994804							
			MS	MSD								
		7570332001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	ND	.04	.04	0.040	0.040	98	98	70-130	0	20	
Arsenic	mg/L	3.1 ug/L	.04	.04	0.042	0.042	97	97	70-130	0	20	
Cadmium	mg/L	ND	.04	.04	0.035	0.035	88	87	70-130	1	20	
Cobalt	mg/L	79.4 ug/L	.04	.04	0.12	0.12	95	102	70-130	2	20	
Molybdenum	mg/L	919 ug/L	.04	.04	0.95	0.98	80	151	70-130	3	20	M1
Selenium	mg/L	0.024	.04	.04	0.060	0.062	90	94	70-130	3	20	
Thallium	mg/L	ND	.04	.04	0.033	0.033	82	81	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



SM 2540C

Analysis Method:

Project: JEC CCR Groundwater

Pace Project No.: 60248973

QC Batch: 486350

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60248973001

METHOD BLANK: 1991663 Matrix: Water

Associated Lab Samples: 60248973001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 07/20/17 13:28

LABORATORY CONTROL SAMPLE: 1991664

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 975 97 80-120

SAMPLE DUPLICATE: 1991665

60249032001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 847 822 3 10 **Total Dissolved Solids** mg/L

SAMPLE DUPLICATE: 1991667

Date: 08/10/2017 11:52 AM

60248961006 Dup Max RPD RPD Parameter Units Result Result Qualifiers 284 **Total Dissolved Solids** mg/L 268 6 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60248973

QC Batch: 486539 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60248973001

SAMPLE DUPLICATE: 1992577

Date: 08/10/2017 11:52 AM

 Parameter
 Units
 60249041003 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.7
 7.7
 1
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60248973

Date: 08/10/2017 11:52 AM

QC Batch: 488423 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60248973001

METHOD BLANK: 1999945 Matrix: Water

Associated Lab Samples: 60248973001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 08/04/17 14:10

LABORATORY CONTROL SAMPLE: 1999946

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.5 2.5 100 90-110

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR Groundwater

Pace Project No.: 60248973

Date: 08/10/2017 11:52 AM

QC Batch: 488537 QC Batch Method: EPA 300.0

Associated Lab Samples: 60248973001

Analysis Method: EPA 300.0

Analysis Description: 300.0 IC Anions

METHOD BLANK: 2000532 Matrix: Water

Associated Lab Samples: 60248973001

Blank Reporting Parameter Units Result Limit Qualifiers Analyzed Chloride <1.0 08/05/17 16:58 mg/L 1.0 Sulfate mg/L <1.0 1.0 08/05/17 16:58

LABORATORY CONTROL SAMPLE: 2000533

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Chloride 5 4.8 95 90-110 mg/L mg/L Sulfate 5 4.8 95 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2000534 2000535

MSD MS 60249497001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Sulfate mg/L 428 250 250 670 667 97 95 80-120 0 15

MATRIX SPIKE SAMPLE: 2000536 % Rec 60249555023 MS MS Spike Parameter % Rec Qualifiers Units Result Conc. Result Limits 29.8 25 Chloride 54.3 98 80-120 mg/L Sulfate 38.5 25 62.4 96 80-120 mg/L

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Sample: FAA-6-071817 Lab ID: 60248973001 Collected: 07/18/17 10:43 Received: 07/19/17 08:35 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.121 ± 0.375 (0.726) Radium-226 pCi/L 08/02/17 12:36 13982-63-3 C:NA T:106% EPA 904.0  $0.0706 \pm 0.309 \quad (0.701)$ Radium-228 pCi/L 08/02/17 14:42 15262-20-1 C:81% T:89% Total Radium Total Radium 0.192 ± 0.684 (1.43) pCi/L 08/04/17 12:01 7440-14-4 Calculation



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

QC Batch: 265794 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60248973001

METHOD BLANK: 1308981 Matrix: Water

Associated Lab Samples: 60248973001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.452 ± 0.339 (0.175) C:NA T:101%
 pCi/L
 08/02/17 12:36

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

QC Batch: 265795 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60248973001

METHOD BLANK: 1308982 Matrix: Water

Associated Lab Samples: 60248973001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 -0.00716 ± 0.281 (0.654) C:82% T:89%
 pCi/L
 08/02/17 11:09

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALIFIERS**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

# **ANALYTE QUALIFIERS**

Date: 08/10/2017 11:52 AM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR Groundwater

Pace Project No.: 60248973

Date: 08/10/2017 11:52 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60248973001	FAA-6-071817	EPA 200.7	487074	EPA 200.7	487127
60248973001	FAA-6-071817	EPA 200.8	487056	EPA 200.8	487128
60248973001	FAA-6-071817	EPA 245.1	486931	EPA 245.1	487027
60248973001	FAA-6-071817	EPA 903.1	265794		
60248973001	FAA-6-071817	EPA 904.0	265795		
60248973001	FAA-6-071817	Total Radium Calculation	267345		
60248973001	FAA-6-071817	SM 2540C	486350		
60248973001	FAA-6-071817	SM 4500-H+B	486539		
60248973001	FAA-6-071817	EPA 300.0	488423		
60248973001	FAA-6-071817	EPA 300.0	488537		



# Sample Condition Upon Receipt



Client Name: Wester Energy			
Courier: FedEx UPS VIA Clay F	PEX 🗆 ECI 🗆	Pace □ Xroads □	Client □ Other □
Tracking #: Pac	e Shipping Label Used	d? Yes □ No □	
Custody Seal on Cooler/Box Present: Yes ✓ No □	Seals intact: Yes	No □	
Packing Material: Bubble Wrap Bubble Bags C	☐ Foam ☐	None 🗆 Oth	ner 🗆
Thermometer Used: T-266 / T-239 Type of	fice: Wet Blue No	ne	Date and initials of person
Cooler Temperature (°C): As-read 3-4 Corr. Fact	or CF +2.9 CF +5.2 Correct	ted <u>3. 6</u>	examining contents:
Temperature should be above freezing to 6°C		i -	PV7/19/17
Chain of Custody present:	Yes No N/A		
Chain of Custody relinquished:	Yes No N/A		
Samples arrived within holding time:	Yes No N/A		
Short Hold Time analyses (<72hr):	✓Yes □No □N/A	PH	
Rush Turn Around Time requested:	□Yes ☑No □N/A		0
Sufficient volume:	ZYes □No □N/A		
Correct containers used:	Yes No N/A		
Pace containers used:	Yes ONO ON/A		
Containers intact:	Yes No N/A		
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No □N/A		
Filtered volume received for dissolved tests?	□Yes □No □N/A		
Sample labels match COC: Date / time / ID / analyses	✓Yes □No □N/A		
Samples contain multiple phases? Matrix:	□Yes □No □N/A		
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	ØYes □No □N/A		
Cyanide water sample checks:			
Lead acetate strip turns dark? (Record only)	□Yes □No		
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No		
Trip Blank present:	☐Yes ☐No ☐N/A		
Headspace in VOA vials ( >6mm):	☐Yes ☐No ☐N/A	/	1:
Samples from USDA Regulated Area: State:	☐Yes ☐No ☐N/A		
Additional labels attached to 5035A / TX1005 vials in the field			
Client Notification/ Resolution: Copy COC to		Field Data Required	? Y / N
Person Contacted: Date/	Гіте:		
Comments/ Resolution:			
- A X		F :	
Project Manager Review:	Date	e: <u>7/19/17</u>	



# **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately,

Section A Required Client Information:	Section B Required Proje	ci Inform	metion:						tion (		ion														Page:	1	of	fer .	
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Email To: brandon.l.griffin@westarenergy.com	Purchase Orde	r No.				_			Quote		-				_	_	_		-	US		-					OTHER		_
Phone: (785) 575-8135 Fax:	Project Name:	JEC	CCR Gr	oundwate	er	-	_		Projec	t F	leath	er W	Ison,	913	3-563	3-14	07	-	-	-	ocatio	on		_	T				////
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# **Chain of Custody**



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1	his chain of custody is conside	ered cor	npiete as is sind	ce this informa	ation is av	ailab	le in th	e ow	ner la	bora	tory	<i>'</i> .									

WO#:30224688

Sample Condition Upon Re	ceipt I	Pitts	burgh	302246
Client Name:	·	Pi	TE, KS	Project#
Courler: DFed Ex OUPS OUSPS OCI		comm	ercial Pace Other _	Label Z.H.
•		<u>-</u>	5	LIMS LogIn RVM
Custody Seal on Cooler/Box Present:				no
Thermometer Used	Туре		: Wel Blue None	
Cooler Temperature Observed Temp  Temp should be above freezing to 6°C		С	Correction Factor:	°C Final Temp: °C
Leash attorded by showing to a.C.				Date and initials of person examining
Comments:	Yes	No	N/A	contents: 7H 77C
Chain of Custody Present:	1.00	110		
Chain of Custody Filled Out:			2.	
Chain of Custody Relinquished:	1			
Sampler Name & Signature on COC:			3.	
Sample Labels match COC;			5.	
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-Includes date/Ilme/ID Matrix: Samples Arrived within Hold Time:	<u> </u>	T I		
Short Hold Time Analysis (<72hr remaining):	1	-+	6,	
Rush Turn Around Time Requested:	+	-		
Sufficient Volume:	+	-	8.	
Correct Containers Used:			9,	
•	-	$\dashv$	10.	
-Pace Containers Used:	-			
Containers Intact;	-		11.	
Orthophosphate field fillered			12,	
Organic Samples checked for dechlorination:			_   13,	
illered volume received for Dissolved tests I containers have been checked for preservation.		+	- 14.	
I containers needing preservation are found to be in impliance with EPA recommendation.			15. CHCZ	
ceptions: VOA, coliform, TOC, O&G, Phenofics			1	ale/lime of eservation
			preservative	
adspace in VOA Vials ( >6mm):		12	16.	
o Blank Present:	_		17.	
Blank Custody Seals Present		1		
d Aqueous Samples Screened > 0,5 mrem/hr	1		Initial when 24 Date	le: 712017
ent Notification/ Resolution: Person Contacted:		Date	/Time:	
omments/ Resolution:				
				7.00

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.



August 21, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

# Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on July 28, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Danton M. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



# **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification Idaho Certification Illinois Certification

Indiana Certification Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219 WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0

Illinois Certification #: 003097 Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976

New Jersey/TNI Certification #: PA 051 New Mexico Certification #: PA01457

New York/TNI Certification #: 10888 North Carolina Certification #: 42706

North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 460198 Washington Certification #: C868 West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C Wisconsin Certification

Wyoming Certification #: 8TMS-L

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070





# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60249711001	FAA-6-072717	Water	07/27/17 15:52	07/28/17 08:00



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60249711001	FAA-6-072717	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	NSM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JMC1	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: August 21, 2017

# **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

# Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

# **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 487830

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60249708001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1997598)
  - Calcium
- MSD (Lab ID: 1997599)
  - Calcium



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: August 21, 2017

# **General Information:**

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

# Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

# **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

# Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: August 21, 2017

# **General Information:**

1 sample was analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# **Sample Preparation:**

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

# Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

# **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 490179

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60249708001,60249708002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2006567)
  - Mercury
- MS (Lab ID: 2006569)
  - Mercury
- MSD (Lab ID: 2006568)
  - Mercury

# **Additional Comments:**



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** August 21, 2017

# **General Information:**

1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method: EPA 904.0

Description:904.0 Radium 228Client:WESTAR ENERGYDate:August 21, 2017

# **General Information:**

1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

# **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:August 21, 2017

# **General Information:**

1 sample was analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY

Date: August 21, 2017

# **General Information:**

1 sample was analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: August 21, 2017

# **General Information:**

1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

• FAA-6-072717 (Lab ID: 60249711001)

# Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: August 21, 2017

#### **General Information:**

1 sample was analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Date: 08/21/2017 12:34 PM

Sample: FAA-6-072717	Lab ID: 602	249711001	Collected: 07/27/1	7 15:52	Received: 07	/28/17 08:00 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.059	mg/L	0.0050	1	07/31/17 16:51	08/13/17 15:39	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/31/17 16:51	08/13/17 15:39	7440-41-7	
Boron, Total Recoverable	2.4	mg/L	0.10	1	07/31/17 16:51			
Calcium, Total Recoverable	135	mg/L	0.10	1	07/31/17 16:51	08/13/17 15:39	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	07/31/17 16:51	08/13/17 15:39	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	07/31/17 16:51			
ithium	0.011	mg/L	0.010	1	07/31/17 16:51	08/13/17 15:39	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	07/31/17 10:19	08/03/17 17:32	7440-36-0	
Arsenic, Total Recoverable	0.0055	mg/L	0.0010	1	07/31/17 10:19	08/03/17 17:32	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	07/31/17 10:19	08/03/17 17:32	7440-43-9	
Cobalt, Total Recoverable	0.0012	mg/L	0.0010	1	07/31/17 10:19	08/03/17 17:32	7440-48-4	
Molybdenum, Total Recoverable	0.50	mg/L	0.0010	1	07/31/17 10:19	08/03/17 17:32	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/31/17 10:19	08/03/17 17:32	7782-49-2	
Γhallium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/31/17 10:19	08/03/17 17:32	7440-28-0	
45.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	08/16/17 19:00	08/17/17 09:36	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	2390	mg/L	5.0	1		08/02/17 15:30		
1500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		08/03/17 11:12		H6
800.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	64.8	mg/L	5.0	5		08/13/17 16:59	16887-00-6	
Fluoride	0.76	mg/L	0.20	1		08/12/17 21:17	16984-48-8	
Sulfate	1320	mg/L	200	200		08/13/17 17:12	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Date: 08/21/2017 12:34 PM

QC Batch: 490179 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60249711001

METHOD BLANK: 2006565 Matrix: Water

Associated Lab Samples: 60249711001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 08/17/17 09:18

LABORATORY CONTROL SAMPLE: 2006566

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0052 104 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2006567 2006568

MS MSD 60249708001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0027 70-130 20 M1 Mercury mg/L < 0.000024 .005 .005 0.0027 54 54

MATRIX SPIKE SAMPLE: 2006569

60249708002 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers < 0.000024 70-130 M1 Mercury mg/L .005 0.0025 50

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Date: 08/21/2017 12:34 PM

QC Batch: 487830 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60249711001

METHOD BLANK: 1997596 Matrix: Water

Associated Lab Samples: 60249711001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
				Analyzed	— Qualificis
Barium	mg/L	< 0.0050	0.0050	08/13/17 15:20	
Beryllium	mg/L	< 0.0010	0.0010	08/13/17 15:20	
Boron	mg/L	<0.10	0.10	08/13/17 15:20	
Calcium	mg/L	<0.10	0.10	08/13/17 15:20	
Chromium	mg/L	< 0.0050	0.0050	08/13/17 15:20	
Lead	mg/L	< 0.0050	0.0050	08/13/17 15:20	
Lithium	mg/L	<0.010	0.010	08/13/17 15:20	

LABORATORY CONTROL SAMPLE:	1997597					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	102	85-115	
Beryllium	mg/L	1	1.0	102	85-115	
Boron	mg/L	1	0.97	97	85-115	
Calcium	mg/L	10	9.6	96	85-115	
Chromium	mg/L	1	0.98	98	85-115	
Lead	mg/L	1	1.0	104	85-115	
Lithium	mg/L	1	1.1	108	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	ATE: 19975	98		1997599							
Parameter	6 Units	0249708001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.12	1	1	1.1	1.2	100	104	70-130	4	20	
Beryllium	mg/L	< 0.00016	1	1	0.98	1.0	98	104	70-130	6	20	
Boron	mg/L	1.8	1	1	2.8	2.8	98	105	70-130	3	20	
Calcium	mg/L	480	10	10	508	587	280	1070	70-130	15	20	M1
Chromium	mg/L	0.0015J	1	1	1.0	1.0	101	103	70-130	1	20	
Lead	mg/L	<0.0048	1	1	0.89	0.90	89	90	70-130	1	20	
Lithium	mg/L	0.42	1	1	1.5	1.5	111	105	70-130	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Date: 08/21/2017 12:34 PM

QC Batch: 487637 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60249711001

METHOD BLANK: 1997155 Matrix: Water

Associated Lab Samples: 60249711001

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	08/01/17 10:32	
Arsenic	mg/L	< 0.0010	0.0010	08/01/17 10:32	
Cadmium	mg/L	< 0.00050	0.00050	08/01/17 10:32	
Cobalt	mg/L	< 0.0010	0.0010	08/01/17 10:32	
Molybdenum	mg/L	< 0.0010	0.0010	08/01/17 10:32	
Selenium	mg/L	< 0.0010	0.0010	08/01/17 10:32	
Thallium	mg/L	<0.0010	0.0010	08/01/17 10:32	

LABORATORY CONTROL SAMPLE:	1997156					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.040	99	85-115	
Arsenic	mg/L	.04	0.040	100	85-115	
Cadmium	mg/L	.04	0.039	98	85-115	
Cobalt	mg/L	.04	0.040	99	85-115	
Molybdenum	mg/L	.04	0.040	100	85-115	
Selenium	mg/L	.04	0.039	97	85-115	
Thallium	mg/L	.04	0.036	91	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	TE: 19971	57		1997158							
			MS	MSD								
	6	0249776001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	ND	.04	.04	0.040	0.040	97	98	70-130	1	20	
Arsenic	mg/L	57.9 ug/L	.04	.04	0.099	0.099	103	102	70-130	1	20	
Cadmium	mg/L	ND	.04	.04	0.038	0.038	95	94	70-130	2	20	
Cobalt	mg/L	7.3 ug/L	.04	.04	0.046	0.046	96	96	70-130	1	20	
Molybdenum	mg/L	ND	.04	.04	0.042	0.042	102	103	70-130	0	20	
Selenium	mg/L	ND	.04	.04	0.038	0.041	94	100	70-130	6	20	
Thallium	mg/L	ND	.04	.04	0.036	0.037	90	91	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

QC Batch: 488160 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60249711001

METHOD BLANK: 1998724 Matrix: Water

Associated Lab Samples: 60249711001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 08/02/17 15:27

LABORATORY CONTROL SAMPLE: 1998725

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 1040 104 80-120

SAMPLE DUPLICATE: 1998726

60249753001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 686 2 10 **Total Dissolved Solids** 697 mg/L

SAMPLE DUPLICATE: 1998727

Date: 08/21/2017 12:34 PM

60249753005 Dup Max RPD RPD Parameter Units Result Result Qualifiers 666 **Total Dissolved Solids** mg/L 656 2 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

QC Batch: 488220 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60249711001

SAMPLE DUPLICATE: 1999035

Date: 08/21/2017 12:34 PM

 Parameter
 Units
 60249711001 Result
 Dup Result
 Max Result
 RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 7.4
 7.5
 0
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 6

60249711

QC Batch:
QC Batch Method:

489572

EPA 300.0

Analysis Method:

EPA 300.0

Analysis Description:

300.0 IC Anions

Associated Lab Samples: 60249711001

METHOD BLANK: 2004274

Matrix: Water

Associated Lab Samples:

60249711001

Blank

Reporting

Parameter Units

Blank Result

Limit Analyzed

Qualifiers

Fluoride

mg/L

< 0.20

0.20 08/12/17 15:58

LABORATORY CONTROL SAMPLE: 2

Parameter

2004275

Spike Conc.

