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# 2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT BOTTOM ASH SETTLING AREA TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

by Haley & Aldrich, Inc. Cleveland, Ohio

for Evergy Kansas Central, Inc. (f/k/a Westar Energy, Inc.) Topeka, Kansas



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Revision No.	Date	Notes
0	January 2020	Original
1	March 2021	Revised to include groundwater potentiometric contour maps for 2019



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2	Appendix IV SSL Alternate Source Demonstration for March 2019 Sampling Event for TEC Bottom Ash Settling Area



This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring program for the Tecumseh Energy Center Bottom Ash Settling Area (BASA) consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2019) and documents compliance with the U.S. Environmental Protection Agency Coal Combustion Residual Rule. I certify that the 2019 Annual Groundwater Monitoring and Corrective Action Report for the BASA is, to the best of my knowledge, accurate and complete.

Signed:

Professional Geologist

Print Name: Kansas License No.: Title: Company: Mark Nicholls Professional Geologist No. 881 Technical Expert 2 Haley & Aldrich, Inc.





# 1. Introduction

This 2019 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the Bottom Ash Settling Area (BASA; also known as the Bottom Ash Settling Pond) at the Tecumseh Energy Center (TEC), operated by Evergy Kansas Central, Inc. (Evergy; f/k/a Westar Energy, Inc.). This Annual Report was developed in accordance with the U.S. Environmental Protection Agency Coal Combustion Residual (CCR) Rule (Rule) effective October 19, 2015, including subsequent revisions, specifically Code of Federal Regulations Title 40 (40 CFR), subsection 257.90(e). The Annual Report documents the groundwater monitoring system for the BASA consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2019) and documents compliance with the Rule. The specific requirements for the Annual Report listed in § 257.90(e) of the Rule are provided in Section 2 of this Annual Report and are in bold italic font, followed by a short narrative describing how each Rule requirement has been met.



# 2. 40 CFR § 257.90 Applicability

# 2.1 40 CFR § 257.90(a)

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 257.99, except as provided in paragraph (g) [Suspension of groundwater monitoring requirements] of this section.

Evergy has installed and certified a groundwater monitoring system at the TEC BASA. The BASA is subject to the groundwater monitoring and corrective action requirements described under 40 CFR §§ 257.90 through 257.98. This document addresses the requirement for the Owner/Operator to prepare an Annual Report per § 257.90(e).

# 2.2 40 CFR § 257.90(e) – SUMMARY

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 describes monitoring completed and actions taken for the groundwater monitoring system at the TEC BASA as required by the Rule. 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 and § 257.95 is also provided in this report. This Annual Report documents the applicable groundwater-related activities completed in the calendar year 2019.

# 2.2.1 Status of the Groundwater Monitoring Program

The BASA remained in the assessment monitoring program during 2019.

# 2.2.2 Key Actions Completed

The 2018 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2019. Statistical evaluation was completed in January 2019 on analytical data from the September 2018 assessment monitoring sampling event. A successful alternate source demonstration (ASD) was completed and certified for the September 2018 assessment monitoring sampling event.



A semi-annual assessment monitoring sampling event was completed in March 2019 for detected Appendix IV constituents identified from the June 2018 annual assessment monitoring sampling event. Statistical evaluation was completed in July 2019 on analytical data for the March 2019 assessment monitoring sampling event. A successful ASD was completed and certified for the March 2019 assessment monitoring sampling event.

An annual assessment monitoring sampling event was completed in June 2019 to identify detected Appendix IV constituents for subsequent semi-annual sampling events in October 2019 and planned for March 2020. Groundwater protection standards for detected Appendix IV constituents were established or updated at this time. Semi-annual assessment monitoring sampling was completed in October 2019 for detected Appendix IV constituents identified during the June 2019 annual monitoring event. Statistical evaluation of the results from the October 2019 semi-annual assessment monitoring sampling event are due to be completed in January 2020 and will be reported in the next annual report.