LCS Result LCS % Rec % Rec Limits

Qualifiers

Fluoride

Fluoride

mg/L

Units

2.5

2.4

97

\_\_\_\_\_

MATRIX SPIKE SAMPLE:

Date: 08/21/2017 12:34 PM

2004278

Parameter

Units

60250635001 Result

Spike Conc. MS Result MS % Rec

90-110

% Rec

s Qualifiers

arameter

mg/L

Result 0.98

98 2.5

3.4

96

Limits

80-120

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



EPA 300.0

300.0 IC Anions

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

METHOD BLANK:

Date: 08/21/2017 12:34 PM

QC Batch: 489607 Analysis Method: QC Batch Method: EPA 300.0 Analysis Description:

Associated Lab Samples: 60249711001

2004586 Matrix: Water

Associated Lab Samples: 60249711001

Blank Reporting Parameter Units Result Limit Qualifiers Analyzed Chloride <1.0 1.0 08/13/17 14:37 mg/L Sulfate mg/L <1.0 1.0 08/13/17 14:37

LABORATORY CONTROL SAMPLE: 2004587

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Chloride 5 4.8 97 90-110 mg/L Sulfate mg/L 5 4.8 96 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2004588 2004589 MSD MS 60250738001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Chloride mg/L 1.4J 10 10 10.8 10.8 94 95 80-120 0 15 Sulfate mg/L 32.2 10 10 42.0 41.9 98 97 80-120 0 15

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Sample: FAA-6-072717 Lab ID: 60249711001 Collected: 07/27/17 15:52 Received: 07/28/17 08:00 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.599 \pm 0.346 \quad (0.135)$ Radium-226 pCi/L 08/16/17 10:46 13982-63-3 C:NA T:95% -0.0840 ± 0.206 (0.513) EPA 904.0 08/11/17 15:22 15262-20-1 Radium-228 pCi/L C:81% T:86% Total Radium Total Radium  $0.599 \pm 0.552 \quad (0.648)$ pCi/L 08/21/17 12:03 7440-14-4 Calculation



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

QC Batch: 267153 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60249711001

METHOD BLANK: 1315208 Matrix: Water

Associated Lab Samples: 60249711001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.593 ± 0.503 (0.624) C:NA T:95%
 pCi/L
 08/16/17 10:12

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

QC Batch: 267154 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60249711001

METHOD BLANK: 1315209 Matrix: Water

Associated Lab Samples: 60249711001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.545 ± 0.365 (0.699) C:77% T:82%
 pCi/L
 08/11/17 15:20

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

# **ANALYTE QUALIFIERS**

Date: 08/21/2017 12:34 PM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249711

Date: 08/21/2017 12:34 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60249711001	FAA-6-072717	EPA 200.7	487830	EPA 200.7	487911
60249711001	FAA-6-072717	EPA 200.8	487637	EPA 200.8	487864
60249711001	FAA-6-072717	EPA 245.1	490179	EPA 245.1	490214
60249711001	FAA-6-072717	EPA 903.1	267153		
60249711001	FAA-6-072717	EPA 904.0	267154		
60249711001	FAA-6-072717	Total Radium Calculation	268953		
60249711001	FAA-6-072717	SM 2540C	488160		
60249711001	FAA-6-072717	SM 4500-H+B	488220		
60249711001	FAA-6-072717	EPA 300.0	488540		
60249711001	FAA-6-072717	EPA 300.0	489572		
60249711001	FAA-6-072717	EPA 300.0	489607		



# Sample Condition Upon Receipt



Client Name: Westar Energy	
Courier: FedEx □ UPS □ VIA 🔽 Clay □ PEX □ ECI [	□ Pace □ Xroads □ Client □ Other □
Tracking #: Pace Shipping Labe	IUsed? Yes □ No □
Custody Seal on Cooler/Box Present: Yes ✓ No □ Seals intact:	Yes No 🗆
Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foar	m □ Neme □ Other □
Thermometer Used: T-266 T-239 Type of Ice: Wet Blue	
Cooler Temperature (°C): As-read Corr. Factor CF+0.3 C	orrected 1 - 9 Date and initials of person examining contents:
Temperature should be above freezing to 6°C	N+/29/12
Chain of Custody present:   ☐ Ves ☐ No 〔	N/A Collection date on containers is 7/27
Chain of Custody relinquished:	□N/A
Samples arrived within holding time: ✓ Yes □No [	□N/A
Short Hold Time analyses (<72hr):	DN/A PH
Rush Turn Around Time requested:	□n/a
Sufficient volume:	In/a
Correct containers used:	□N/A
Pace containers used:	□N/A
Containers intact:	□N/A
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	AN/A
Filtered volume received for dissolved tests?	Sn/a
Sample labels match COC: Date / time / ID / analyses	□N/A
Samples contain multiple phases? Matrix: WT - Yes No	Jn/a
, , , ,	□n/A
(HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH_OK-DRO)	
Cyanide water sample checks: N/A	
Lead acetate strip turns dark? (Record only) □Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	
Trip Blank present:	DN/A
Headspace in VOA vials ( >6mm):	N/A
Samples from USDA Regulated Area: State:   Over Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discourse Discours	ON/A
Additional labels attached to 5035A / TX1005 vials in the field?   Output  Description:	ZN/A
Client Notification/ Resolution: Copy COC to Client? Y	N Field Data Required? Y / N
Person Contacted: Date/Time:	
Comments/ Resolution:	
1/15	1 1 2 2
Project Manager Review:	Date: 72817



# **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

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mpany: WESTAR ENERGY		Report To:	Bran	don (	Griffin				ľ	Attent	on	Jar	ed M	orriso	n														).K
dress: 818 Kansas Ave		Сору То:	Jare	d Mor	rison, He	ath Horr	nya		ľ	Comp	any Nar	ne:	WES	TAR	ENE	RGY				REG	ULA	TOR	Y AGI	ENCY			8 1		
Topeka, KS 66612									1	Addre	SS:		SEE	SEC	TION	Α				F	NPD	ES	Γ G	ROUN	ND W	ATER		DRINKING	WATER
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# **Chain of Custody**



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<sup>\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

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compliance with EPA recommendation.			<u> </u>	iniliai when -	-	Date/time of				
exceptions: VOA, coliform, TOC, O&G, Phenolics				completed Lot # of added	C1+	preservation				$\dashv$
	. <del></del>			bteast/stine						
leadspace in VOA Vials ( >6mm);	·			16.						_
Trip Blank Present:			_	17.						
rrip Blank Custody Seals Present			_			<del></del>				
Rad Aqueous Samples Screened > 0.5 mrem/hr	-	-		Initial when completed; 7	74	Date:	1.1	1-7		
Ilent Notification/ Resolution:							1 1			~
Person Contacled:		D	ale/T	īme:		Contacte	ed By:			
Comments/ Resolution:							1			
										_
										-

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LiMS. When the Project Manager closes the SRF Review schedule in LiMS. The review is in the Status section of the Workorder Edit Screen.

J'IQAQCIMasteriDocument ManagementtSample MgltSample Condition Upon Receipt Pittsburgh (C056-5 5July2017)

ATTACHMENT 1-10
August 2017 Sampling Event
Laboratory Analytical Report





August 23, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

# Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on August 02, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Danson Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683

Georgia Certification #: C040

Guam Certification Hawaii Certification

Idaho Certification

Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14

Nevada Certification #: PA014572015-1

New Hampshire/TNI Certification #: 2976

New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA01457

New York/TNI Certification #: 10888

North Carolina Certification #: 42706

North Dakota Certification #: R-190

Oregon/TNI Certification #: PA200002

Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8

Utah/TNI Certification #: PA014572015-5

USDA Soil Permit #: P330-14-00213

Vermont Dept. of Health: ID# VT-0282

Virgin Island/PADEP Certification

Virginia/VELAP Certification #: 460198

Washington Certification #: C868

West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01

Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60249958001	FAA-6-080117	Water	08/01/17 11:38	08/02/17 08:55



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Lab ID Sample ID		Method	Analysts	Analytes Reported	Laboratory
60249958001	FAA-6-080117	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	NSM	1	PASI-K
	EPA 903.1	WRR	1	PASI-PA	
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: August 23, 2017

#### **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### **Sample Preparation:**

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 488235

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60249958001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1999072)
  - Calcium

#### **Additional Comments:**

**Analyte Comments:** 

QC Batch: 488235

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- FAA-6-080117 (Lab ID: 60249958001)
  - Beryllium, Total Recoverable
  - Lithium



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: August 23, 2017

#### **General Information:**

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

## Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: August 23, 2017

#### **General Information:**

1 sample was analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### **Sample Preparation:**

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 490179

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60249708001,60249708002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2006567)
  - Mercury
- MS (Lab ID: 2006569)
  - Mercury
- MSD (Lab ID: 2006568)
  - Mercury

#### **Additional Comments:**



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method: EPA 903.1

Description: 903.1 Radium 226
Client: WESTAR ENERGY
Date: August 23, 2017

#### **General Information:**

1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method: EPA 904.0

Description:904.0 Radium 228Client:WESTAR ENERGYDate:August 23, 2017

#### **General Information:**

1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:August 23, 2017

#### **General Information:**

1 sample was analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



# **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY

Date: August 23, 2017

#### **General Information:**

1 sample was analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: August 23, 2017

#### **General Information:**

1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

• FAA-6-080117 (Lab ID: 60249958001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

## **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: August 23, 2017

#### **General Information:**

1 sample was analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Date: 08/23/2017 11:22 AM

Sample: FAA-6-080117	Lab ID: 60249958001		Collected: 08/01/1	7 11:38	Received: 08	/02/17 08:55 I	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua	
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7				
Barium, Total Recoverable	0.066	mg/L	0.010	2	08/03/17 09:59	08/22/17 16:11	7440-39-3		
Beryllium, Total Recoverable	<0.0020	mg/L	0.0020	2	08/03/17 09:59	08/22/17 16:11	7440-41-7	D3	
Boron, Total Recoverable	3.0	mg/L	0.10	1	08/03/17 09:59	08/13/17 15:48	7440-42-8		
Calcium, Total Recoverable	141	mg/L	0.20	2	08/03/17 09:59	08/22/17 16:11	7440-70-2	M1	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	08/03/17 09:59				
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	08/03/17 09:59				
Lithium	<0.020	mg/L	0.020	2	08/03/17 09:59	08/22/17 16:11	7439-93-2	D3	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8				
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/03/17 09:59	08/08/17 10:47	7440-36-0		
Arsenic, Total Recoverable	0.0060	mg/L	0.0010	1	08/03/17 09:59	08/08/17 10:47	7440-38-2		
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/03/17 09:59	08/08/17 10:47	7440-43-9		
Cobalt, Total Recoverable	0.0012	mg/L	0.0010	1	08/03/17 09:59	08/08/17 10:47	7440-48-4		
Molybdenum, Total Recoverable	0.59	mg/L	0.0010	1	08/03/17 09:59	08/08/17 10:47	7439-98-7		
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/03/17 09:59	08/08/17 10:47	7782-49-2		
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/03/17 09:59	08/08/17 10:47	7440-28-0		
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: EP	A 245.1				
Mercury	<0.00020	mg/L	0.00020	1	08/16/17 19:00	08/17/17 09:47	7439-97-6		
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC						
Total Dissolved Solids	2370	mg/L	5.0	1		08/07/17 14:11			
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B						
oH at 25 Degrees C	7.5	Std. Units	0.10	1		08/07/17 08:04		H6	
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0						
Chloride	63.6	mg/L	5.0	5		08/07/17 00:07	16887-00-6		
Fluoride	0.81	mg/L	0.20	1		08/06/17 00:00	16984-48-8		
Sulfate	1400	mg/L	200	200		08/07/17 00:45	14808-79-8		



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Date: 08/23/2017 11:22 AM

QC Batch: 490179 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60249958001

METHOD BLANK: 2006565 Matrix: Water

Associated Lab Samples: 60249958001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 08/17/17 09:18

LABORATORY CONTROL SAMPLE: 2006566

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0052 104 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2006567 2006568

MS MSD 60249708001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0027 70-130 20 M1 Mercury mg/L < 0.000024 .005 .005 0.0027 54 54

MATRIX SPIKE SAMPLE: 2006569 60249708002 Spike MS MS %

% Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers < 0.000024 70-130 M1 Mercury mg/L .005 0.0025 50

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Date: 08/23/2017 11:22 AM

QC Batch: 488235 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60249958001

METHOD BLANK: 1999070 Matrix: Water

Associated Lab Samples: 60249958001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	08/13/17 15:44	
Beryllium	mg/L	< 0.0010	0.0010	08/13/17 15:44	
Boron	mg/L	<0.10	0.10	08/13/17 15:44	
Calcium	mg/L	<0.10	0.10	08/13/17 15:44	
Chromium	mg/L	< 0.0050	0.0050	08/13/17 15:44	
Lead	mg/L	< 0.0050	0.0050	08/13/17 15:44	
Lithium	mg/L	< 0.010	0.010	08/13/17 15:44	

LABORATORY CONTROL SAMPLE:	1999071					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		0.97	97	85-115	
Beryllium	mg/L	1	1.1	107	85-115	
Boron	mg/L	1	0.96	96	85-115	
alcium	mg/L	10	9.8	98	85-115	
hromium	mg/L	1	1.0	100	85-115	
ead	mg/L	1	1.1	106	85-115	
ithium	mg/L	1	1.0	101	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	TE: 19990	72		1999073							
			MS	MSD								
	6	0249958001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	0.066	1	1	1.1	1.1	103	101	70-130	1	20	
Beryllium	mg/L	< 0.0020	1	1	1.1	1.0	105	104	70-130	1	20	
Boron	mg/L	3.0	1	1	3.8	3.8	82	82	70-130	0	20	
Calcium	mg/L	141	10	10	154	151	133	103	70-130	2	20	M1
Chromium	mg/L	< 0.0050	1	1	1.1	1.0	110	101	70-130	8	20	
Lead	mg/L	< 0.0050	1	1	0.96	0.94	96	94	70-130	1	20	
Lithium	mg/L	< 0.020	1	1	1.1	1.0	105	103	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Date: 08/23/2017 11:22 AM

QC Batch: 488237 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60249958001

METHOD BLANK: 1999079 Matrix: Water

Associated Lab Samples: 60249958001

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	08/08/17 10:40	
Arsenic	mg/L	< 0.0010	0.0010	08/08/17 10:40	
Cadmium	mg/L	< 0.00050	0.00050	08/08/17 10:40	
Cobalt	mg/L	< 0.0010	0.0010	08/08/17 10:40	
Molybdenum	mg/L	< 0.0010	0.0010	08/08/17 10:40	
Selenium	mg/L	< 0.0010	0.0010	08/08/17 10:40	
Thallium	mg/L	< 0.0010	0.0010	08/08/17 10:40	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
nony	mg/L	.04	0.040	100	85-115	
nic	mg/L	.04	0.040	99	85-115	
nium	mg/L	.04	0.040	99	85-115	
lt	mg/L	.04	0.040	100	85-115	
denum	mg/L	.04	0.041	102	85-115	
nium	mg/L	.04	0.038	95	85-115	
um	mg/L	.04	0.039	97	85-115	

MATRIX SPIKE & MATRIX SF	PIKE DUPLICA	TE: 19990	31		1999082							
			MS	MSD								
	6	0249985001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	<0.0010	.04	.04	0.039	0.038	96	96	70-130	0	20	
Arsenic	mg/L	< 0.0010	.04	.04	0.041	0.041	100	100	70-130	0	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.036	0.036	90	89	70-130	0	20	
Cobalt	mg/L	0.0013	.04	.04	0.039	0.039	95	94	70-130	1	20	
Molybdenum	mg/L	0.071	.04	.04	0.11	0.11	110	110	70-130	0	20	
Selenium	mg/L	< 0.0010	.04	.04	0.036	0.037	90	91	70-130	1	20	
Thallium	mg/L	< 0.0010	.04	.04	0.043	0.043	106	106	70-130	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

QC Batch: 488701 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60249958001

METHOD BLANK: 2000988 Matrix: Water

Associated Lab Samples: 60249958001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 08/07/17 14:08

LABORATORY CONTROL SAMPLE: 2000989

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 1030 103 80-120

SAMPLE DUPLICATE: 2000990

60250086001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 469 2 10 **Total Dissolved Solids** 480 mg/L

SAMPLE DUPLICATE: 2000991

Date: 08/23/2017 11:22 AM

ParameterUnits60250164001 ResultDup ResultRPDMax RPDQualifiersTotal Dissolved Solidsmg/L831825110

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

QC Batch: 488359 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60249958001

SAMPLE DUPLICATE: 1999600

Date: 08/23/2017 11:22 AM

60250049002 Dup Max Parameter Units Result Result **RPD** RPD Qualifiers 7.9 pH at 25 Degrees C 7.9 5 H6 Std. Units 0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Date: 08/23/2017 11:22 AM

QC Batch: 488540 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60249958001

METHOD BLANK: 2000546 Matrix: Water

Associated Lab Samples: 60249958001

Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 08/05/17 17:38

LABORATORY CONTROL SAMPLE: 2000547

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.6 103 90-110

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



EPA 300.0

300.0 IC Anions

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Date: 08/23/2017 11:22 AM

QC Batch: 488592 Analysis Method: QC Batch Method: EPA 300.0 Analysis Description:

Associated Lab Samples: 60249958001

METHOD BLANK: 2000742 Matrix: Water

Associated Lab Samples: 60249958001

Blank Reporting Limit Parameter Units Result Qualifiers Analyzed Chloride <1.0 1.0 08/06/17 20:14 mg/L Sulfate mg/L <1.0 1.0 08/06/17 20:14

LABORATORY CONTROL SAMPLE: 2000743

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Chloride 5 4.8 97 90-110 mg/L Sulfate mg/L 5 4.8 97 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2000744 2000745 MSD MS 60249708001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Chloride mg/L 14300 5000 5000 20000 19800 115 111 80-120 15 Sulfate mg/L 619 500 500 1070 1080 90 93 80-120 15

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Sample: FAA-6-080117 Lab ID: 60249958001 Collected: 08/01/17 11:38 Received: 08/02/17 08:55 Matrix: Water PWS: Site ID: Sample Type: Method Act ± Unc (MDC) Carr Trac **Parameters** Units Analyzed CAS No. Qual EPA 903.1  $0.0604 \pm 0.276 \quad (0.445)$ Radium-226 pCi/L 08/15/17 22:50 13982-63-3 C:NA T:97% EPA 904.0  $0.0678 \pm 0.487$  (1.11) 08/16/17 15:49 15262-20-1 Radium-228 pCi/L C:80% T:87% Total Radium Total Radium  $0.128 \pm 0.763 \quad (1.56)$ pCi/L 08/23/17 11:20 7440-14-4 Calculation



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

QC Batch: 267280 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60249958001

METHOD BLANK: 1315748 Matrix: Water

Associated Lab Samples: 60249958001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.340 ± 0.313 (0.184) C:NA T:93%
 pCi/L
 08/15/17 22:33

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

QC Batch: 267282 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60249958001

METHOD BLANK: 1315755 Matrix: Water

Associated Lab Samples: 60249958001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.892 ± 0.367 (0.576) C:77% T:96%
 pCi/L
 08/16/17 11:37

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

# **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

# **ANALYTE QUALIFIERS**

Date: 08/23/2017 11:22 AM

D3 Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60249958

Date: 08/23/2017 11:22 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60249958001	FAA-6-080117	EPA 200.7	488235	EPA 200.7	488322
60249958001	FAA-6-080117	EPA 200.8	488237	EPA 200.8	488321
60249958001	FAA-6-080117	EPA 245.1	490179	EPA 245.1	490214
60249958001	FAA-6-080117	EPA 903.1	267280		
60249958001	FAA-6-080117	EPA 904.0	267282		
60249958001	FAA-6-080117	Total Radium Calculation	269244		
60249958001	FAA-6-080117	SM 2540C	488701		
60249958001	FAA-6-080117	SM 4500-H+B	488359		
60249958001	FAA-6-080117	EPA 300.0	488540		
60249958001	FAA-6-080117	EPA 300.0	488592		



# Sample Condition Upon Receipt



Client Name: Wester Energy			
	EX 🗆 ECI 🗆	Pace □ Xroads □ C	Client □ Other □
Tracking #: Pace	Shipping Label Used	]? Yes□ No 🕅	
Custody Seal on Cooler/Box Present: Yes ★ No □	Seals intact: Yes		
Packing Material: Bubble Wrap □ Bubble Bags □		None 🗶 Other	r 🗆
CP0.0) CF +0.3	Ice: Vet Blue No		4
Cooler Temperature (°C): As-read 5.0 Corr. Factor	or CF(0.0 CF +0.3 Correct	ed <u>5.0</u>	Date and initials of person examining contents: 9/2//7 (1)
Temperature should be above freezing to 6°C			
Chain of Custody present:	Yes □No □N/A		
Chain of Custody relinquished:	Ses □No □N/A		
Samples arrived within holding time:	¥Yes □No □N/A		
Short Hold Time analyses (<72hr):	X Yes □No □N/A	HN63	
Rush Turn Around Time requested:	□Yes □No □XN/A		
Sufficient volume:	ŻYes □No □N/A		
Correct containers used:	X Yes □No □N/A		
Pace containers used:	Yes □No □N/A		
Containers intact:	Xxes □No □N/A		ж
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No □ <b>X</b> I/A		
Filtered volume received for dissolved tests?	□Yes □No DXN/A		
Sample labels match COC: Date / time / ID / analyses	ØYes □No □N/A		
Samples contain multiple phases? Matrix: WT	□Yes 🗖 No □N/A	961	
Containers requiring pH preservation in compliance?	Yes □No □N/A		
(HNO₃, H₂SO₄, HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide)			
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)  Cyanide water sample checks:			
Lead acetate strip turns dark? (Record only)	□Yes 🕅No		
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes ဩ(No		
Trip Blank present:	□Yes □No Ū\N/A		
Headspace in VOA vials ( >6mm):	☐Yes ☐No ☐M/A		
Samples from USDA Regulated Area: State:	□Yes □No ▼N/A		
	$\sim$		
Additional labels attached to 5035A / TX1005 vials in the field?			
Client Notification/ Resolution: Copy COC to		Field Data Required?	Y / N
Person Contacted: Date/Ti	me:		
Comments/ Resolution:			
- W.			
- Alan I		2010	
Project Manager Review:	. Date	= 8/2/1/	



# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

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hone: (785) 575-81		Project Name	e: JEC	CCR Gr	oundwate	·r			Page Pi Manage	roject	He	ather	Wils	on, 9	13-5	63-1	407		S	ite L	ocation							
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# **Chain of Custody**



-	rkorder: 60249958	Workorder		EC CCR GROUNDWATER			Owner Received Date: 8/2/				8/2/2017 Results Requested By:				: 8/24/2017				
-	ort To		Subcontra	ct To			21 G (61 A)		SHANTIMA		PANTATA SA	NACES CONTRACTOR	Regu	ested	Analy	sis		<u>-</u>	. 0,2 ,,2017
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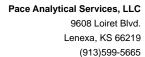
\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

WO#:30226151

30226161

Sample Condition Upon Re	∍ceipĩ	PI	tsbu	ırah				ring are	era era i	dia n
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, Расе Analytical : Client Name;		(A	AZ	E, 10	<u> </u>	Pro	ject#			
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Tracking #: 7285(6595			1411616	a)  a.e	Other			LIMS Log	bel <u>&amp;</u>	
Custody Seal on Cooler/Box Present:ye		fño	S	eals Intact:	-Flves	Ппо			7	,
Thermometer Used		oe of		Wet Blue						
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Temp should be above freezing to 6°C						1-222-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2			2070	<b>-</b>
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Chain of Custody Relinquished:		1-		3,	-		<del></del>			
Sampler Name & Signature on COC:		-	$\neg \vdash$	4.						
Sample Labels match COC:		1		5.	····			··		
-Includes date/lime/ID Matrix:		<del>-</del>		7						
Samples Arrived within Hold Time:		T	T	6,	** <u>.</u>		···	<del></del>		
Short Hold Time Analysis (<72hr remaining):		-	-   -	7.		· · · · · · · · · · · · · · · · · · ·				<del>~</del>
Rush Turn Around Time Requested:				8.						
Sufficient Volume:	_		1	9.						
Correct Containers Used:		_		10.						
-Pace Containers Used:	/									
Containers Intact:	/			11.		~				
Orihophosphate fleld fillered				12.				· · · ·		
Organic Samples checked for dechlorination:			-	13.						
fillered volume received for Dissolved tests				14.						
All containers have been checked for preservation.				15.	) t4 c					
ill containers needing preservation are found to be in ompliance with EPA recommendation,				6-	UT C					
xceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed	211	Date/time				
				Lot # of added		, jp. reserve				
eadspace in VOA Vlals ( >6mm);				preservative						
lp Blank Present:				16. 17.						
ip Blank Custody Seals Present	<del></del>	_		17.						
ad Aqueous Samples Screened > 0.5 mrem/hr		$\exists$		Initial when	$\overline{}$	Ţ	V1.	2 /		
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\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.





August 31, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

# Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on August 08, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

danson Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification Idaho Certification Illinois Certification

Indiana Certification lowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976

New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888

North Carolina Certification #: 42706 North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 460198

Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219 WY STR Certification #: 2456.01

Arkansas Certification #: 2456.01

Allinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055 Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070





# **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60250360001	FAA-6-080717	Water	08/07/17 13:55	08/08/17 07:20



# **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60250360001	FAA-6-080717	EPA 200.7	SMW	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	NSM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	JMC1	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: August 31, 2017

#### **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 490028

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60250784001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2005870)
  - Calcium
- MSD (Lab ID: 2005871)
  - Calcium



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: August 31, 2017

#### **General Information:**

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method:EPA 245.1Description:245.1 MercuryClient:WESTAR ENERGYDate:August 31, 2017

#### **General Information:**

1 sample was analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

# **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** August 31, 2017

#### **General Information:**

1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method: EPA 904.0

**Description:** 904.0 Radium 228 **Client:** WESTAR ENERGY **Date:** August 31, 2017

#### **General Information:**

1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:August 31, 2017

#### **General Information:**

1 sample was analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method: SM 2540C

**Description:** 2540C Total Dissolved Solids

Client: WESTAR ENERGY

Date: August 31, 2017

#### **General Information:**

1 sample was analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: August 31, 2017

#### **General Information:**

1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

• FAA-6-080717 (Lab ID: 60250360001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: August 31, 2017

#### **General Information:**

1 sample was analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

# **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



# **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Date: 08/31/2017 09:56 AM

Sample: FAA-6-080717	Lab ID: 602	250360001	Collected: 08/07/1	7 13:55	Received: 08	/08/17 07:20 <b>I</b>	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.067	mg/L	0.0050	1	08/16/17 09:53	08/17/17 17:25	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/16/17 09:53	08/17/17 17:25	7440-41-7	
Boron, Total Recoverable	3.1	mg/L	0.10	1	08/16/17 09:53	08/17/17 17:25	7440-42-8	
Calcium, Total Recoverable	140	mg/L	0.10	1	08/16/17 09:53	08/17/17 17:25	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	08/16/17 09:53	08/17/17 17:25	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	08/16/17 09:53	08/17/17 17:25	7439-92-1	
Lithium	0.012	mg/L	0.010	1	08/16/17 09:53	08/17/17 17:25	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/09/17 17:03	08/10/17 16:10	7440-36-0	
Arsenic, Total Recoverable	0.0060	mg/L	0.0010	1	08/09/17 17:03	08/10/17 16:10	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/09/17 17:03	08/10/17 16:10	7440-43-9	
Cobalt, Total Recoverable	0.0015	mg/L	0.0010	1	08/09/17 17:03	08/10/17 16:10	7440-48-4	
Molybdenum, Total Recoverable	0.58	mg/L	0.0010	1	08/09/17 17:03	08/10/17 16:10	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/09/17 17:03	08/10/17 16:10	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/09/17 17:03	08/10/17 16:10	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	08/29/17 11:40	08/29/17 16:13	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	C					
Total Dissolved Solids	2390	mg/L	5.0	1		08/09/17 14:47	•	
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	-H+B					
pH at 25 Degrees C	7.4	Std. Units	0.10	1		08/09/17 09:58	}	H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	66.0	mg/L	5.0	5		08/30/17 14:01	16887-00-6	
Fluoride	0.81	mg/L	0.20	1		08/29/17 23:17		
Sulfate	1380	mg/L	250	250		08/30/17 15:17	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Date: 08/31/2017 09:56 AM

QC Batch: 491873 QC Batch Method: EPA 245.1

Associated Lab Samples: 60250360001

Analysis Method:
Analysis Description:

EPA 245.1

245.1 Mercury

Qualifiers

METHOD BLANK: 2013080 Matrix: Water

Associated Lab Samples: 60250360001

Parameter Units Result Limit Analyzed

Mercury mg/L <0.00020 0.00020 08/29/17 16:08

LABORATORY CONTROL SAMPLE: 2013081

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0051 102 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2013082 2013083

MS MSD 60251349001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual ND 0.0052 70-130 2 20 Mercury mg/L .005 .005 0.0051 102 103

MATRIX SPIKE SAMPLE: 2013084 60251349002 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers 0.0052 ND 104 70-130 Mercury mg/L .005

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Date: 08/31/2017 09:56 AM

QC Batch: 490028 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60250360001

METHOD BLANK: 2005868 Matrix: Water

Associated Lab Samples: 60250360001

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	08/17/17 17:13	
Beryllium	mg/L	< 0.0010	0.0010	08/17/17 17:13	
Boron	mg/L	<0.10	0.10	08/17/17 17:13	
Calcium	mg/L	<0.10	0.10	08/17/17 17:13	
Chromium	mg/L	< 0.0050	0.0050	08/17/17 17:13	
Lead	mg/L	< 0.0050	0.0050	08/17/17 17:13	
Lithium	mg/L	< 0.010	0.010	08/17/17 17:13	

LABORATORY CONTROL SAMPLE:	2005869					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	100	85-115	
Beryllium	mg/L	1	1.0	102	85-115	
Boron	mg/L	1	1.0	101	85-115	
Calcium	mg/L	10	9.7	97	85-115	
Chromium	mg/L	1	0.98	98	85-115	
ead	mg/L	1	1.0	102	85-115	
ithium	mg/L	1	1.0	105	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	ATE: 20058	70		2005871							
Parameter	6 Units	0250784001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec	RPD	Max RPD	Qual
Barium	mg/L	0.12	1	1	1.1	1.1	100	103	70-130	2	20	
Beryllium	mg/L	< 0.00016	1	1	0.99	1.0	99	101	70-130	2	20	
Boron	mg/L	1.9	1	1	2.9	2.9	98	95	70-130	1	20	
Calcium	mg/L	532	10	10	524	516	-81	-160	70-130	2	20	M1
Chromium	mg/L	< 0.0014	1	1	1.0	1.0	101	103	70-130	2	20	
Lead	mg/L	0.0050J	1	1	0.90	0.90	89	90	70-130	0	20	
Lithium	mg/L	0.43	1	1	1.6	1.6	112	113	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Date: 08/31/2017 09:56 AM

QC Batch: 489217 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60250360001

METHOD BLANK: 2002653 Matrix: Water

Associated Lab Samples: 60250360001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	< 0.0010	0.0010	08/10/17 14:24	
Arsenic	mg/L	< 0.0010	0.0010	08/10/17 14:24	
Cadmium	mg/L	< 0.00050	0.00050	08/10/17 14:24	
Cobalt	mg/L	< 0.0010	0.0010	08/10/17 14:24	
Molybdenum	mg/L	< 0.0010	0.0010	08/10/17 14:24	
Selenium	mg/L	< 0.0010	0.0010	08/10/17 14:24	
Thallium	mg/L	< 0.0010	0.0010	08/10/17 14:24	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
timony	mg/L	.04	0.040	100	85-115	
senic	mg/L	.04	0.040	101	85-115	
dmium	mg/L	.04	0.039	99	85-115	
alt	mg/L	.04	0.041	101	85-115	
/bdenum	mg/L	.04	0.041	104	85-115	
enium	mg/L	.04	0.038	95	85-115	
llium	mg/L	.04	0.041	102	85-115	

MATRIX SPIKE & MATRIX SPI	KE DUPLICA	ATE: 20026	55		2002656							
			MS	MSD								
	6	0250510001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	ND	.04	.04	0.039	0.040	98	99	70-130	2	20	
Arsenic	mg/L	11.4 ug/L	.04	.04	0.052	0.053	102	104	70-130	2	20	
Cadmium	mg/L	ND	.04	.04	0.039	0.039	98	98	70-130	0	20	
Cobalt	mg/L	ND	.04	.04	0.043	0.043	100	100	70-130	0	20	
Molybdenum	mg/L	ND	.04	.04	0.042	0.042	104	104	70-130	0	20	
Selenium	mg/L	ND	.04	.04	0.040	0.040	98	98	70-130	1	20	
Thallium	mg/L	ND	.04	.04	0.039	0.040	96	98	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

QC Batch: 489132 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60250360001

METHOD BLANK: 2002352 Matrix: Water

Associated Lab Samples: 60250360001

Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 08/09/17 14:36

LABORATORY CONTROL SAMPLE: 2002353

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 1040 104 80-120

SAMPLE DUPLICATE: 2002354

60250346001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 851 2 10 **Total Dissolved Solids** 868 mg/L

SAMPLE DUPLICATE: 2002355

Date: 08/31/2017 09:56 AM

60250343001 Dup Max RPD RPD Parameter Units Result Result Qualifiers 880 **Total Dissolved Solids** mg/L 860 2 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **QUALITY CONTROL DATA**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

QC Batch: 489010 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60250360001

SAMPLE DUPLICATE: 2001784

Date: 08/31/2017 09:56 AM

 Parameter
 Units
 60250317001 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 6.5
 6.5
 0
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Date: 08/31/2017 09:56 AM

QC Batch: 491643 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60250360001

METHOD BLANK: 2012453 Matrix: Water

Associated Lab Samples: 60250360001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	08/29/17 22:16	
Fluoride	mg/L	<0.20	0.20	08/29/17 22:16	
Sulfate	mg/L	<1.0	1.0	08/29/17 22:16	

LABORATORY CONTROL SAMPLE:	2012454					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L		4.8	96	90-110	
Fluoride	mg/L	2.5	2.7	108	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIK	E DUPLIC	ATE: 20124	55		2012456							
			MS	MSD								
	(	60250360001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	66.0	25	25	95.2	95.1	117	116	80-120	0	15	
Fluoride	mg/L	0.81	2.5	2.5	3.3	3.4	100	103	80-120	2	15	
Sulfate	mg/L	1380	1250	1250	2610	2610	99	99	80-120	0	15	

MATRIX SPIKE SAMPLE:	2012457						
		2059121002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Fluoride	mg/L	ND	2.5	2.8	112	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Sample: FAA-6-080717 PWS:	<b>Lab ID: 6025036</b> Site ID:	<b>0001</b> Collected: 08/07/17 13:55 Sample Type:	Received:	08/08/17 07:20	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.130 ± 0.404 (0.783) C:NA T:102%	pCi/L	08/19/17 13:08	13982-63-3	
Radium-228	EPA 904.0	0.235 ± 0.311 (0.662) C:75% T:89%	pCi/L	08/21/17 11:41	15262-20-1	
Total Radium	Total Radium Calculation	0.365 ± 0.715 (1.45)	pCi/L	08/23/17 15:26	7440-14-4	



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

QC Batch: 267988 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60250360001

METHOD BLANK: 1318833 Matrix: Water

Associated Lab Samples: 60250360001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.617 ± 0.409 (0.788) C:79% T:80%
 pCi/L
 08/21/17 11:40

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

QC Batch: 267982 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60250360001

METHOD BLANK: 1318829 Matrix: Water

Associated Lab Samples: 60250360001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.0630 ± 0.371 (0.757) C:NA T:107%
 pCi/L
 08/19/17 12:14

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 08/31/2017 09:56 AM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



## **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60250360

Date: 08/31/2017 09:56 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60250360001	FAA-6-080717	EPA 200.7	490028	EPA 200.7	490117
60250360001	FAA-6-080717	EPA 200.8	489217	EPA 200.8	489263
60250360001	FAA-6-080717	EPA 245.1	491873	EPA 245.1	492022
60250360001	FAA-6-080717	EPA 903.1	267982		
60250360001	FAA-6-080717	EPA 904.0	267988		
60250360001	FAA-6-080717	Total Radium Calculation	269344		
60250360001	FAA-6-080717	SM 2540C	489132		
60250360001	FAA-6-080717	SM 4500-H+B	489010		
60250360001	FAA-6-080717	EPA 300.0	491643		



## Sample Condition Upon Receipt



Client Name: WStar Energy		
Courier: FedEx □ UPS □ VIA ☑ Clay □ P	EX 🗆 ECI 🗆	Pace ☐ Xroads ☐ Client ☐ Other ☐
Tracking #: Pace	Shipping Label Used	d? Yes □ Nø □
Custody Seal on Cooler/Box Present: Yes No 🗆	Seals intact: Yes	ſ No□
Packing Material: Bubble Wrap ☐ Bubble Bags ☐	Foam 🗆	Nope □ Other □
CF 00 CF +0 3	ice: Wet Blue No	ne
Cooler Temperature (°C): As-read Ø· Corr. Facto	or OF 0.0 CF +0.3 Correct	Date and initials of person examining contents:
Temperature should be above freezing to 6°C		DV8/8/17
Chain of Custody present:	Yes ONO ON/A	7 - 2 / - 2
Chain of Custody relinquished:	Zyes ONo ON/A	
Samples arrived within holding time:	✓Yes □No □N/A	
Short Hold Time analyses (<72hr):	Zyes □No □N/A	PH
	□Yes ☑No □N/A	
Rush Turn Around Time requested:	//	
Sufficient volume:	Yes No N/A	excessive volume received, entire IL
Correct containers used:	Yes □No □N/A	for in-house wetats analyses.
Pace containers used:	Ves □No □N/A	- not excessive volume
Containers intact:	Yes ONO ON/A	Amw 8/8/17
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No ☑N/A	
Filtered volume received for dissolved tests?	□Yes □No □N/A	
Sample labels match COC: Date / time / ID / analyses	Yes No N/A	
Samples contain multiple phases? Matrix:	—□Yes No □N/A	
Containers requiring pH preservation in compliance?	Yes □No □N/A	
(HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide)		
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)		
Cyanide water sample checks: N/A	□Yes □No	
Lead acetate strip turns dark? (Record only)		
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	
Trip Blank present:	□Yes □No □N/A	41
Headspace in VOA vials ( >6mm):	☐Yes ☐No ☐N/A	
Samples from USDA Regulated Area: State:	□Yes □No □N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	Yes No NA	
Client Notification/ Resolution: Copy COC to	Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/T	ime:	
Comments/ Resolution:		
-		
Almora)		2017
Project Manager Review:	_ Dat	



# **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

JC0001171	Section B Required Project Information:		Section C Invoice Information	n:		, I	Page:	of		
Company: WESTAR ENERGY	Report To: Brandon Griffin		Attention: Ja	ared Morrison						
Address: 818 Kansas Ave	Copy To: Jared Morrison, Heath Horn	iya	Company Name:	WESTAR ENERGY		REGULATORY AGENCY				
Topeka, KS 66612			Address:	SEE SECTION A		₩ NPDES  GROUND WATER  DRINKING WATER				
Email To: brandon.l.griffin@westarenergy.com	Purchase Order No.:		Pace Quole Reference:			F UST F RCRA	, Tu	OTHER		
Phone: (785) 575-8135 Fax:	Project Name: JEC CCR Groundwate	Г		eather Wilson, 913-563	3-1407	Site Location				
Requested Due Date/TAT: 7 DAY	Project Number.			357, 1		STATE: KS	· //////			
					Requested	Analysis Filtered (Y/N)	VIIIIIII			
Section D Valid Matrix C	odes 🔒 🕤			reservatives						
Required Client Information  MATRIX DRINKING WATER WASTE WATER WASTE WATER PRODUCT SOIL/SOLID OIL WIPE AIR (A-Z, 0-9 / ,-) Sample IDS MUST BE UNIQUE  1 FAA-6 ~ 0807/7 2 3 4 5 6	DOES CODE DW WT WW P SL OOL WP AR OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT TS  OT	COMPOSITE END/GRAB  DATE TIME S  WANTE LEWP AT COLLECTION	# OF CONTAINERS  Unpreserved  H <sub>2</sub> SO <sub>4</sub>	HCI NaOH Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> Methanol Other	200.7 Total Metals* 200.8 Total Metals** 245.1 Total Mercury 300.0 CI, FI, SO4	4500 H+B 2540C TDS Radium 226 Radium 228	Sesidual O Pace	250360  e Project No./ Lab I.D.  1 389/N 20 \omegas		
8										
9										
10										
11										
12			TIME	ACCEPTED BY	/ AEEU IATION	DATE TIME	SAN	IPLE CONDITIONS		
ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATI					8/8/17 6720	0111	VV		
*200.7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Li  **200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl	BJJ/ Wesk	8/7/17	1600	Janj	DAST.	9917 0726	0.1 ¥			
Pag								) ed		
ge 27 of 29	SAMPL	ER NAME AND SIGNATU PRINT Name of SAMPLER SIGNATURE of SAMPLER	Branden	Griffin	DATE Signed (MM/DD/YY):	08/07/17	Temp in °C Received on Ice (Y/N)	Custody Sealed Cooler (Y/N) Samples Intact (Y/N)		

# Chain of Custody



			IEC CCB		TER		Own	er Rec	eived	Date	: 8	3/8/201	7 Re	sults R	equested	By:	8/30/2017
	order: 60250360	Workorder N	ame:JEC CCR	t To	and the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of t							Reque	sted Ana	lysis	T T		
Pace 9608 Lene:	er Wilson Analytical Kansas Loiret Blvd. (a, KS 66219 e 1(913)563-1407	Pace Analytical Pittsburgh 1638 Roseytown Road Suites 2,3, & 4 Greensburg, PA 15601 Phone (724)850-5600						ntainers	Radium-228	Radium-226 & Total Radium						AND SECURIOR SECURITY OF THE SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR SECURIOR S	
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WO#:30226674