During closure of the unit, substantial material around the monitoring well casings was removed to assist with closure activities. The monitoring well casings for downgradient wells MW-8, MW-9, and MW-10 were shortened accordingly between the June annual assessment monitoring sampling event and the October semi-annual assessment monitoring sampling event. Updated top of casing elevations are recorded in Table I.

An additional semi-annual assessment monitoring sampling event occurred in December 2019 associated with confirmation sampling for the closure of the BASA unit.

# 2.2.3 Problems Encountered

During the additional confirmation sampling event completed in December 2019, downgradient monitoring well MW-9 was identified as being dry. The monitoring well was unable to be sampled.

# 2.2.4 Actions to Resolve Problems

Evergy plans to monitor downgradient well MW-9 for the presence of groundwater in 2020. If sufficient groundwater is present at the well, an additional sample will be collected and analyzed for Appendix IV constituents to support closure of the unit.

# 2.2.5 Project Key Activities for Upcoming Year

Key activities planned for 2020 include the completion of the 2019 Annual Groundwater Monitoring and Corrective Action Report and statistical evaluation of semi-annual assessment monitoring analytical data collected in October and December 2019. Semi-annual assessment monitoring with subsequent statistical evaluations and annual assessment monitoring will be completed if necessary. Supplemental confirmation sampling and analysis is planned to support closure if sufficient groundwater is present at well MW-9.



2019 Annual Groundwater Monitoring and Corrective Action Report

#### 2.3 40 CFR § 257.90(e) – INFORMATION

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

# 2.3.1 40 CFR § 257.90(e)(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 TEC BASA is included in this report as Figure 1.

# 2.3.2 40 CFR § 257.90(e)(2) – Monitoring System Changes

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;

No monitoring wells were installed or decommissioned during 2019.

# 2.3.3 40 CFR § 257.90(e)(3) – Summary of Sampling Events

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 § 257.95(b) and § 257.95(d)(1), three independent assessment monitoring samples from each background and downgradient monitoring well were collected in 2019, along with an additional confirmation monitoring event in December 2019. A summary including sample names, dates of sample collection, field parameters, and monitoring data obtained for the groundwater monitoring program for the TEC BASA is presented in Table I of this report. Groundwater potentiometric elevation contour maps associated with each groundwater monitoring sampling event in 2019 are provided in Figures 2 through 5.

# 2.3.4 40 CFR § 257.90(e)(4) – Monitoring Transition Narrative

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

The assessment monitoring program was established in June 2018 to meet the requirements of 40 CFR § 257.95. The BASA remained in assessment monitoring during 2019.



# 2.3.5 40 CFR § 257.90(e)(5) – Other Requirements

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

This Annual Report documents activities conducted to comply with §§ 257.90 through 257.95 of the Rule. It is understood that there are supplemental references in §§ 257.90 through 257.98 that must be placed in the Annual Report. The following requirements include relevant and required information in the Annual Report for activities completed in calendar year 2019.

# 2.3.5.1 40 CFR § 257.94(d)(3) – Demonstration for Alternative Detection Monitoring Frequency

The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).

An alternative groundwater detection monitoring sampling and analysis frequency has not been established for this CCR unit; therefore, no demonstration or certification is applicable.

# 2.3.5.2 40 CFR § 257.94(e)(2) – Detection Monitoring Alternate Source Demonstration

The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under this section. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

This unit is in assessment monitoring; therefore, no detection monitoring alternative source demonstration or certification is applicable.

2.3.5.3 40 CFR § 257.95(c)(3) – Demonstration for Alternative Assessment Monitoring Frequency The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the



permitting authority stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).

An alternative groundwater assessment monitoring sampling and analysis frequency has not been established for this CCR unit; therefore, no demonstration or certification is applicable.

# 2.3.5.4 40 CFR § 257.95(d)(3) – Assessment Monitoring Concentrations and Groundwater Protection Standards

Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).