<sup>\*\*\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

Sample Condition Upon Rece	sipt P	ittst	ourg	n			
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Client Name:		)A(	<u></u>	KS	_ Proj	ect #	
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		of Ice	: We	t Blue None			• •
Cooler Temperature Observed Temp			Corr	rection Factor:	·c	Final Temp:_	°C
Temp should be above freezing to 6°C		-			]	ale and initials of	person examining
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Comments:	Yes	No	N/A				
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Chain of Custody Filled Out:		ļ	ļ	2.			
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Sampler Name & Signature on COC:	<u> </u>	-/	<u> </u>	4		<u> </u>	
Sample Labels match COC:	/	L	L	6.			
-includes date/time/ID Matrix:	MI		<del>-</del> -				
Samples Arrived within Hold Time:			ļ	6.			
Short Hold Time Analysis (<72hr remaining):		_	ļ	7			
Rush Turn Around Time Requested:			<u> </u>	8.			
Sufficient Volume:			ļ	9			
Correct Containers Used:				10.			
-Pace Containers Used:							
Containers intact;			DECEMBER 1	11			
Orthophosphate field filtered				12			
Organic Samples checked for dechlorination:				13.			
Fillered volume received for Dissolved tests				14.		<u></u> .	
All containers have been checked for preservation.				15. PI+	2		
All containers needing preservation are found to be in							
compliance with EPA recommendation.	[J			Inillal when	Date/th	me of .	
exceptions: VOA, coliform, TOC, O&G, Phenolics				completed 71	presen	/ation	
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- 100 Viole / Semmi:				16.			
Headspace in VOA Vlals ( >6mm):				17.			
Trip Blank Present:			/				
Trip Blank Custody Seals Present Rad Aqueous Samples Screened > 0.5 mrem/hr				Initial when 2+	Dale:	8191	7
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September 11, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

## Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on August 17, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Diantos m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification Hawaii Certification Idaho Certification

Illinois Certification

Indiana Certification Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457

Rhode Island Certification #: 65-00282 South Dakota Certification

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14

Nevada Certification #: PA014572015-1

New Jersey/TNI Certification #: PA 051

New Hampshire/TNI Certification #: 2976

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

#### **Kansas Certification IDs**

9608 Loiret Boulevard, Lenexa, KS 66219 WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097 Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055 Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070



## **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60251119001	FAA-6-081617	Water	08/16/17 14:22	08/17/17 07:50
60251119002	DUP-081617	Water	08/16/17 06:00	08/17/17 07:50



## **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60251119001	FAA-6-081617	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	NSM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60251119002	DUP-081617	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	NSM	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: September 11, 2017

#### **General Information:**

2 samples were analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: September 11, 2017

#### **General Information:**

2 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: September 11, 2017

#### **General Information:**

2 samples were analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method: EPA 903.1

**Description:** 903.1 Radium 226 **Client:** WESTAR ENERGY **Date:** September 11, 2017

#### **General Information:**

2 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method: EPA 904.0

Description: 904.0 Radium 228
Client: WESTAR ENERGY
Date: September 11, 2017

#### **General Information:**

2 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:September 11, 2017

#### **General Information:**

2 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method: SM 2540C

**Description:** 2540C Total Dissolved Solids

Client: WESTAR ENERGY

Date: September 11, 2017

#### **General Information:**

2 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: September 11, 2017

#### **General Information:**

2 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

- DUP-081617 (Lab ID: 60251119002)
- FAA-6-081617 (Lab ID: 60251119001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: September 11, 2017

#### **General Information:**

2 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 493302

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60251775001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2018407)
  - Sulfate

#### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



## **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Date: 09/11/2017 12:07 PM

Sample: FAA-6-081617	Lab ID: 602	251119001	Collected: 08/16/1	7 14:22	Received: 08	/17/17 07:50 ľ	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua	
200.7 Metals, Total	Analytical Met	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7				
Barium, Total Recoverable	0.065	mg/L	0.0050	1	08/25/17 12:14	08/28/17 18:09	7440-39-3		
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/25/17 12:14	08/28/17 18:09	7440-41-7		
Boron, Total Recoverable	2.9	mg/L	0.10	1	08/25/17 12:14	08/28/17 18:09	7440-42-8		
Calcium, Total Recoverable	141	mg/L	0.10	1	08/25/17 12:14	08/28/17 18:09	7440-70-2		
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	08/25/17 12:14	08/28/17 18:09	7440-47-3		
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	08/25/17 12:14				
ithium	0.016	mg/L	0.010	1	08/25/17 12:14	08/28/17 18:09	7439-93-2		
200.8 MET ICPMS	Analytical Met	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8				
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/23/17 15:28	08/28/17 16:59	7440-36-0		
Arsenic, Total Recoverable	0.0059	mg/L	0.0010	1	08/23/17 15:28	08/28/17 16:59	7440-38-2		
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/23/17 15:28	08/28/17 16:59	7440-43-9		
Cobalt, Total Recoverable	0.0011	mg/L	0.0010	1	08/23/17 15:28	08/28/17 16:59	7440-48-4		
Molybdenum, Total Recoverable	0.57	mg/L	0.0010	1	08/23/17 15:28	08/28/17 16:59	7439-98-7		
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/23/17 15:28	08/28/17 16:59	7782-49-2		
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/23/17 15:28	08/28/17 16:59	7440-28-0		
245.1 Mercury	Analytical Met	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1				
Mercury	<0.00020	mg/L	0.00020	1	09/06/17 16:45	09/07/17 12:57	7439-97-6		
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	OC						
Total Dissolved Solids	2330	mg/L	5.0	1		08/18/17 09:09	)		
1500H+ pH, Electrometric	Analytical Met	thod: SM 4500	)-H+B						
oH at 25 Degrees C	7.4	Std. Units	0.10	1		08/18/17 12:47	•	H6	
800.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	.0						
Chloride	69.0	mg/L	5.0	5		09/08/17 09:22	16887-00-6		
Fluoride	0.80	mg/L	0.20	1		09/06/17 19:22	16984-48-8		
Sulfate	1450	mg/L	200	200		09/08/17 09:37			



## **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Date: 09/11/2017 12:07 PM

Sample: DUP-081617	Lab ID: 602	251119002	Collected: 08/16/1	7 06:00	Received: 08	/17/17 07:50 ľ	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.061	mg/L	0.0050	1	08/25/17 12:14	08/28/17 17:21	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/25/17 12:14	08/28/17 17:21	7440-41-7	
Boron, Total Recoverable	3.1	mg/L	0.10	1	08/25/17 12:14	08/28/17 17:21	7440-42-8	
Calcium, Total Recoverable	139	mg/L	0.10	1	08/25/17 12:14	08/28/17 17:21	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	08/25/17 12:14	08/28/17 17:21	7440-47-3	
_ead, Total Recoverable	<0.0050	mg/L	0.0050	1	08/25/17 12:14	08/28/17 17:21	7439-92-1	
ithium	0.016	mg/L	0.010	1	08/25/17 12:14	08/28/17 17:21	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/23/17 15:28	08/28/17 17:06	7440-36-0	
Arsenic, Total Recoverable	0.0065	mg/L	0.0010	1	08/23/17 15:28	08/28/17 17:06	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/23/17 15:28	08/28/17 17:06	7440-43-9	
Cobalt, Total Recoverable	0.0011	mg/L	0.0010	1	08/23/17 15:28	08/28/17 17:06	7440-48-4	
Molybdenum, Total Recoverable	0.62	mg/L	0.0010	1	08/23/17 15:28	08/28/17 17:06	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/23/17 15:28	08/28/17 17:06	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/23/17 15:28	08/28/17 17:06	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	09/06/17 16:45	09/07/17 13:08	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC					
Total Dissolved Solids	2330	mg/L	5.0	1		08/18/17 09:10	)	
1500H+ pH, Electrometric	Analytical Met	hod: SM 4500	)-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		08/18/17 12:48	;	H6
800.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	.0					
Chloride	67.9	mg/L	5.0	5		09/08/17 09:52	16887-00-6	
Fluoride	0.89	mg/L	0.20	1		09/06/17 19:37	16984-48-8	
Sulfate	1530	mg/L	200	200		09/08/17 10:07		



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Date: 09/11/2017 12:07 PM

QC Batch: 492993 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60251119001, 60251119002

METHOD BLANK: 2017225 Matrix: Water

Associated Lab Samples: 60251119001, 60251119002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 09/07/17 12:52

LABORATORY CONTROL SAMPLE: 2017226

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0050 100 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2017227 2017228

MS MSD 60251119001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0048 97 70-130 2 20 Mercury mg/L < 0.00020 .005 .005 0.0049 95

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Date: 09/11/2017 12:07 PM

QC Batch: 491466 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60251119002

METHOD BLANK: 2011490 Matrix: Water

Associated Lab Samples: 60251119002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	08/28/17 17:03	
Beryllium	mg/L	< 0.0010	0.0010	08/28/17 17:03	
Boron	mg/L	< 0.10	0.10	08/28/17 17:03	
Calcium	mg/L	< 0.10	0.10	08/28/17 17:03	
Chromium	mg/L	< 0.0050	0.0050	08/28/17 17:03	
Lead	mg/L	< 0.0050	0.0050	08/28/17 17:03	
Lithium	mg/L	< 0.010	0.010	08/28/17 17:03	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
ium	mg/L		1.0	101	85-115	
llium	mg/L	1	1.0	100	85-115	
n	mg/L	1	0.96	96	85-115	
ım	mg/L	10	9.7	97	85-115	
nium	mg/L	1	0.98	98	85-115	
	mg/L	1	1.0	105	85-115	
n	mg/L	1	1.0	100	85-115	

MATRIX SPIKE & MATRIX SP	IKE DUPLICA	TE: 201149	92		2011493							
			MS	MSD								
	6	0250872002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	244 ug/L	1	1	1.3	1.3	106	102	70-130	3	20	
Beryllium	mg/L	ND	1	1	1.0	1.0	103	100	70-130	3	20	
Boron	mg/L	484 ug/L	1	1	1.5	1.5	104	100	70-130	3	20	
Calcium	mg/L	54900 ug/L	10	10	67.7	65.9	127	110	70-130	3	20	
Chromium	mg/L	ND	1	1	1.0	0.99	102	98	70-130	4	20	
Lead	mg/L	ND	1	1	1.0	1.0	103	100	70-130	3	20	
Lithium	mg/L	21.7 ug/L	1	1	1.1	1.0	103	101	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Date: 09/11/2017 12:07 PM

QC Batch: 491467 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60251119001

METHOD BLANK: 2011494 Matrix: Water

Associated Lab Samples: 60251119001

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	08/28/17 17:47	
Beryllium	mg/L	< 0.0010	0.0010	08/28/17 17:47	
Boron	mg/L	<0.10	0.10	08/28/17 17:47	
Calcium	mg/L	<0.10	0.10	08/28/17 17:47	
Chromium	mg/L	< 0.0050	0.0050	08/28/17 17:47	
Lead	mg/L	< 0.0050	0.0050	08/28/17 17:47	
Lithium	mg/L	<0.010	0.010	08/28/17 17:47	

LABORATORY CONTROL SAMPLE:	2011495					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	100	85-115	
Beryllium	mg/L	1	0.98	98	85-115	
Boron	mg/L	1	0.96	96	85-115	
Calcium	mg/L	10	9.5	95	85-115	
Chromium	mg/L	1	0.98	98	85-115	
_ead	mg/L	1	1.0	102	85-115	
ithium	mg/L	1	0.99	99	85-115	

MATRIX SPIKE & MATRIX SP	PIKE DUPLICA	TE: 201149	96		2011497							
			MS	MSD								
	6	0250975002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	5.9 ug/L	1	1	1.0	1.0	102	103	70-130	1	20	
Beryllium	mg/L	ND	1	1	1.0	1.0	100	101	70-130	1	20	
Boron	mg/L	136 ug/L	1	1	1.1	1.1	101	98	70-130	2	20	
Calcium	mg/L	16500 ug/L	10	10	26.3	26.7	98	102	70-130	1	20	
Chromium	mg/L	ND	1	1	1.0	1.0	102	100	70-130	2	20	
Lead	mg/L	ND	1	1	1.0	1.0	101	101	70-130	1	20	
Lithium	mg/L	ND	1	1	1.0	1.0	101	102	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Date: 09/11/2017 12:07 PM

QC Batch: 491169 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60251119001, 60251119002

METHOD BLANK: 2010358 Matrix: Water

Associated Lab Samples: 60251119001, 60251119002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	08/28/17 15:43	
Arsenic	mg/L	< 0.0010	0.0010	08/28/17 15:43	
Cadmium	mg/L	< 0.00050	0.00050	08/28/17 15:43	
Cobalt	mg/L	< 0.0010	0.0010	08/28/17 15:43	
Molybdenum	mg/L	< 0.0010	0.0010	08/28/17 15:43	
Selenium	mg/L	< 0.0010	0.0010	08/28/17 15:43	
Thallium	mg/L	< 0.0010	0.0010	08/28/17 15:43	

LABORATORY CONTROL SAMPLE:	2010359					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.040	100	85-115	
Arsenic	mg/L	.04	0.041	102	85-115	
Cadmium	mg/L	.04	0.040	99	85-115	
Cobalt	mg/L	.04	0.040	101	85-115	
Molybdenum	mg/L	.04	0.040	101	85-115	
Selenium	mg/L	.04	0.039	99	85-115	
Thallium	mg/L	.04	0.040	99	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	ATE: 201036	60		2010361							
			MS	MSD								
	6	60250784001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	<0.00013	.04	.04	0.037	0.036	91	89	70-130	3	20	
Arsenic	mg/L	0.00092J	.04	.04	0.036	0.036	88	87	70-130	1	20	
Cadmium	mg/L	<0.000089	.04	.04	0.032	0.031	80	79	70-130	2	20	
Cobalt	mg/L	0.0038J	.04	.04	0.039	0.038	87	86	70-130	1	20	
Molybdenum	mg/L	0.0048J	.04	.04	0.048	0.048	109	107	70-130	1	20	
Selenium	mg/L	< 0.00043	.04	.04	0.030	0.031	75	77	70-130	4	20	
Thallium	mg/L	<0.00018	.04	.04	0.033	0.033	83	81	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

QC Batch: 490385 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60251119001, 60251119002

METHOD BLANK: 2007444 Matrix: Water

Associated Lab Samples: 60251119001, 60251119002

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 08/18/17 08:57

LABORATORY CONTROL SAMPLE: 2007445

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 988 99 80-120

SAMPLE DUPLICATE: 2007446

60251157001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 621 4 10 **Total Dissolved Solids** 599 mg/L

SAMPLE DUPLICATE: 2007447

Date: 09/11/2017 12:07 PM

ParameterUnits60251157015 ResultDup ResultRPDMax RPDQualifiersTotal Dissolved Solidsmg/L371375110

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

QC Batch: 490368 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60251119001, 60251119002

SAMPLE DUPLICATE: 2007330

Date: 09/11/2017 12:07 PM

 Parameter
 Units
 60251056001 Result
 Dup Result
 Max RPD
 Max RPD
 Qualifiers

 pH at 25 Degrees C
 Std. Units
 8.7
 8.7
 0
 5 H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

QC Batch: 492909 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60251119001, 60251119002

METHOD BLANK: 2016940 Matrix: Water

Associated Lab Samples: 60251119001, 60251119002

Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 09/06/17 18:51

LABORATORY CONTROL SAMPLE: 2016941

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.5 2.5 100 90-110

MATRIX SPIKE SAMPLE: 2016944

Date: 09/11/2017 12:07 PM

60251775002 Spike MS MS % Rec Parameter Units Result Conc. Result % Rec Limits Qualifiers 0.52 105 80-120 Fluoride 2.5 3.1 mg/L

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Date: 09/11/2017 12:07 PM

QC Batch: 493302 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60251119001, 60251119002

METHOD BLANK: 2018405 Matrix: Water

Associated Lab Samples: 60251119001, 60251119002

Blank Reporting Parameter Result Limit Qualifiers Units Analyzed Chloride <1.0 1.0 09/08/17 08:52 mg/L Sulfate mg/L <1.0 1.0 09/08/17 08:52

LABORATORY CONTROL SAMPLE: 2018406 Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Chloride 5 4.8 97 90-110 mg/L Sulfate mg/L 5 5.0 99 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2018407 2018408 MSD MS 60251775001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** RPD Qual Chloride mg/L 31.7 50 50 82.5 81.3 102 99 80-120 2 15 Sulfate mg/L 142 50 50 203 197 121 110 80-120 3 15 M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Sample: FAA-6-081617 Lab ID: 60251119001 Collected: 08/16/17 14:22 Received: 08/17/17 07:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.529 \pm 0.522 \quad (0.794)$ Radium-226 pCi/L 08/29/17 20:47 13982-63-3 C:NA T:82% EPA 904.0  $0.401 \pm 0.374 \quad (0.760)$ Radium-228 pCi/L 08/31/17 16:19 15262-20-1 C:75% T:77% Total Radium Total Radium  $0.930 \pm 0.896 \quad (1.55)$ pCi/L 09/05/17 12:59 7440-14-4 Calculation



#### **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Sample: DUP-081617 Lab ID: 60251119002 Collected: 08/16/17 06:00 Received: 08/17/17 07:50 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1  $0.428 \pm 0.551 \quad (0.917)$ Radium-226 pCi/L 08/29/17 20:47 13982-63-3 C:NA T:89% EPA 904.0 0.617 ± 0.373 (0.689) Radium-228 pCi/L 08/31/17 16:19 15262-20-1 C:75% T:86% Total Radium Total Radium  $1.05 \pm 0.924$  (1.61) pCi/L 09/05/17 12:59 7440-14-4 Calculation



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

QC Batch: 269145 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60251119001, 60251119002

METHOD BLANK: 1324788 Matrix: Water

Associated Lab Samples: 60251119001, 60251119002

ParameterAct  $\pm$  Unc (MDC) Carr TracUnitsAnalyzedQualifiersRadium-2260.560  $\pm$  0.480 (0.650) C:NA T:80%pCi/L08/29/17 20:30

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

QC Batch: 269257 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60251119001, 60251119002

METHOD BLANK: 1325053 Matrix: Water

Associated Lab Samples: 60251119001, 60251119002

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.427 ± 0.337 (0.668) C:79% T:86%
 pCi/L
 08/31/17 16:17

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

## **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 09/11/2017 12:07 PM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



## **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251119

Date: 09/11/2017 12:07 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60251119001	FAA-6-081617	EPA 200.7	491467	EPA 200.7	491544
60251119002	DUP-081617	EPA 200.7	491466	EPA 200.7	491538
60251119001 60251119002	FAA-6-081617 DUP-081617	EPA 200.8 EPA 200.8	491169 491169	EPA 200.8 EPA 200.8	491198 491198
60251119001 60251119002	FAA-6-081617 DUP-081617	EPA 245.1 EPA 245.1	492993 492993	EPA 245.1 EPA 245.1	493149 493149
60251119001 60251119002	FAA-6-081617 DUP-081617	EPA 903.1 EPA 903.1	269145 269145		
60251119001 60251119002	FAA-6-081617 DUP-081617	EPA 904.0 EPA 904.0	269257 269257		
60251119001 60251119002	FAA-6-081617 DUP-081617	Total Radium Calculation Total Radium Calculation	270486 270486		
60251119001 60251119002	FAA-6-081617 DUP-081617	SM 2540C SM 2540C	490385 490385		
60251119001 60251119002	FAA-6-081617 DUP-081617	SM 4500-H+B SM 4500-H+B	490368 490368		
60251119001	FAA-6-081617	EPA 300.0	492909		
60251119001	FAA-6-081617	EPA 300.0	493302		
60251119002	DUP-081617	EPA 300.0	492909		
60251119002	DUP-081617	EPA 300.0	493302		



# Sample Condition Upon Receipt



Client Name: WS Fow Grungy						
Courier: FedEx □ UPS □ VIA Clay □	PEX 🗆 ECI 🗆	Pace ☐ Xroads ☐ Client ☐ Other ☐				
Tracking #: Pac	ce Shipping Label Used	d? Yes□ Nø□				
Custody Seal on Cooler/Box Present: Yes ☐ No ☐	Seals intact: Yes	No □				
Packing Material: Bubble Wrap ☐ Bubble Bags I	Foam 🗆	None □ Other □				
Thermometer Used: 1-266 / T-239 Type o	fice: Wet Blue Nor	Date and initials of person				
Cooler Temperature (°C): As-read 5 6 Corr. Fact	tor CFO CF +0.3 Correct	ted 3 - 3 examining contents:				
Temperature should be above freezing to 6°C		NO117/12				
Chain of Custody present:	Yes □No □N/A	1801 - 244 - 25 274				
Chain of Custody relinquished:	ZYes □No □N/A					
Samples arrived within holding time:	Yes No N/A					
Short Hold Time analyses (<72hr):	Yes □No □N/A	PH				
Rush Turn Around Time requested:	□Yes ∕□No □N/A					
Sufficient volume:	Yes 🗆 No 🗀 N/A					
Correct containers used:	Oyes □No □N/A					
Pace containers used:	☐Yes ☐No ☐N/A					
Containers intact:	Yes No N/A					
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No ☑N/A					
Filtered volume received for dissolved tests?	□Yes □No □N/A					
Sample labels match COC: Date / time / ID / analyses	Yes No N/A					
Samples contain multiple phases? Matrix: WT	□Yes □No □N/A					
Containers requiring pH preservation in compliance?	Yes \( \sum_{No} \sum_{N/A} \)					
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)						
Cyanide water sample checks: 1 N/A						
Lead acetate strip turns dark? (Record only)	☐Yes ☐No					
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No					
Trip Blank present:	□Yes □No ☑N/A					
Headspace in VOA vials ( >6mm):	□Yes □No N/A					
Samples from USDA Regulated Area: State:	□Yes □No □N/A	-				
Additional labels attached to 5035A / TX1005 vials in the field	? □Yes □No ZN/A					
Client Notification/ Resolution: Copy COC t	o Client? Y / N	Field Data Required? Y / N				
Person Contacted: Date/	Time:					
Comments/ Resolution:						
		dala				
Project Manager Review: Date:						



# **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

ection lequired	A Client Information:			Section B Required P		Inform	ation:						ion C e Infori	mation:													Pa	ge:		of		
ompany	WESTAR EN	ERGY	F	Report To:	Bran	ndon (	3riffin					Attent	ion:	Jar	ed M	orrisc	on															
ddress:	818 Kansas A	ve		Сору То:	Jare	d Mor	rrison, He	eath Horr	nya			Comp	any Na	ime:	WES	TAR	ENE	RGY				RE	GUL	ATOF	RY A	GENCY	′					
	Topeka, KS 6	66612								(8		Addre	ss:		SEE	SEC	TION	Α				Ñ	NP	DES	Г	GROUI	ND W	/ATE	3 L I	DRINKING	WATER	
mail To:	brandon.l.griff	fin@westarenergy	y.com F	ourchase C	order N	No :						Pace C Refere										15	US	Т	Г	RCRA			Г	THER	_	
hone:	(785) 575-8135	Fax:	F	Project Nan	ne:	JEC	CCR Gro	oundwate	er			Pace F Manag		He	ather	Wils	on, 91	13-56	3-14	107		S	ite Lo	ocatio		KS						
Requeste	ed Due Date/TAT:	7 DAY	F	Project Nun	nber.							Pace F	Profile #	96	57, 1								5	TATE.		NO		- 1				
																			R	leque	este	d Ana	alysi	s Filte	red (	Y/N)						
	Section D Required Client Information		d Matrix Co	des CODE	to left)	MP)		COLL	ECTED					Pre	serva	tives		↑N/A														
	SAMPL	WATE WAST PROD SOILS OIL WIPE AIR	ER V FE WATER V DUCT F SOLID S	SL OL WP AR	(see valid codes to left)	(G=GRAB C=COMP)	COMPC STAR		COMPOS END/GR	AB	AT COLLECTION	VERS						Test	Metals*	Wetals**		808 408						orine (Y/N)	( "		a	
ITEM #	(A-Z, 0-9 i Sample IDs MUST		R (	OT TS	MATRIX CODE	SAMPLE TYPE	DATE	TIME	DATE	TIME	SAMPLE TEMP	# OF CONTAINERS	Unpreserved	HNO <sub>3</sub>	HCI	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol	↓ Analysis		Total	245.1 Total I	300.0 Cl, Fl, 4500 H+B	2540C TDS	Radium 226				Residual Chlorine (Y/N)	Pace	25 (   1 ) Project N	o./ Lab	
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# **Chain of Custody**



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Hea Pac 960 Len	ther Wilson e Analytical Kansas 3 Loiret Blvd. exa, KS 66219 ne 1(913)563-1407		Pace 1638 Suites Greer	Analytical Pittst Roseytown Roa 22,3, & 4 Isburg, PA 156 (724)850-5600	nd							226 & Total Radium	white Re	queste	d Anal	ysis			
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3	DUP-081617	PS	8/16/2017 06:00	60251119002	Water	2			THE REAL PROPERTY OF THE PERSON NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUM	<del></del> }		X					Transmission in the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract o		<u> </u>
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	order to maintain aller to			tody Seal Y	or N		<u> </u>	Rece	ived	on lo	се	Υo	N)		***************************************	Sam	ples In	<u>ıtact 🗸</u>	Y or N

\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

WO#:30227610



# Sample Condition Upon Receipt Pittsburgh

(		_						
Face Analytical Client Name:		OF	115	168	Pi	roject#	£	
	<u></u>	ł	- 1	`				OM
Courler: Fed Ex UPS USPS C			ercial L	Pace Other			Lab	101
Tracking #: 778565958				<b>,</b>			LIMS Logi	
Custody Seal on Cooler/Box Present:			Seals Int		s 🔲 no			
Thermometer Used (A)	Туре			Blue (None	) .	_		* ^
Cooler Temperature Observed Temp		- °C	Correction	on Factor:		C Final	Temp:	- °C
Temp should be above freezing to 6°С						Date and	initials of per	son examining
Comments:	Yes	No	N/A			content	-4+	son examining
Chain of Custody Present:	-		1.			.,		
Chain of Custody Filled Out:			2.					
Chain of Custody Relinquished:			3.					
Sampler Name & Signature on COC:		7	4.					
Sample Labels match COC:			5.					
-includes date/lime/iD Matrix:	_ 					-		
Samples Arrived within Hold Time:			6,		,			
Short Hold Time Analysis (<72hr remaining):		1	7.					
Rush Turn Around Time Requested:			8.					
Sufficient Volume:			9.					
Correct Containers Used:			10.					
-Pace Conlainers Used;	/							
Containers Intact:	//		11.					
Orthophosphate field filtered			12,					
Organic Samples checked for dechlorination:	$\perp \perp$							
Fillered volume received for Dissolved tests			14.					
All containers have been checked for preservation,	1		15.	PHC	7			-
All containers needing preservation are found to be in compliance with EPA recommendation.				h of				Ī
·		I	Inilial w	then 7.	Dale/l	me of		
exceptions: VOA, coilform, TOC, O&G, Phenolics			comple		preser	vation		
			preserv	f added alive				
leadspace in VOA Vlals ( >6mm):			16.					
rlp Blank Present:		_   -	17.	•				
rip Blank Custody Seals Present			-					
ad Aqueous Samples Screened > 0,5 mrem/hr	.		initial wi complet		Date:	8/18	107	
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Person Contacled:		Date	e/Tlme: _		,	Contacted	В <u>у:</u>	
Comments/ Resolution:								
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→ A check in this box indicates that additi	onal info	ormatic	on has be	en stored li	n ereport	s.		

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.



September 18, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

#### Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on August 24, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Danson Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY



9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665



#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

Arkansas Certification

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683

Georgia Certification #: C040

Guam Certification Hawaii Certification

Idaho Certification

Illinois Certification

Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008

Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091

Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Cortification #: 42706

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14

North Carolina Certification #: 42706 North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282

Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 460198 Washington Certification #: C868 West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070





#### **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60251634001	FAA-6-082317	Water	08/23/17 13:13	08/24/17 07:09



#### **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60251634001	FAA-6-082317	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	SMW	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: September 18, 2017

#### **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: September 18, 2017

#### **General Information:**

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: September 18, 2017

#### **General Information:**

1 sample was analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method: EPA 903.1

Description: 903.1 Radium 226
Client: WESTAR ENERGY
Date: September 18, 2017

#### **General Information:**

1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method: EPA 904.0

Description: 904.0 Radium 228
Client: WESTAR ENERGY
Date: September 18, 2017

#### **General Information:**

1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### **Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:September 18, 2017

#### **General Information:**

1 sample was analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method: SM 2540C

**Description:** 2540C Total Dissolved Solids

Client: WESTAR ENERGY

Date: September 18, 2017

#### **General Information:**

1 sample was analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: September 18, 2017

#### **General Information:**

1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

• FAA-6-082317 (Lab ID: 60251634001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: September 18, 2017

#### **General Information:**

1 sample was analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



#### **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Date: 09/18/2017 09:02 AM

Sample: FAA-6-082317	Lab ID: 602	251634001	Collected: 08/23/1	7 13:13	Received: 08	8/24/17 07:09 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Me	thod: EPA 200	.7 Preparation Met	hod: EP	A 200.7			
Barium, Total Recoverable	0.065	mg/L	0.0050	1	08/25/17 12:14	08/28/17 17:32	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/25/17 12:14	08/28/17 17:32	7440-41-7	
Boron, Total Recoverable	2.9	mg/L	0.10	1	08/25/17 12:14	08/28/17 17:32	7440-42-8	
Calcium, Total Recoverable	143	mg/L	0.10	1	08/25/17 12:14	08/28/17 17:32	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	08/25/17 12:14	08/28/17 17:32	7440-47-3	
Lead, Total Recoverable	<0.0050	mg/L	0.0050	1	08/25/17 12:14	08/28/17 17:32	7439-92-1	
_ithium	0.011	mg/L	0.010	1	08/25/17 12:14	08/28/17 17:32	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	.8 Preparation Met	hod: EP	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/26/17 10:43	08/28/17 17:57	7440-36-0	
Arsenic, Total Recoverable	0.0054	mg/L	0.0010	1	08/26/17 10:43	08/28/17 17:57	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/26/17 10:43	08/28/17 17:57	7440-43-9	
Cobalt, Total Recoverable	0.0011	mg/L	0.0010	1	08/26/17 10:43	08/28/17 17:57	7440-48-4	
Molybdenum, Total Recoverable	0.53	mg/L	0.0010	1	08/26/17 10:43	08/28/17 17:57	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/26/17 10:43	08/28/17 17:57	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/26/17 10:43	08/28/17 17:57	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: EP	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	09/13/17 16:05	09/14/17 12:18	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	OC					
Total Dissolved Solids	2330	mg/L	5.0	1		08/26/17 15:34		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
oH at 25 Degrees C	7.5	Std. Units	0.10	1		08/26/17 14:44		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	.0					
Chloride	66.2	mg/L	5.0	5		09/13/17 12:57	16887-00-6	
Fluoride	0.81	mg/L	0.20	1		09/12/17 18:52	16984-48-8	
Sulfate	1350	mg/L	100	100		09/13/17 13:12	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

MATRIX SPIKE SAMPLE:

Date: 09/18/2017 09:02 AM

QC Batch: 494071 Analysis Method: EPA 245.1

QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury

Associated Lab Samples: 60251634001

METHOD BLANK: 2021073 Matrix: Water

Associated Lab Samples: 60251634001

Parameter Units Blank Reporting
Result Limit Analyzed Qualifiers

Mercury mg/L <0.00020 0.00020 09/14/17 12:07

LABORATORY CONTROL SAMPLE: 2021074

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0051 101 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2021075 2021076

2021077

MS MSD 60251633001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0044 85 70-130 20 Mercury mg/L < 0.00020 .005 .005 0.0042 88

60252592002 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers ND 70-130 Mercury mg/L .005 0.0049 98

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Date: 09/18/2017 09:02 AM

QC Batch: 491466 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60251634001

METHOD BLANK: 2011490 Matrix: Water

Associated Lab Samples: 60251634001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	08/28/17 17:03	
Beryllium	mg/L	< 0.0010	0.0010	08/28/17 17:03	
Boron	mg/L	<0.10	0.10	08/28/17 17:03	
Calcium	mg/L	<0.10	0.10	08/28/17 17:03	
Chromium	mg/L	< 0.0050	0.0050	08/28/17 17:03	
Lead	mg/L	< 0.0050	0.0050	08/28/17 17:03	
Lithium	mg/L	<0.010	0.010	08/28/17 17:03	

LABORATORY CONTROL SAMPLE:	2011491					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		1.0	101	85-115	
Beryllium	mg/L	1	1.0	100	85-115	
Boron	mg/L	1	0.96	96	85-115	
Calcium	mg/L	10	9.7	97	85-115	
Chromium	mg/L	1	0.98	98	85-115	
ead	mg/L	1	1.0	105	85-115	
ithium	mg/L	1	1.0	100	85-115	

MATRIX SPIKE & MATRIX SP	IKE DUPLICA	TE: 201149	92		2011493							
			MS	MSD								
	6	0250872002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	244 ug/L	1	1	1.3	1.3	106	102	70-130	3	20	
Beryllium	mg/L	ND	1	1	1.0	1.0	103	100	70-130	3	20	
Boron	mg/L	484 ug/L	1	1	1.5	1.5	104	100	70-130	3	20	
Calcium	mg/L	54900 ug/L	10	10	67.7	65.9	127	110	70-130	3	20	
Chromium	mg/L	ND	1	1	1.0	0.99	102	98	70-130	4	20	
Lead	mg/L	ND	1	1	1.0	1.0	103	100	70-130	3	20	
Lithium	mg/L	21.7 ug/L	1	1	1.1	1.0	103	101	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Date: 09/18/2017 09:02 AM

QC Batch: 491610 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60251634001

METHOD BLANK: 2012290 Matrix: Water

Associated Lab Samples: 60251634001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	08/28/17 17:32	
Arsenic	mg/L	< 0.0010	0.0010	08/28/17 17:32	
Cadmium	mg/L	< 0.00050	0.00050	08/28/17 17:32	
Cobalt	mg/L	< 0.0010	0.0010	08/28/17 17:32	
Molybdenum	mg/L	< 0.0010	0.0010	08/28/17 17:32	
Selenium	mg/L	< 0.0010	0.0010	08/28/17 17:32	
Thallium	mg/L	<0.0010	0.0010	08/28/17 17:32	

LABORATORY CONTROL SAMPLE:	2012291					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.038	96	85-115	
Arsenic	mg/L	.04	0.039	99	85-115	
Cadmium	mg/L	.04	0.038	96	85-115	
Cobalt	mg/L	.04	0.038	95	85-115	
Molybdenum	mg/L	.04	0.039	96	85-115	
Selenium	mg/L	.04	0.039	98	85-115	
Thallium	mg/L	.04	0.038	95	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 201229	92		2012293							
Parameter	6 Units	0251633001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/L	<0.0010	.04	.04	0.037	0.038	93	94	70-130	1	20	
Arsenic	mg/L	< 0.0010	.04	.04	0.040	0.040	97	98	70-130	1	20	
Cadmium	mg/L	< 0.00050	.04	.04	0.035	0.035	86	87	70-130	1	20	
Cobalt	mg/L	0.0013	.04	.04	0.037	0.038	90	91	70-130	1	20	
Molybdenum	mg/L	0.074	.04	.04	0.12	0.12	108	111	70-130	1	20	
Selenium	mg/L	< 0.0010	.04	.04	0.037	0.037	91	92	70-130	0	20	
Thallium	mg/L	< 0.0010	.04	.04	0.035	0.035	88	88	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

QC Batch: 491618 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60251634001

METHOD BLANK: 2012388 Matrix: Water

Associated Lab Samples: 60251634001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 08/26/17 15:28

LABORATORY CONTROL SAMPLE: 2012389

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 984 98 80-120

SAMPLE DUPLICATE: 2012392

60251710001 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 15700 2 10 **Total Dissolved Solids** 16000 mg/L

SAMPLE DUPLICATE: 2012393

Date: 09/18/2017 09:02 AM

60251710004 Dup Max RPD RPD Parameter Units Result Result Qualifiers 19000 **Total Dissolved Solids** mg/L 19000 0 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

QC Batch: 491501 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60251634001

SAMPLE DUPLICATE: 2011638

Date: 09/18/2017 09:02 AM

60251559001 Dup Max Parameter Units Result Result **RPD** RPD Qualifiers 5.8 pH at 25 Degrees C 5 H6 Std. Units 5.8 0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



EPA 300.0

300.0 IC Anions

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Date: 09/18/2017 09:02 AM

QC Batch: 493864 Analysis Method:
QC Batch Method: EPA 300.0 Analysis Description:

Associated Lab Samples: 60251634001

METHOD BLANK: 2020308 Matrix: Water

Associated Lab Samples: 60251634001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 09/12/17 15:38

LABORATORY CONTROL SAMPLE: 2020309

Parameter Units Spike LCS LCS % Rec Conc. Result % Rec Limits Qualifiers

Fluoride mg/L 2.5 2.3 91 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2020310 2020311

MS MSD 60252175001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual Fluoride ND 125 129 80-120 mg/L 125 125 103 100 3 15

MATRIX SPIKE SAMPLE: 2020312

MS MS 60252175002 Spike % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers ND 127 101 80-120 Fluoride mg/L 125

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.:

60251634

QC Batch:

Chloride

Sulfate

Chloride

Chloride

Sulfate

Sulfate

493957

QC Batch Method:

EPA 300.0

Analysis Method:

EPA 300.0

Analysis Description:

300.0 IC Anions

Associated Lab Samples: 60251634001

Parameter

METHOD BLANK: 2020640

Matrix: Water

Associated Lab Samples: 60251634001

Reporting Limit

Units

mg/L mg/L

60252145005

Result

Result <1.0

Blank

Analyzed
1.0 09/13/17 11:43

Qualifiers

Chloride mg/L Sulfate mg/L

<1.0

1.0 09/13/17 11:43

LABORATORY CONTROL SAMPLE: 2020641

Parameter Units

Spike
Conc.
5

MS

Spike

Conc.

5

LCS LCS
Result % Rec

4.6
4.8

2020643

MS

Result

28.9

64.0

10

92 Limits 92 90-110 97 90-110

% Rec

its Qualifiers 90-110

95

102

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

2020642

5.4

38.3

MSD

Spike
Conc.
25 25

20.1

25

MSD Result

29.0

63.8

MS MSD

We Rec

94

MS

103

Limits RPD 80-120 0

% Rec

80-120

% Rec

RPD RPD Qual 0 15 0 15

Max

MATRIX SPIKE SAMPLE:

Date: 09/18/2017 09:02 AM

Parameter

2020644

Units

mg/L

mg/L

Parameter Units

mg/L

mg/L

60252145006 Result

25

06 Spike Conc.

MS
Result
27.7

30.8

% Rec Lin

Limits Qualifiers 80-120 80-120

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Sample: FAA-6-082317 PWS:	<b>Lab ID: 6025163</b> Site ID:	<b>4001</b> Collected: 08/23/17 13:13 Sample Type:	Received:	08/24/17 07:09	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.358 ± 0.703 (1.26) C:NA T:71%	pCi/L	09/05/17 22:30	13982-63-3	
Radium-228	EPA 904.0	0.222 ± 0.384 (0.837) C:75% T:67%	pCi/L	09/07/17 15:58	3 15262-20-1	
Total Radium	Total Radium Calculation	0.580 ± 1.09 (2.10)	pCi/L	09/10/17 12:52	2 7440-14-4	



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

QC Batch: 269996 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60251634001

METHOD BLANK: 1328673 Matrix: Water

Associated Lab Samples: 60251634001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.209 ± 0.410 (0.750) C:NA T:87%
 pCi/L
 09/05/17 21:41

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

QC Batch: 270008 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60251634001

METHOD BLANK: 1328710 Matrix: Water

Associated Lab Samples: 60251634001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.475 ± 0.397 (0.799) C:78% T:78%
 pCi/L
 09/07/17 15:57

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

#### **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### ANALYTE QUALIFIERS

Date: 09/18/2017 09:02 AM

H6 Analysis initiated outside of the 15 minute EPA required holding time.