An assessment monitoring program has been implemented at the CCR unit since June 2018. Three rounds of assessment monitoring sampling were completed in 2019, along with an additional confirmation monitoring event in December 2019. Analytical results for both downgradient and upgradient wells are provided in Table I. The background concentrations (upper tolerance limits) and groundwater protection standards established for detected Appendix IV constituents for the TEC BASA are included in Table II. The background concentrations and groundwater protection standards provided in Table II were utilized for the statistical evaluations completed in 2019 for September 2018 and March 2019 semi-annual assessment monitoring sampling events.

# 2.3.5.5 40 CFR § 257.95(g)(3)(ii) – Assessment Monitoring Alternate Source Demonstration

Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in appendices III and IV to this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

The successful assessment monitoring ASDs are included in this report as Attachments 1 and 2. The TEC BASA remained in assessment monitoring during 2019.



# 2.3.5.6 40 CFR § 257.96(a) – Demonstration for Additional Time for Assessment of Corrective Measures

Within 90 days of finding that any constituent listed in appendix IV to this part has been detected at a statistically significant level exceeding the groundwater protection standard defined under § 257.95(h), or immediately upon detection of a release from a CCR unit, the owner or operator must initiate an assessment of corrective measures to prevent further releases, to remediate any releases and to restore affected area to original conditions. The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for no longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

No assessment of corrective measures was required to be initiated during 2019; therefore, no demonstration or certification is applicable for this unit.