#### **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251634

Date: 09/18/2017 09:02 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60251634001	FAA-6-082317	EPA 200.7	491466	EPA 200.7	491538
60251634001	FAA-6-082317	EPA 200.8	491610	EPA 200.8	491629
60251634001	FAA-6-082317	EPA 245.1	494071	EPA 245.1	494160
60251634001	FAA-6-082317	EPA 903.1	269996		
60251634001	FAA-6-082317	EPA 904.0	270008		
60251634001	FAA-6-082317	Total Radium Calculation	271118		
60251634001	FAA-6-082317	SM 2540C	491618		
60251634001	FAA-6-082317	SM 4500-H+B	491501		
60251634001	FAA-6-082317	EPA 300.0	493864		
60251634001	FAA-6-082317	EPA 300.0	493957		



## Sample Condition Upon Receipt

# WO#:60251634

Client Name: Wes Far Energy	
Courier: FedEx UPS VIA Clay PEX ECI	Pace ☐ Xroads ☐ Client ☐ Other ☐
Tracking #: Pace Shipping Label Us	sed? Yes □ No □
Custody Seal on Cooler/Box Present: Yes ✓ No □ Seals intact: Yes	No 🗆
Packing Material: Bubble Wrap □ Bubble Bags □ Foam □	None □ Other □
Thermometer Used: (F-266 / T-239) Type of Ice: (Vet Blue N	
Cooler Temperature (°C): As-read / G Corr. Factor CF-0.3 Corre	Date and initials of person examining contents:
Temperature should be above freezing to 6°C	pv8/24/17
Chain of Custody present: Yes □No □N/	Α
Chain of Custody relinquished: Yes □No □N/	Α
Samples arrived within holding time:	A
Short Hold Time analyses (<72hr): ₽9/24 (1) res 1/2ho □N/2	a PH
Rush Turn Around Time requested:	4
Sufficient volume:	A
Correct containers used: Д́Yes □No □N//	4
Pace containers used: ☑Yes ☐No ☐N//	A
Containers intact: ∠Yes □No □N//	Α.
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	4
Filtered volume received for dissolved tests?	A
Sample labels match COC: Date / time / ID / analyses	4
Samples contain multiple phases? Matrix:	A .
Containers requiring pH preservation in compliance? Yes □No □N//	A
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide)	-
Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)  Cyanide water sample checks: 🗷 N/A	
_ead acetate strip tums dark? (Record only)	
Potassium iodide test strip turns blue/purple? (Preserve) □Yes □No	
Frip Blank present: □Yes □No □Will	A
Headspace in VOA vials ( >6mm): □Yes □No ☑N/A	Α
Samples from USDA Regulated Area: State:	A
Additional labels attached to 5035A / TX1005 vials in the field?   Yes   No   No	<b>\</b>
Client Notification/ Resolution: Copy COC to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/Time:	
Comments/ Resolution:	*
Project Manager Review: Da	ate: 8/24/17
- William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - William - Will	



## **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

	Section B Required Pro	ject Inform	nation:				1		e Inform	mation	1												Pa	age:		of	1
ompany: WESTAR ENERGY	Report To: Brandon Griffin						ľ	Attention: Jared Morrison														1					
ddress: 818 Kansas Ave	Copy To: Jared Morrison, Heath Hornya						Company Name: WESTAR ENERGY REGULATORY AGEN							GENC.	Υ												
Topeka, KS 66612							1	Addre:	ss:		SEE	SEC	TION	1 A	1			Ĭ^	NP	DES	Г	GROU	JND V	VATE	R 🗆	DRINKING	WATER
mail To: brandon.l.griffin@westarenergy.com	Purchase Ord	ier No.						Pace C Refere											US	Т	П	RCRA				OTHER	
hone: (785) 575-8135 Fax:	Project Name:	JEC	CCR Gro	oundwate	er		- 1	Pace P Manag	er.		ather	Wils	on, 9	13-5	63-1	407		S	ite Lo	cation		KS					
equested Due Date/TAT: 7 DAY	Project Number	er:							rofile #:	96	57, 1									TATE:	_		<u>-</u>	— <i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>			
															_	Requ	este	d An	alysis	Filte	red (	Y/N)					
Section D Valid Matrix Co Required Client Information MATRIX	des	o left)		COLLI	ECTED					Pre	serva	atives	S	N/A													
WATER WASTE WATER PRODUCT SOIL/SOLID OIL  WIPE AIR (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE  WATER WATER PRODUCT SOIL/SOLID OIL TISSUE	OL WP AR OT TS	RIX CODE (see valid codes to left)  LE TYPE (G=GRAB C=COMP)	COMPC		COMPOS END/GR	iTE AB	PLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	33		5 <sub>2</sub> O <sub>3</sub>	Methanol	Other   Analysis Tost	7 Total Metals*	Total	1 Total Mercury	300.0 Cl, Fl, SO4 4500 H+B	2540C TDS	Radium 226 Radium 228				Residual Chlorine (Y/N)	60	N516	34
# E		MATRIX	DATE	TIME	DATE	TIME	SAMPLE	# P	Unpre	HNO <sub>3</sub>	ᄝ	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Meth	Other	7007	00.	245.1	500	2540	Radium				Resi	Pace	Project N	lo./ Lab I.D.
1 FAA-6-082317		VI G	2.,,,_		8/23			4	1	3	-				1	1,	<u> </u>	1	1		$\Box$		П	$\Box$		3BP	
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3																											
4															L						$\sqcup$			Ш			
5													$\sqcup$	_	L												
6													$\sqcup$			_		1			$\square$		$\perp$	$\sqcup$			
7							Ш				$\sqcup$	_	$\sqcup$	_		_		4	$\sqcup$		$\square$		$\perp$	Н			
8														_									$\perp$	Ш			
9									Ш	4		$\perp$	$\sqcup$	_				4	$\sqcup$	_			$\perp$	Ш			
10											Ш	$\perp$	$\sqcup$						$\sqcup$	$\perp$				Ш			
11												_			L									Ш			
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ADDITIONAL COMMENTS	F	RELINQU	ISHED BY			DATE			IME			-	_	_		FFILIA	TION			ATE,		TIME		je.	SAMP	LE CONDIT	IONS
200.7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Li	17	21	1/w	estar		8/23	117	14	115			M	<u>in</u>	P	45	_			8/	24/17	6	201	1-	8	7	7	У
*200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl	'			1							,			1													
							_			-									$\vdash$		-		+	-			
Page 28 of 30					ER NAME A PRINT Nam SIGNATUR	e of SAMP	LER:	3	ran	da		êri	FF	14		DATE (MM/E	Signe	d 02	8/2	3/1	17			Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

# **Chain of Custody**



						Own	er Re	r: 9/18/2017						
Report To	Subcontract To						Requested Analysis							
Heather Wilson Pace Analytical Kansas 9608 Loiret Blvd. Lenexa, KS 66219 Phone 1(913)563-1407	Pace Analytical Pittsburgh 1638 Roseytown Road Suites 2,3, & 4 Greensburg, PA 15601 Phone (724)850-5600					erved Con	tainers	Radium-228	n-226 & Total Radium		30228488			
Item   Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	HN03				Radium-226	3022848	\$ <b>8</b>	LAB USE ONLY		
1 FAA-6-082317	PS	8/23/2017 13:13	60251634001	Water	2			+	X					
2												001_		
3														
4		7/2							1					
5														
	0.890,031035.0	55.06 NASSE 991 97 9916					Hadiğiri (Ç				Comments			
Transfers Released By		Date/Time	Received B	4			Date/	Time			*****			
1 Bank Vf		J/W//7 /	700	<del></del>	_ر		13/2	عرب	14.20	>				
2		<u> </u>		1				-						
Caslar Town					<del></del>		<u> </u>					<u> </u>		
Cooler Temperature on Receipt	4	°C   Cus	tody Seal Y	or (N		Rece	eived	on lc	e Y	or(N)	Samples Intact	or N		

<sup>\*</sup>In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

Pittsburgh Lab Sample Conc	lition	Upo	n F	Receipt	3022848
Face Analytical Client Name:		1	19-17	E, 148	Project #
	. $\Box$	· · · · · ·		I El Basa Othor	Label 7th
Courier: Fed Ex UPS USPS Clie		Comm	iercia	La Pace Oillei _	LIMS Login MM/
Tracking #: 77856596198		-			man Abbat and a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second
Custody Seal on Cooler/Box Present: 📋 yes					_] no
Thermometer Used	Туре	of Ice:	: We	et Blue (None	*C =:! T
Cooler Temperature Observed Temp		°C	Cor	rection Factor:	°C Final Temp: — °C
Temp should be above freezing to 6°C					Date and Initials of person examining
	re7		1	<del>,                                    </del>	Date and Initials of person examining contents: 714 812917
Comments:	Yes	No	N/A		And the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of t
Chain of Custody Present:	-			1.	
Chain of Custody Filled Out:	1			2.	-
Chain of Custody Relinquished:	_		<u> </u>	3.	
Sampler Name & Signature on COC:	<u> </u>			4.	
Sample Labels match COC:			<u> </u>	5.	
-Includes date/time/ID Matrix:	<b>ω</b> τ		=		
Samples Arrived within Hold Time:				6.	
Short Hold Time Analysis (<72hr remaining):	ļ			7.	
Rush Turn Around Time Requested:	<u> </u>			8.	
Sufficient Volume:				9.	
Correct Containers Used:				10.	
-Pace Containers Used:					
Containers Intact:	-			11.	
Orthophosphate field filtered			ş	12.	
Hex Cr Aqueous Compliance/NPDES sample field filtered				13.	
Organic Samples checked for dechlorination:		Ì	*****	14.	
Filtered volume received for Dissolved tests				15.	
All containers have been checked for preservation.	-	ĺ		16. PHL-	7
All containers needing preservation are found to be in				1	
compliance with EPA recommendation.				1-11-1-1-1-1-1	Date/lime of
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed 24	preservation
Oxeoptia:122 7 = 0 1				Lot # of added	
				preservative	
Headspace in VOA Vials ( >6mm):				17.	
Trip Blank Present:				18.	VA.
Trip Blank Custody Seals Present  Rad Aqueous Samples Screened > 0.5 mrem/hr				Initial when	
Rad Aqueous Samples Screened > 0.5 menting				completed: 24	Date: 8(29(19
Client Notification/ Resolution:					
Person Contacted:			Date/1	ſime:	Contacted By:
Comments/ Resolution:					
and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	<u>.</u>				

 $\ \square$  A check in this box indicates that additional information has been stored in ereports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.



September 21, 2017

Brandon Griffin Westar Energy 818 S. Kansas Ave Topeka, KS 66612

RE: Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

#### Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on August 29, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Danie M. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

**Enclosures** 

cc: HEATH HORYNA, WESTAR ENERGY
Adam Kneeling, Haley & Aldrich, Inc.
JARED MORRISON, WESTAR ENERGY







#### **CERTIFICATIONS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification

Indiana Certification lowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification

Missouri Certification #: 235

Montana Certification #: Cert 0082

Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976 New Jersey/TNI Certification #: PA 051

New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190

Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282

South Dakota Certification

Tennessee Certification #: TN2867

Texas/TNI Certification #: T104704188-14-8 Utah/TNI Certification #: PA014572015-5 USDA Soil Permit #: P330-14-00213 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 460198 Washington Certification #: C868 West Virginia DEP Certification #: 143

West Virginia DHHR Certification #: 9964C Wisconsin Certification

Wyoming Certification #: 8TMS-L

**Kansas Certification IDs** 

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01 Arkansas Certification #: 15-016-0 Illinois Certification #: 003097

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055 Nevada Certification #: KS000212008A Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070





#### **SAMPLE SUMMARY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60251947001	FAA-6-082817	Water	08/28/17 14:48	08/29/17 07:05



## **SAMPLE ANALYTE COUNT**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60251947001	FAA-6-082817	EPA 200.7	TDS	7	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	JRS	1	PASI-K
		EPA 903.1	WRR	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	RMK	1	PASI-PA
		SM 2540C	JSS	1	PASI-K
		SM 4500-H+B	HMM	1	PASI-K
		EPA 300.0	OL	3	PASI-K



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: EPA 200.7

Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: September 21, 2017

#### **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 491981

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60251805001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2013432)
  - Calcium
- MSD (Lab ID: 2013433)
  - Calcium



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: EPA 200.8

Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: September 21, 2017

#### **General Information:**

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### **Sample Preparation:**

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### **Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 491980

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60251805002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2013426)
  - Antimony
  - Arsenic
  - Cadmium
  - Cobalt
  - Selenium
- MSD (Lab ID: 2013427)
  - Antimony
  - Arsenic
  - Cadmium
  - Cobalt
  - Selenium





#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: EPA 200.8

Description:200.8 MET ICPMSClient:WESTAR ENERGYDate:September 21, 2017



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: EPA 245.1
Description: 245.1 Mercury
Client: WESTAR ENERGY
Date: September 21, 2017

#### **General Information:**

1 sample was analyzed for EPA 245.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 245.1 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: EPA 903.1

Description: 903.1 Radium 226
Client: WESTAR ENERGY
Date: September 21, 2017

#### **General Information:**

1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: EPA 904.0

Description: 904.0 Radium 228
Client: WESTAR ENERGY
Date: September 21, 2017

#### **General Information:**

1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method:Total Radium CalculationDescription:Total Radium 228+226Client:WESTAR ENERGYDate:September 21, 2017

#### **General Information:**

1 sample was analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: SM 2540C

**Description: 2540C Total Dissolved Solids** 

Client: WESTAR ENERGY

Date: September 21, 2017

#### **General Information:**

1 sample was analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: September 21, 2017

#### **General Information:**

1 sample was analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

• FAA-6-082817 (Lab ID: 60251947001)

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.



#### **PROJECT NARRATIVE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: September 21, 2017

#### **General Information:**

1 sample was analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.



#### **ANALYTICAL RESULTS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Date: 09/21/2017 12:09 PM

Sample: FAA-6-082817	Lab ID: 602	251947001	Collected: 08/28/1	7 14:48	Received: 08	/29/17 07:05 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
200.7 Metals, Total	Analytical Met	hod: EPA 200	).7 Preparation Met	hod: EF	A 200.7			
Barium, Total Recoverable	0.065	mg/L	0.0050	1	08/29/17 12:19	08/30/17 14:27	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/29/17 12:19	08/30/17 14:27	7440-41-7	
Boron, Total Recoverable	2.6	mg/L	0.10	1	08/29/17 12:19	08/30/17 14:27	7440-42-8	
Calcium, Total Recoverable	136	mg/L	0.10	1	08/29/17 12:19	08/30/17 14:27	7440-70-2	
Chromium, Total Recoverable	< 0.0050	mg/L	0.0050	1	08/29/17 12:19	08/30/17 14:27	7440-47-3	
Lead, Total Recoverable	< 0.0050	mg/L	0.0050	1	08/29/17 12:19	08/30/17 14:27	7439-92-1	
_ithium	0.012	mg/L	0.010	1	08/29/17 12:19	08/30/17 14:27	7439-93-2	
200.8 MET ICPMS	Analytical Met	hod: EPA 200	0.8 Preparation Met	hod: EF	A 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	08/29/17 12:19	09/05/17 11:49	7440-36-0	
Arsenic, Total Recoverable	0.0051	mg/L	0.0010	1	08/29/17 12:19	09/05/17 11:49	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	08/29/17 12:19	09/05/17 11:49	7440-43-9	
Cobalt, Total Recoverable	0.0012	mg/L	0.0010	1	08/29/17 12:19	09/05/17 11:49	7440-48-4	
Molybdenum, Total Recoverable	0.48	mg/L	0.0010	1	08/29/17 12:19	09/05/17 11:49	7439-98-7	
Selenium, Total Recoverable	0.0011	mg/L	0.0010	1	08/29/17 12:19	09/05/17 11:49	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	08/29/17 12:19	09/05/17 11:49	7440-28-0	
245.1 Mercury	Analytical Met	hod: EPA 245	5.1 Preparation Met	hod: EF	A 245.1			
Mercury	<0.00020	mg/L	0.00020	1	09/18/17 12:44	09/18/17 16:01	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	hod: SM 2540	OC					
Total Dissolved Solids	2340	mg/L	5.0	1		08/29/17 10:51		
1500H+ pH, Electrometric	Analytical Met	hod: SM 4500	0-H+B					
oH at 25 Degrees C	7.4	Std. Units	0.10	1		08/30/17 12:57		H6
300.0 IC Anions 28 Days	Analytical Met	hod: EPA 300	0.0					
Chloride	66.8	mg/L	5.0	5		09/20/17 11:00	16887-00-6	
Fluoride	0.80	mg/L	0.20	1		09/19/17 16:09	16984-48-8	
Sulfate	1390	mg/L	100	100		09/20/17 11:14	14808-79-8	



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

METHOD BLANK:

Date: 09/21/2017 12:09 PM

Mercury

QC Batch: 494528
QC Batch Method: EPA 245.1

Associated Lab Samples: 60251947001

Analysis Method: EPA 245.1
Analysis Description: 245.1 Mercury

2023233 Matrix: Water

Associated Lab Samples: 60251947001

 Parameter
 Units
 Blank Reporting Result
 Limit
 Analyzed
 Qualifiers

 mg/L
 <0.00020</td>
 0.00020
 09/18/17 15:57

LABORATORY CONTROL SAMPLE: 2023234

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Mercury mg/L .005 0.0054 109 85-115

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2023235 2023236

MS MSD 60251947001 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.0051 70-130 3 20 Mercury mg/L < 0.00020 .005 .005 0.0049 98 101

MATRIX SPIKE SAMPLE: 2023237

60253227001 Spike MS MS % Rec % Rec Parameter Units Result Conc. Result Limits Qualifiers 0.0051 ND 100 70-130 Mercury mg/L .005

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Date: 09/21/2017 12:09 PM

QC Batch: 491981 Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60251947001

METHOD BLANK: 2013430 Matrix: Water

Associated Lab Samples: 60251947001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	08/30/17 14:00	
Beryllium	mg/L	< 0.0010	0.0010	08/30/17 14:00	
Boron	mg/L	<0.10	0.10	08/30/17 14:00	
Calcium	mg/L	<0.10	0.10	08/30/17 14:00	
Chromium	mg/L	< 0.0050	0.0050	08/30/17 14:00	
Lead	mg/L	< 0.0050	0.0050	08/30/17 14:00	
Lithium	mg/L	<0.010	0.010	08/30/17 14:00	

LABORATORY CONTROL SAMPLE:	2013431					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L		0.99	99	85-115	
Beryllium	mg/L	1	0.99	99	85-115	
Boron	mg/L	1	0.96	96	85-115	
Calcium	mg/L	10	9.6	96	85-115	
Chromium	mg/L	1	0.98	98	85-115	
Lead	mg/L	1	1.0	103	85-115	
Lithium	mg/L	1	0.99	99	85-115	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	ATE: 20134	32		2013433							
			MS	MSD								
	6	0251805001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	0.12	1	1	1.2	1.2	106	105	70-130	1	20	
Beryllium	mg/L	< 0.00033	1	1	1.0	1.0	104	102	70-130	2	20	
Boron	mg/L	1.8	1	1	2.9	2.8	109	98	70-130	4	20	
Calcium	mg/L	537	10	10	539	528	24	-87	70-130	2	20	M1
Chromium	mg/L	< 0.0014	1	1	1.0	0.98	103	98	70-130	5	20	
Lead	mg/L	0.0028J	1	1	0.89	0.91	89	91	70-130	2	20	
Lithium	mg/L	0.54	1	1	1.8	1.7	124	119	70-130	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Date: 09/21/2017 12:09 PM

QC Batch: 491980 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET

Associated Lab Samples: 60251947001

METHOD BLANK: 2013424 Matrix: Water

Associated Lab Samples: 60251947001

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	09/05/17 11:42	
Arsenic	mg/L	< 0.0010	0.0010	09/05/17 11:42	
Cadmium	mg/L	< 0.00050	0.00050	09/05/17 11:42	
Cobalt	mg/L	< 0.0010	0.0010	09/05/17 11:42	
Molybdenum	mg/L	< 0.0010	0.0010	09/05/17 11:42	
Selenium	mg/L	< 0.0010	0.0010	09/05/17 11:42	
Thallium	mg/L	< 0.0010	0.0010	09/05/17 11:42	

LABORATORY CONTROL SAMPLE:	2013425	Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	.04	0.040	100	85-115	
Arsenic	mg/L	.04	0.041	102	85-115	
Cadmium	mg/L	.04	0.040	101	85-115	
Cobalt	mg/L	.04	0.040	101	85-115	
Molybdenum	mg/L	.04	0.041	102	85-115	
Selenium	mg/L	.04	0.040	101	85-115	
Thallium	mg/L	.04	0.039	98	85-115	

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 20134:	26		2013427							
			MS	MSD								
	6	0251805002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	mg/L	0.00011J	.04	.04	0.027	0.027	67	67	70-130	0	20	M1
Arsenic	mg/L	0.0022	.04	.04	0.027	0.027	63	63	70-130	1	20	M1
Cadmium	mg/L	<0.000018	.04	.04	0.022	0.022	55	55	70-130	0	20	M1
Cobalt	mg/L	0.0072	.04	.04	0.034	0.034	67	67	70-130	0	20	M1
Molybdenum	mg/L	0.0074	.04	.04	0.042	0.041	86	84	70-130	2	20	
Selenium	mg/L	<0.000086	.04	.04	0.022	0.022	55	55	70-130	1	20	M1
Thallium	mg/L	<0.00018	.04	.04	0.035	0.035	87	88	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

QC Batch: 491906 Analysis Method: SM 2540C

QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60251947001

METHOD BLANK: 2013226 Matrix: Water

Associated Lab Samples: 60251947001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Total Dissolved Solids mg/L <5.0 5.0 08/29/17 09:32

LABORATORY CONTROL SAMPLE: 2013227

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers **Total Dissolved Solids** mg/L 1000 977 98 80-120

SAMPLE DUPLICATE: 2013228

60251761003 Dup Max **RPD RPD** Parameter Units Result Result Qualifiers 468 0 10 **Total Dissolved Solids** 467 mg/L

SAMPLE DUPLICATE: 2013229

Date: 09/21/2017 12:09 PM

Parameter Units 60251856007 Dup Result RPD AND Qualifiers

Total Dissolved Solids mg/L 159 162 1 10

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

QC Batch: 492191 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 60251947001

SAMPLE DUPLICATE: 2014091

Date: 09/21/2017 12:09 PM

60251920001 Dup Max Parameter Units Result Result **RPD** RPD Qualifiers pH at 25 Degrees C 8.1 5 H6 Std. Units 8.1 0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Date: 09/21/2017 12:09 PM

QC Batch: 494740 Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60251947001

METHOD BLANK: 2023778 Matrix: Water

Associated Lab Samples: 60251947001

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Fluoride mg/L <0.20 0.20 09/19/17 15:40

LABORATORY CONTROL SAMPLE: 2023779

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Fluoride mg/L 2.3 93 90-110

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



JEC CCR GROUNDWATER Project:

Pace Project No.:

60251947

QC Batch:

494891

QC Batch Method: EPA 300.0 Analysis Method:

EPA 300.0

Analysis Description:

300.0 IC Anions

Associated Lab Samples: 60251947001

METHOD BLANK:

2024673

Matrix: Water

Associated Lab Samples:

60251947001

Blank

Reporting Limit

Units

Result <1.0 Analyzed

Qualifiers

mg/L mg/L

<1.0

1.0 09/20/17 10:02 1.0 09/20/17 10:02

LABORATORY CONTROL SAMPLE:

Parameter

Parameter

MATRIX SPIKE SAMPLE:

Date: 09/21/2017 12:09 PM

Parameter

2024674

Spike Conc. 5

LCS Result % Rec 4.7

% Rec Limits

90-110

Qualifiers

Chloride Sulfate

Chloride

Sulfate

mg/L mg/L

7573568001

Result

Units

5

4.8

2024676

LCS

10

802

1430

94 96

27.5

1340

2000

90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

2024675

17.8

MSD MS Spike Spike Conc. Conc.

10

MS MSD Result Result

27.5

500

MS % Rec

MSD % Rec % Rec Limits

97

115

Max **RPD** RPD 0

15

Qualifiers

Qual

Chloride

Chloride

Sulfate

2024677

Parameter Units mg/L mg/L

Units

mg/L

60252961001 Result

MS Spike Conc. Result 500

MS % Rec

98

% Rec Limits 108 80-120

80-120

80-120

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Sample: FAA-6-082817 Lab ID: 60251947001 Collected: 08/28/17 14:48 Received: 08/29/17 07:05 Matrix: Water PWS: Site ID: Sample Type: Act ± Unc (MDC) Carr Trac **Parameters** Method Units Analyzed CAS No. Qual EPA 903.1 0.162 ± 0.382 (0.707) Radium-226 pCi/L 09/11/17 13:00 13982-63-3 C:NA T:88% EPA 904.0  $0.710 \pm 0.431 \quad (0.798)$ Radium-228 pCi/L 09/13/17 14:57 15262-20-1 C:72% T:85% Total Radium Total Radium 0.872 ± 0.813 (1.51) pCi/L 09/19/17 17:10 7440-14-4 Calculation



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

QC Batch: 270146 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60251947001

METHOD BLANK: 1329311 Matrix: Water

Associated Lab Samples: 60251947001

 Parameter
 Act  $\pm$  Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-228
 0.456  $\pm$  0.437 (0.897) C:77% T:69%
 pCi/L
 09/13/17 14:56

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

QC Batch: 270142 Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60251947001

METHOD BLANK: 1329307 Matrix: Water

Associated Lab Samples: 60251947001

 Parameter
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 Qualifiers

 Radium-226
 0.475 ± 0.377 (0.490) C:NA T:89%
 pCi/L
 09/11/17 12:19

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

#### **LABORATORIES**

PASI-K Pace Analytical Services - Kansas City
PASI-PA Pace Analytical Services - Greensburg

#### **ANALYTE QUALIFIERS**

Date: 09/21/2017 12:09 PM

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.



#### **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: JEC CCR GROUNDWATER

Pace Project No.: 60251947

Date: 09/21/2017 12:09 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60251947001	FAA-6-082817	EPA 200.7	491981	EPA 200.7	492041
60251947001	FAA-6-082817	EPA 200.8	491980	EPA 200.8	492040
60251947001	FAA-6-082817	EPA 245.1	494528	EPA 245.1	494640
60251947001	FAA-6-082817	EPA 903.1	270142		
60251947001	FAA-6-082817	EPA 904.0	270146		
60251947001	FAA-6-082817	Total Radium Calculation	272308		
60251947001	FAA-6-082817	SM 2540C	491906		
60251947001	FAA-6-082817	SM 4500-H+B	492191		
60251947001	FAA-6-082817	EPA 300.0	494740		
60251947001	FAA-6-082817	EPA 300.0	494891		



## Sample Condition Upon Receipt



Client Name: Wester Energy			
Courier: FedEx □ UPS □ VIA □ Clay □ F	PEX 🗆 ECI 🗆	Pace   Xroads	Client □ Other □
Tracking #: Page	e Shipping Label Used	? Yes□ No□	
Custody Seal on Cooler/Box Present: Yes ☐ No ☐	Seals intact: Yes	No □	
Packing Material: Bubble Wrap □ Bubble Bags □	□ Foam □	None Othe	er 🗆
Thermometer Used: T 266 / T-239 Type of	fice: We Blue Nor	ne	Date and initials of person
Cooler Temperature (°C): As-read 17 Corr. Fact	or CF 0.0 CF +0.3 Correct	ed <u>/ 7</u>	examining contents:
Temperature should be above freezing to 6°C			M8129/17
Chain of Custody present:	Ves □No □N/A		
Chain of Custody relinquished:	Yes No N/A		
Samples arrived within holding time:	Yes No N/A		
Short Hold Time analyses (<72hr):	Yes □No □N/A	PH	
Rush Turn Around Time requested:	□Yes No □N/A		
Sufficient volume:	☑Yes ☐No ☐N/A		
Correct containers used:	□yes □No □N/A		
Pace containers used:	Yes □No □N/A		
Containers intact:	Yes ONo ON/A		
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A		
Filtered volume received for dissolved tests?	□Yes □No ☑N/A		
Sample labels match COC: Date / time / ID / analyses	□yes □No □N/A		
Samples contain multiple phases? Matrix:	□Yes □No □N/A		
Containers requiring pH preservation in compliance?	Yes □No □N/A		
(HNO₃, H₂SO₄, HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPḤ, OK-DRO)			
Cyanide water sample checks: N/A			
Lead acetate strip turns dark? (Record only)	□Yes □No		
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No		
Trip Blank present:	□Yes □No ☑N/A		
Headspace in VOA vials ( >6mm):	□Yes □No ☑N/A		
Samples from USDA Regulated Area: State:	□Yes □No □N/A		
Additional labels attached to 5035A / TX1005 vials in the field Client Notification/ Resolution: Copy COC		Field Data Required	? Y / N
Person Contacted: Date/	Time:		
Comments/ Resolution:			
Project Manager Review:	Dat	e: 8/29/17	



## **CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

ection A equired Client Information:	Section B Required Project Information:		Section C Invoice Information:			Page: of
ompany: WESTAR ENERGY	Report To: Brandon Griffin		Attention: Jared Morrison			/
ddress: 818 Kansas Ave	Copy To: Jared Morrison, Heath Hornya		Company Name: WESTAR ENER	GY F	REGULATORY AGENCY	Y
Topeka, KS 66612			Address: SEE SECTION A	`	NPDES F GROU	IND WATER
mail To: brandon.l.griffin@westarenergy.com	Purchase Order No.		Pace Quote Reference:		UST F RCRA	OTHER
hone: (785) 575-8135 Fax:	Project Name: JEC CCR Groundwater		Pace Project Heather Wilson, 913 Manager.	3-563-1407	Site Location	
equested Due Date/TAT: 7 DAY	Project Number.		Pace Profile #: 9657, 1		STATE: KS	<u>;                                    </u>
				Requested A	nalysis Filtered (Y/N)	
Section D Valid Matrix 0	Codes 😰 û			† N /A		
Required Client Information MATRIX  DRINKING WATER	COLLECTED  OWT  WT  S  OWT  COMPOSITE  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS  COMPOS	z		*	<del></del>	
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# #	M M M DATE TIME DATE	SAMPLE		## Analysis 200.7 Total 200.8 Total 245.1 Total 300.0 CI, FI	4500 H+B 2540C TDS Radium 226 Radium 228	
1 FAA-6-082817	WT 6 8/28	1448	413			IBAN 3BANZO
2						
3						
4						
5						
6						
7						
8						
9						
11						
12						
ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME ACCEPTED	BY / AFFILIATION	DATE TIME	SAMPLE CONDITIONS
*200 7 Total Metals: Ba, Be, B, Ca, Cr, Pb, Li	By 3/ /wester	8/28/17	7 1600 Jun	PAGE	8/29 0405	17 7 7 4
**200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl	777	0,11				
P age						, De , 10
ige 29 of 31		AND SIGNATU	R: Brandon Gri	DATE Signed (MM/DD/YY): C	08/28/17	Temp in *C Received on Ice (Y/N) Custody Sealed Cocler (Y/N) Samples Inlact (Y/N)

## **Chain of Custody**



Workorder: 60251947	Workorder I	Name:JEC CCI	R GROUNDW	ATER		Ow	ner Re	ceive	d Date	e: 8/29	/2017	Resu	ılts Red	uested B	y: 9/21/2017
Report To		Subcontra	ct To	an engage		ali ne una matu	(iteraterata)	ijani k	alnika Wild			d Analys		etikija (Valetuesa	wakingiskaa angeleka a a
Heather Wilson Pace Analytical Kansas 9608 Loiret Blvd. Lenexa, KS 66219 Phone 1(913)563-1407	,	1638 Suites Greer	Analytical Pittsb Roseytown Roa 2,3, & 4 sburg, PA 1560 (724)850-5600	id 01				000							
	andanah Haspana		recognista	i Diviranosnees	Pres	served Co	ontainer	5000	~		No.		ACCOMMON.	Military Marie	
Item Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	HNO3		History And Conscion	e de la descripción de debe emmercialidade prior	Radium				delenantementen erekterende	ACEMINATE AND AND AND AND AND AND AND AND AND AND	LAB USE ONLY
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Transfers Released By		Date/Time	Bossinad F	\									Commen	its	
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3								<del></del>			_				
Cooler Temperature on R	eceint 100	°C   C::	tody Seal Y	or N		-			<u> </u>	-	<del></del>	^			
***/ a sale of a			tody Sea( )	or N		Ke	ceived	on lo	ce Y	or W			Sample	s Intact	Y or N

\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

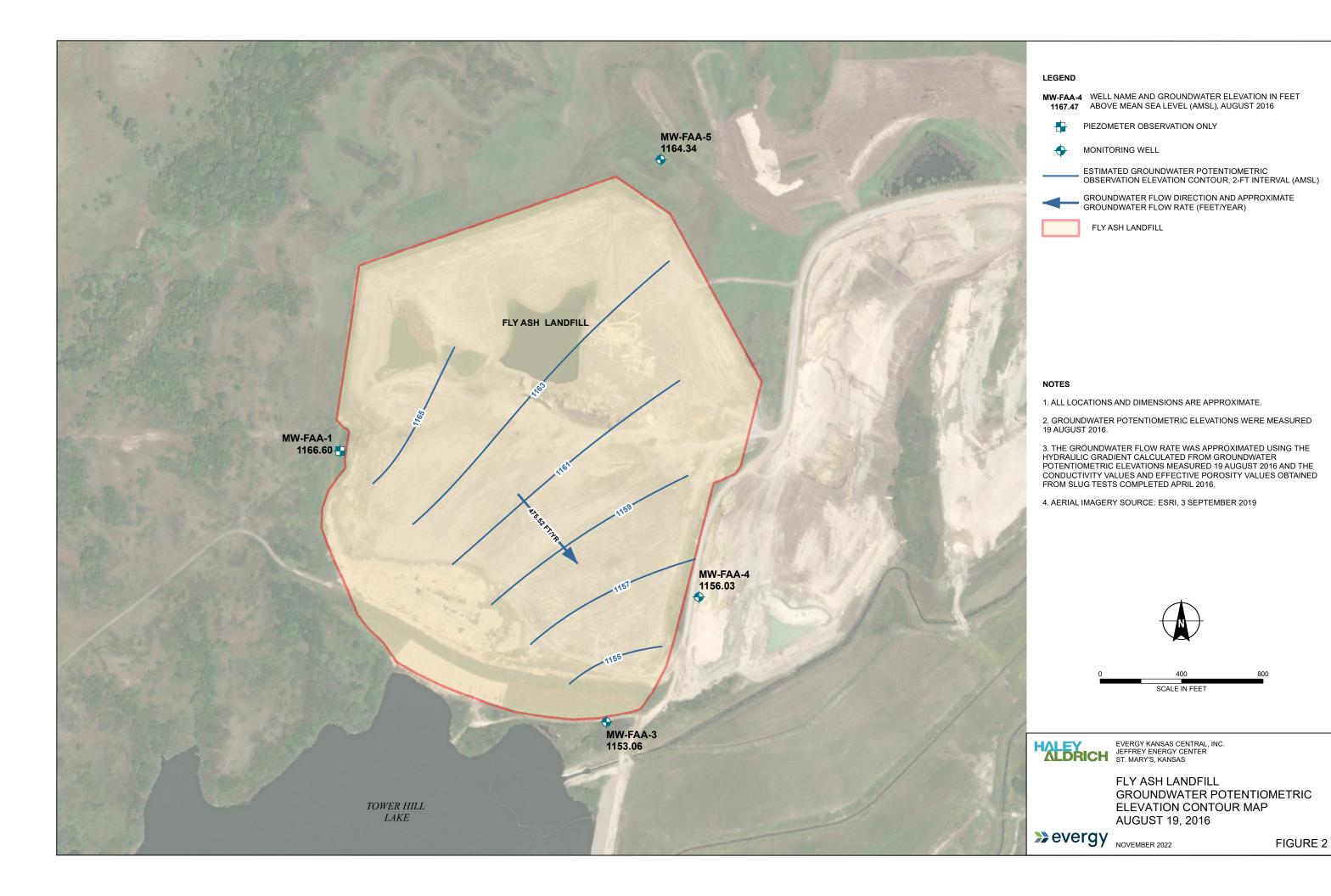
WO#:30228604

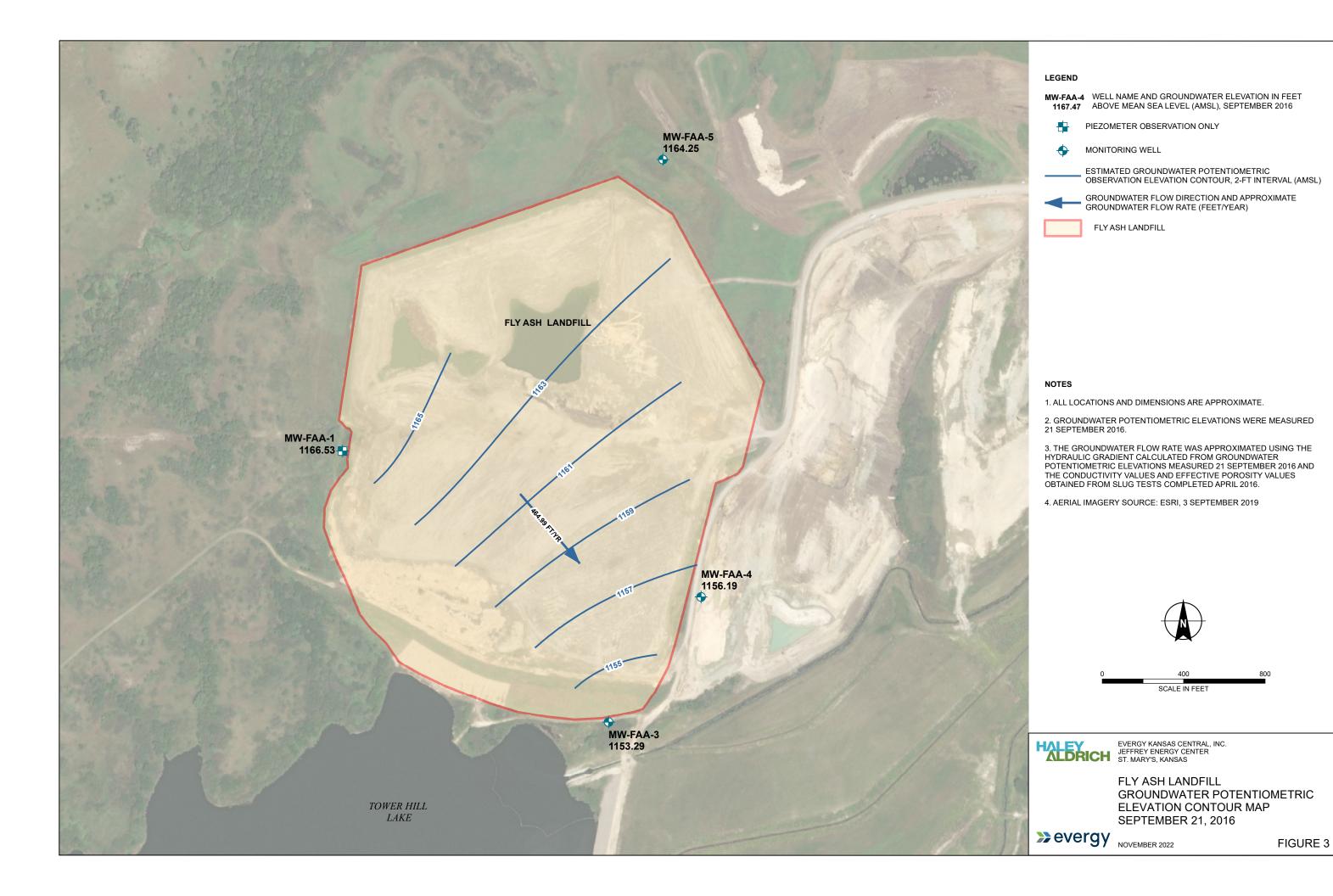
Pittsburgh Lab	Sample Cond	ditior	ı Up	on	Recei	ot					
Face Analytical C	Client Name:		(-	) <sub>A</sub>	TC 1	۷.	_ Pi	Project # 30 2			860
Courier: ☐ Fed Ex ☐ UP			merci	ial □ P	ace Other			L: LIMS Lo	abel ogin \	71. VV	
Custody Seal on Cooler/Bo	x Present: 🖵 yes		no	Se	als intact:	⊟_yes	□ no	5		,	
Thermometer Used		Туре	of ice	e: V	Vet Blue	None				•	
Cooler Temperature Observed Temp							۰	C Final	Temp:		٠c
Temp should be above freezing t		_			<u> </u>			'-		—	
								Date and	Initials of	person ex	amining
Comments:			No	N/	Ά			Contents	s; <u>7,7-</u>	81 <u>70</u> 1	1-1-
Chain of Custody Present:					1.						
Chain of Custody Filled Out:			<u> </u>		2.					( <b>k</b> )	
Chain of Custody Relinguished:					3.						
Sampler Name & Signature on COC:			-		4.						
Sample Labels match COC;					5.						
-Includes date/time/ID Matrix: į		- سر		_							
Samples Arrived within Hold Time:		-			6.						
Short Hold Time Analysis (<72hr remaining):					7.						
Rush Turn Around Time Requested;					8.						
Sufficient Volume;		<i>_</i>			9.						
Correct Containers Used:		-			10.						
-Pace Containers Used:											
Containers Intact:					11.						
Orthophosphate field filtered					12.						
Hex Cr Aqueous Compliance/NPDES sample field filtered					13.						
Organic Samples checked for dechlorination:				_	14.						
Filtered volume received for Dissolved tests				سمير	15.						
All containers have been checked for preservation.					]16.	· -					-
All containers needing preservation are found to be in compliance with EPA recommendation.  exceptions: VOA, collform, TOC, O&G, Phenolics					(H22						
					Initial whe	) TD-1.	Date	time of			
					completed	( L   J-	1	ervation			
					Lot # of ac						İ
Headspace in VOA Vials ( >6mm):			T		17.						
Trip Blank Present:					18.				·····		$\neg \neg$
Trip Blank Custody Seals Present				_							ļ
Rad Aqueous Samples Screened > 0.5 mrem/hr					initial wher completed:		Date:	Ma.			
Client Notification/ Resolution:	<del>*************************************</del>				completed.	( (-)	Date.	8/30	3 <u> </u>		
Person Contacted:		D	ate/T	ime:			Contacted	d Bv:			
Comments/ Resolution:								-			
t Advisor materials and a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second seco											
☐ A check in this box indi	icates that additio	nal in	form	ation	n has bee	en stored i	in erep	orts.			

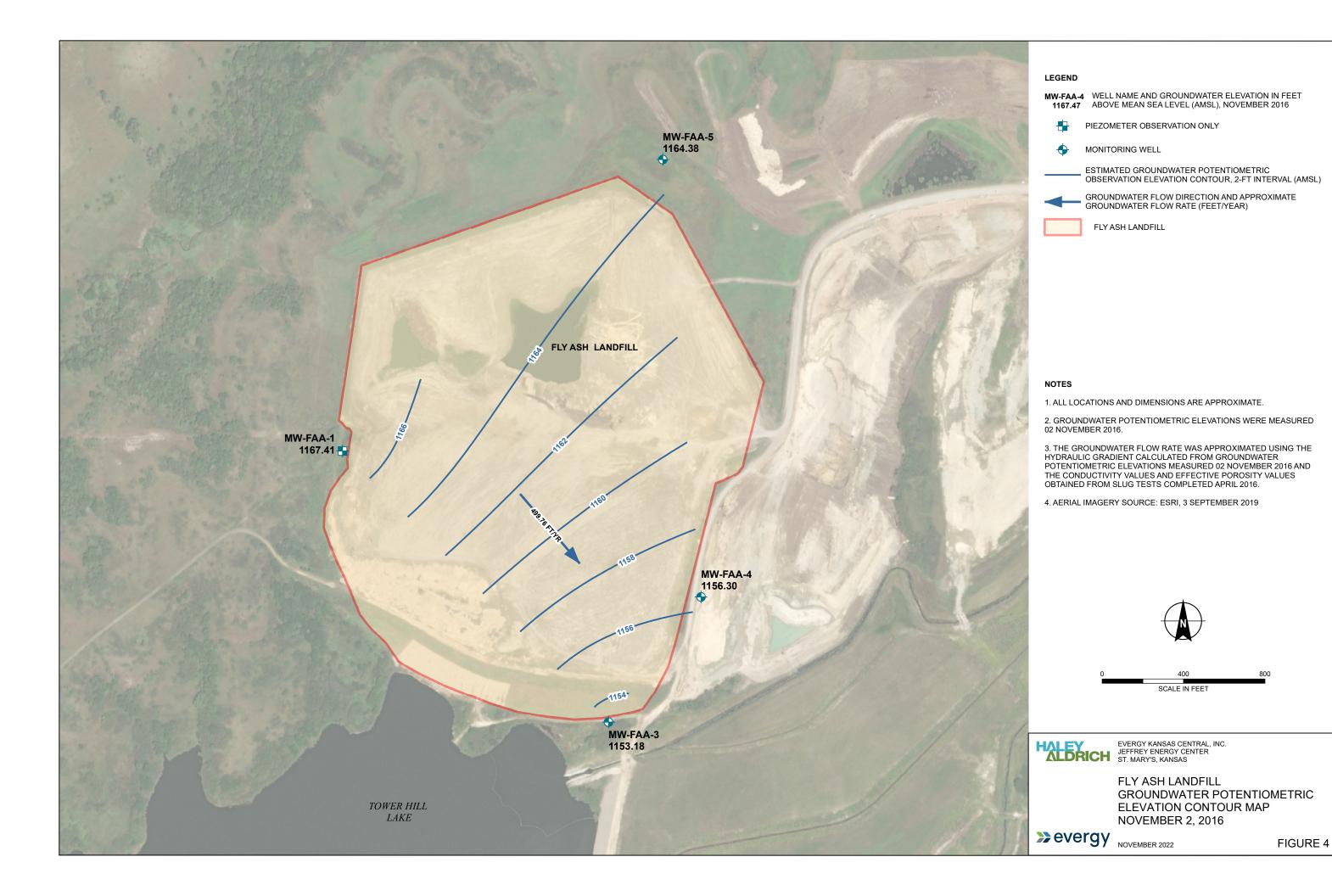
Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR

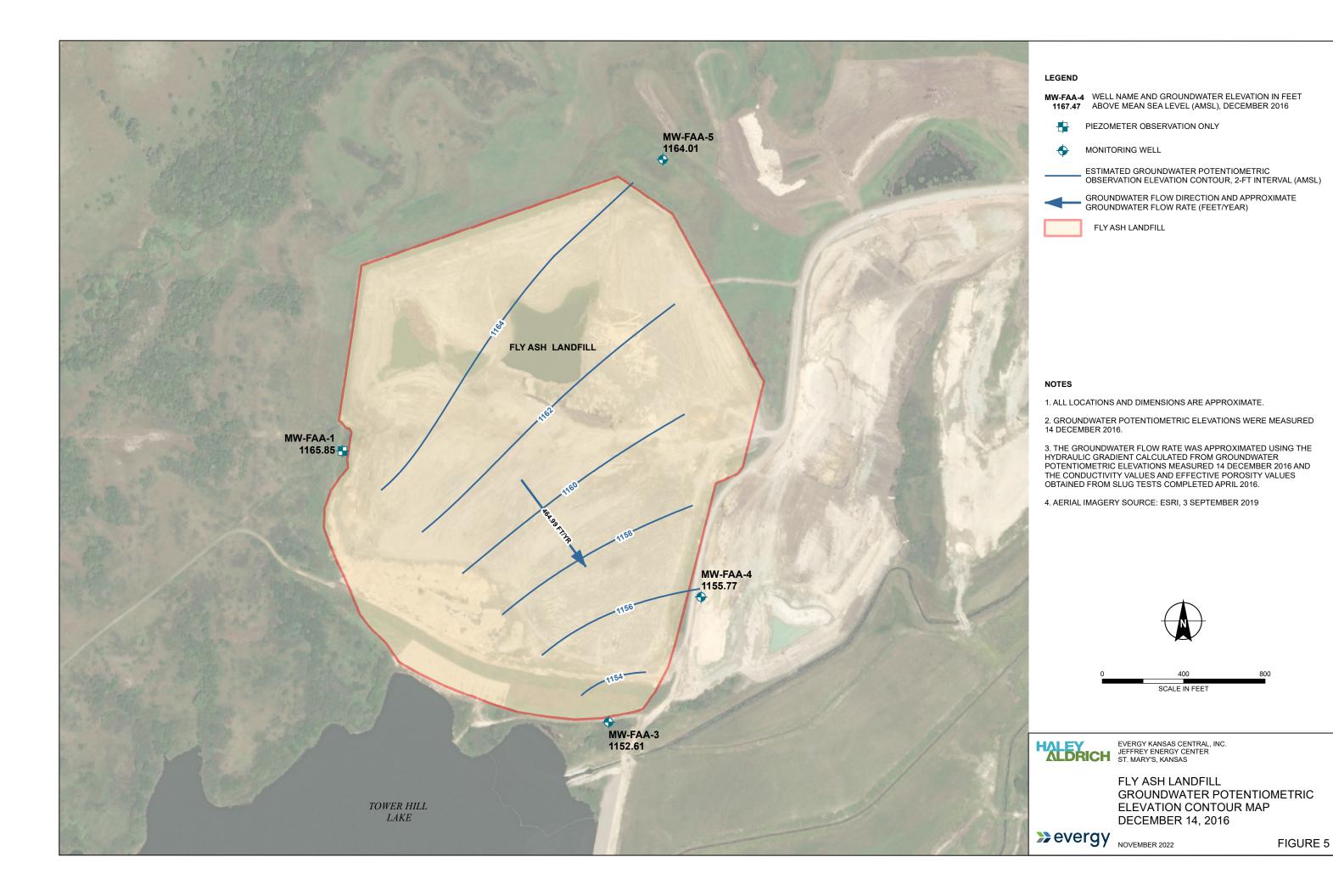
Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)
\*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

# ATTACHMENT 2 Groundwater Potentiometric Maps









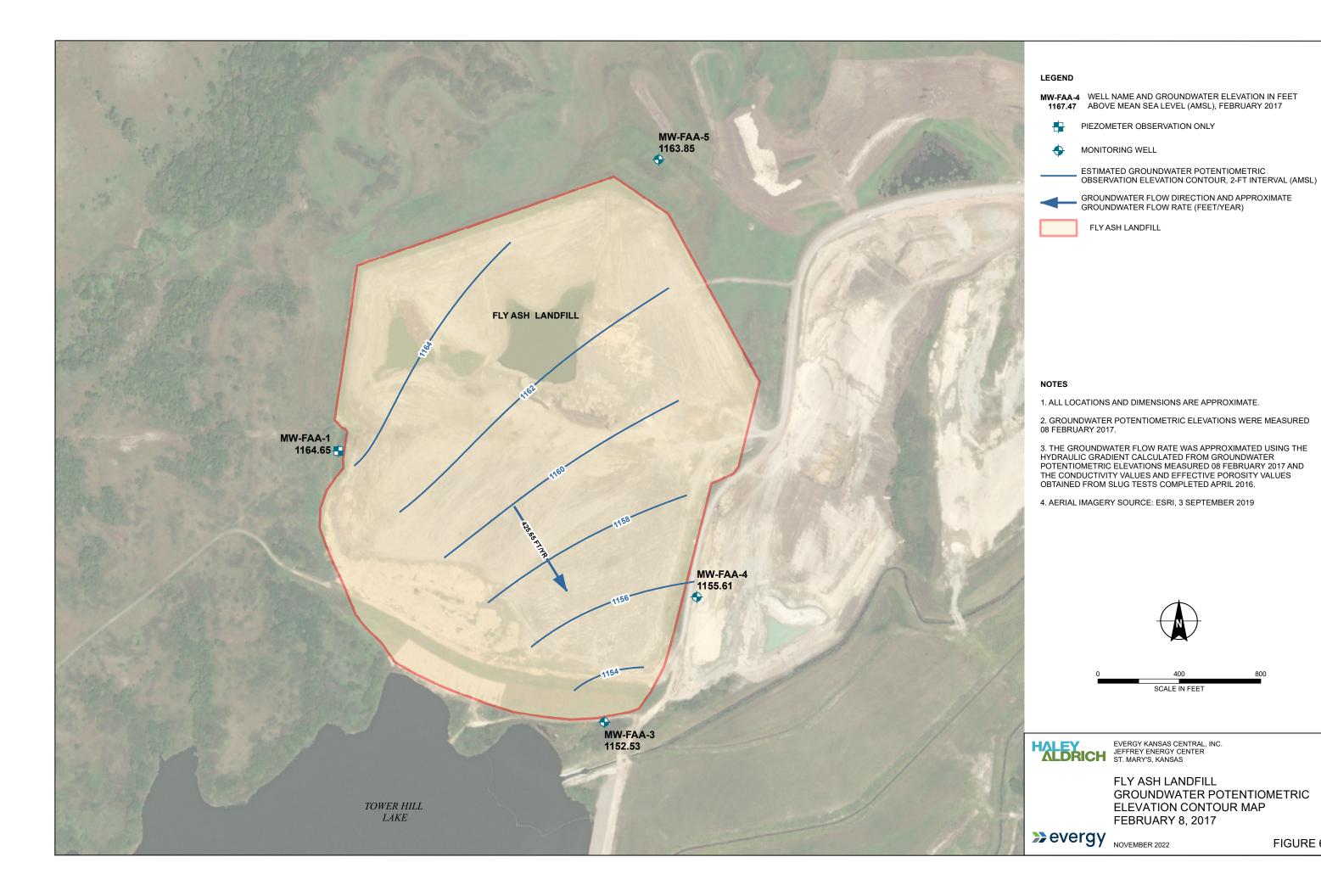
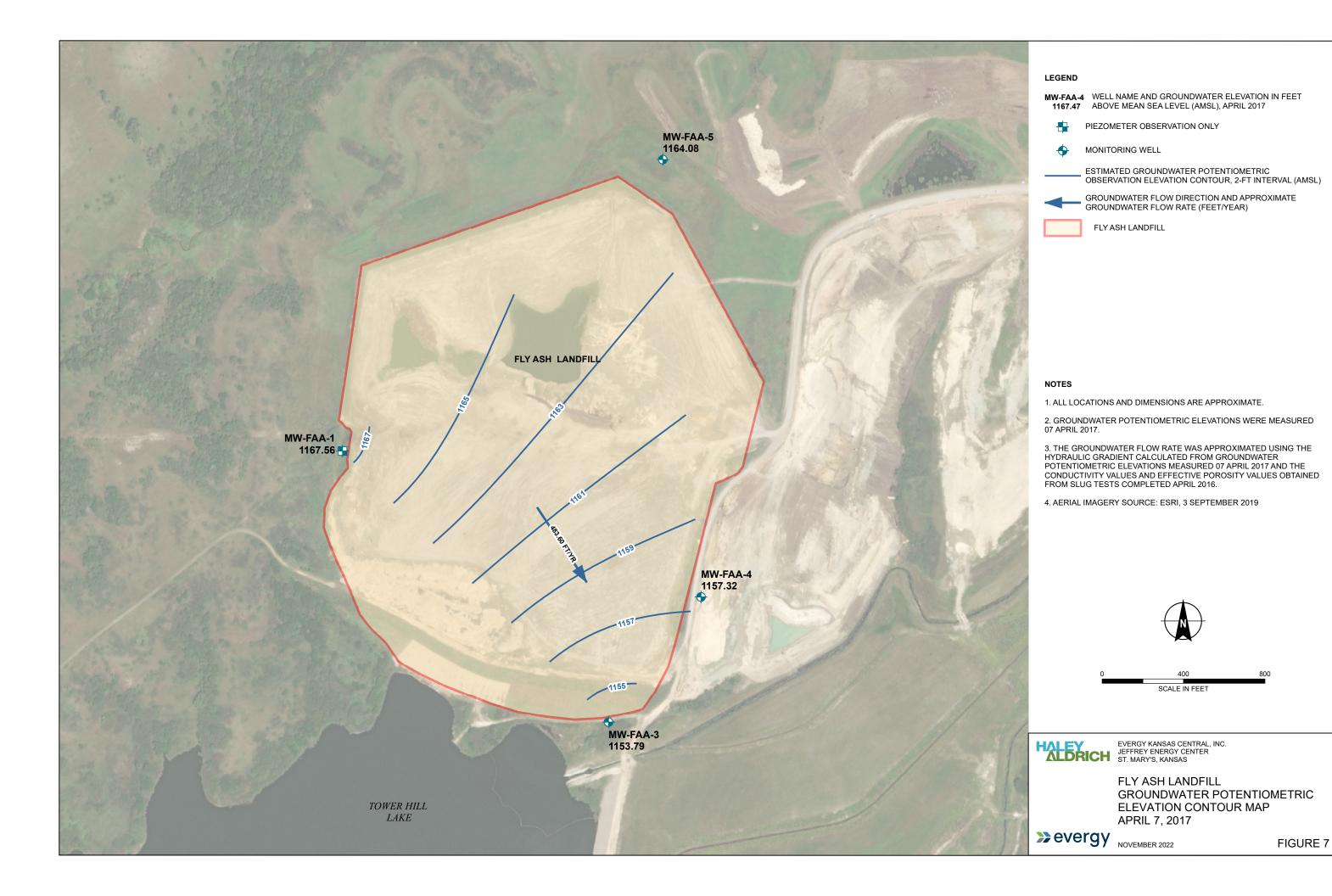
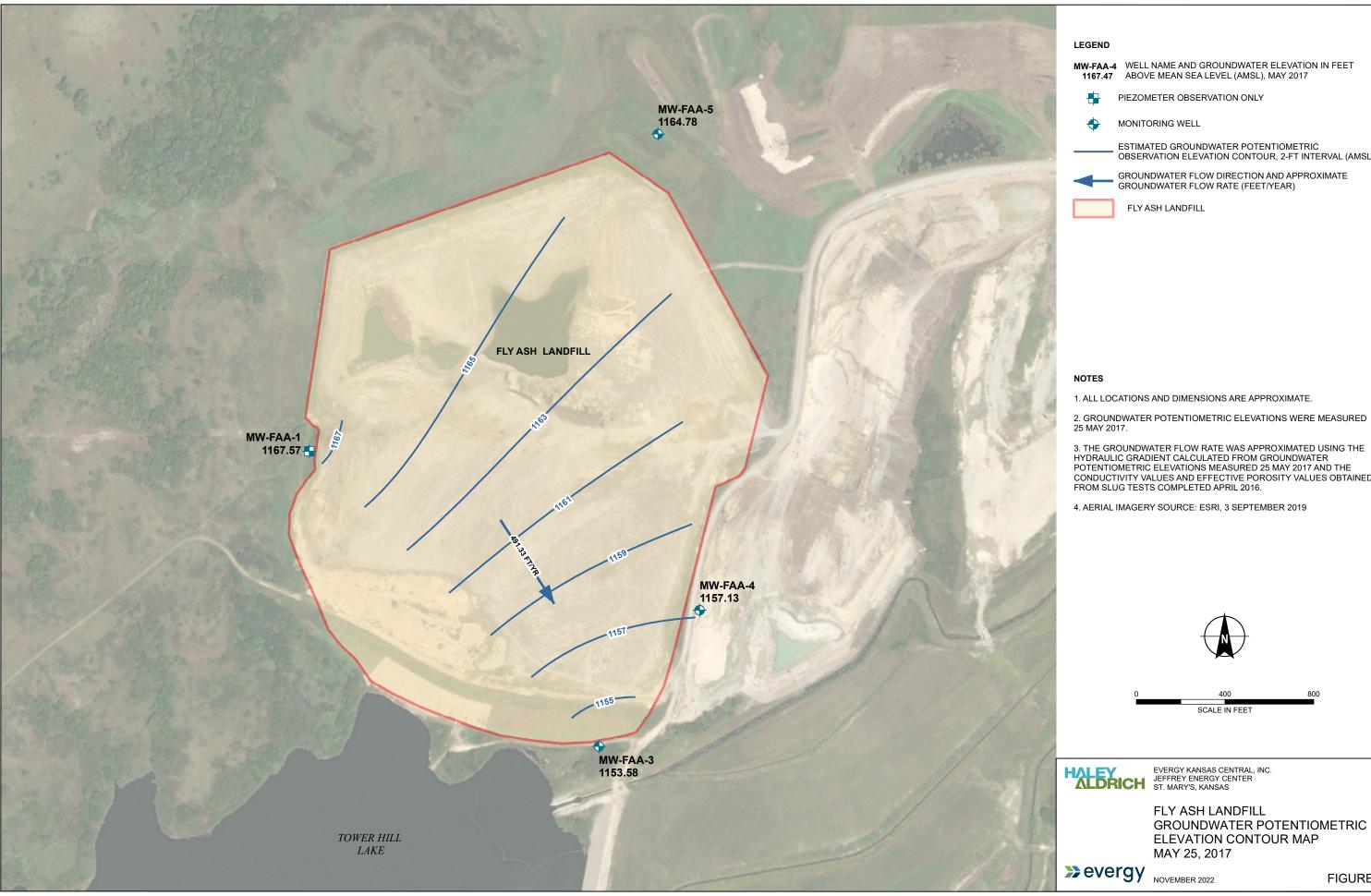


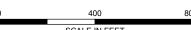
FIGURE 6





ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 2-FT INTERVAL (AMSL)

- 3. THE GROUNDWATER FLOW RATE WAS APPROXIMATED USING THE HYDRAULIC GRADIENT CALCULATED FROM GROUNDWATER POTENTIOMETRIC ELEVATIONS MEASURED 25 MAY 2017 AND THE CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED



GROUNDWATER POTENTIOMETRIC **ELEVATION CONTOUR MAP** 

FIGURE 8