TABLES

# TABLE ISUMMARY OF ANALYTICAL RESULTS - ASSESSMENT MONITORINGEVERGY KANSAS CENTRAL, INC.

TECUMSEH ENERGY CENTER

BOTTOM ASH SETTLING AREA

TECUMSEH, KANSAS

Location	Upgradient MW-7					Downgradient										
Location						MW-8			MW-9			MW-10				
Measure Point (TOC)			878.28			888.01		869	9.90*	88	6.98	865.60*		887.08	867.	.15*
Sample Name	MW-7-032019	MW-7-062519	MW-7	MW-07-120519	DUP-120519	MW-8-032119	MW-8-062519	MW-8	MW-08-120519	MW-9-032119	MW-9-062519	MW-9	MW-10-032119	MW-10-062519	MW-10	MW-10-120519
Sample Date	3/20/2019	6/25/2019	10/10/2019	12/5/2019	12/5/2019	3/21/2019	6/25/2019	10/10/2019	12/5/2019	3/21/2019	6/25/2019	10/10/2019	3/21/2019	6/25/2019	10/9/2019	12/5/2019
Final Lab Report Date	4/1/2019	7/9/2019	10/22/2019	12/18/2019	12/18/2019	4/1/2019	7/9/2019	10/22/2019	12/18/2019	4/1/2019	7/9/2019	10/22/2019	4/1/2019	7/9/2019	10/22/2019	12/18/2019
Final Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Final Radiation Lab Report Date	4/3/2019	7/16/2019	11/8/2019	1/2/2020	1/2/2020	4/3/2019	7/16/2019	11/8/2019	1/2/2020	4/3/2019	7/16/2019	11/8/2019	4/3/2019	7/16/2019	11/8/2019	1/2/2020
Final Radiation Lab Report Revision Date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lab Data Reviewed and Accepted	5/3/2019	7/17/2019	12/6/2019	1/9/2020	1/9/2020	5/3/2019	7/17/2019	12/6/2019	1/9/2020	5/3/2019	7/17/2019	12/6/2019	5/3/2019	7/17/2019	12/6/2019	1/9/2020
Depth to Water (ft btoc)	23.55	16.18	23.50	25.04		35.29	27.43	18.50	18.41	36.14	30.39	18.46	34.58	28.95	17.57	18.01
Temperature (Deg C)	15.56	17.62	17.28	15.48	15.48	15.62	20.61	19.69	16.07	15.67	19.52	17.96	12.92	19.72	16.85	14.33
Conductivity (µS/cm)	1800	1740	1354	1559	1559	1920	2010	1874	1933	1960	2160	1797	1900	2110	1877	2082
Turbidity (NTU)	3.23	4.56	0.91	1.54	1.54	5.47	1.33	0.91	19.86	18.0	3.22	12.01	3.31	2.17	7.96	5.6
Boron, Total (mg/L)	0.73		0.66	0.66	0.65	1.4		1.3	1.3	0.48		0.11	0.23		0.22	0.22
Calcium, Total (mg/L)	188		129	126	128	223		205	199	206		203	174		182	162
Chloride (mg/L)	268		172	197	199	271		216	220	261		206	252		222	228
Fluoride (mg/L)	0.26		0.34	0.22	0.21	0.23		0.25	<0.20	0.38		0.32	0.50		0.41	0.35
Sulfate (mg/L)	617		375	418	417	733		648	654	443		19.3	86.7		98.6	175
pH (su)	6.9		7.2	6.9	6.9	6.7		7.2	7.0	6.7		7.8	6.8		6.9	6.8
TDS (mg/L)	1,340		1,000	1,080	1,100	1,440		1,380	1,330	1,440		1,110	1,190		1,260	1,250
Antimony, Total (mg/L)	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010		<0.0010	<0.0010		<0.0010
Arsenic, Total (mg/L)	0.0016	0.0016	0.0016	0.0016	0.0015	0.0023	0.0029	0.0024	0.0039	0.040	0.093	0.051	0.028	0.029	0.021	0.026
Barium, Total (mg/L)	0.078	0.063	0.053	0.053	0.053	0.054	0.055	0.064	0.077	0.54	0.36	0.85	0.36	0.27	0.36	0.30
Beryllium, Total (mg/L)	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010		<0.0010	<0.0010		<0.0010
Cadmium, Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0013	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium, Total (mg/L)	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050	<0.0050		<0.0050	<0.0050	<0.0050		<0.0050	<0.0050		<0.0050
Cobalt, Total (mg/L)	0.0016	0.0016	<0.0010	0.0018	0.0016	<0.0010	<0.0010	0.0014	0.0025	0.048	0.032	0.016	0.0014	0.0091	0.002	0.0028
Lead, Total (mg/L)	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010		<0.010	<0.010		<0.010
Lithium, Total (mg/L)	0.028	0.027	0.017	0.024	0.024	0.017	0.019	0.017	0.024	0.021	0.020	<0.010	<0.010	<0.010	<0.010	<0.010
Molybdenum, Total (mg/L)	0.0050	0.0072	0.0110	0.0100	0.0110	0.031	0.025	0.039	0.046	0.0062	0.0024	0.0085	0.0029	0.0053	0.0041	0.0043
Selenium, Total (mg/L)	<0.0010	<0.0010		<0.0010	<0.0010	<0.0050	<0.0010		<0.0010	<0.0010	<0.0010		<0.0010	<0.0010		<0.0010
Thallium, Total	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010		<0.0010	<0.0010		<0.0010
Mercury, Total (mg/L)	<0.00020	<0.00020		<0.20	<0.20	<0.00020	<0.00020		<0.20	<0.00020	<0.00020		<0.00020	<0.00020		<0.20
Fluoride (mg/L)	0.26	0.32	0.34	0.22	0.21	0.23	<0.20	0.25	<0.20	0.38	<0.20	0.32	0.50	<0.20	0.41	0.35
Radium-226 & 228 Combined (pCi/L)	0.0990 ± 0.718 (1.59)	0.933 ± 0.772 (1.31)	0.403 ± 0.611 (1.25)	0.666 +/- 0.573 (0.873)	0.755 +/- 0.581 (0.988)	0.465 ± 0.962 (1.89)	1.46 ± 0.891 (1.30)	0.721 ± 0.842 (1.63)	0.569 +/- 0.668 (1.06)	0.663 ± 0.907 (1.70)	1.01 ± 0.808 (1.35)	1.67 ± 1.01 (1.17)	1.57 ± 1.04 (1.73)	1.87 ± 0.973 (1.30)	2.64 ± 1.15 (1.50)	1.60 +/- 0.752 (1.11)

#### Notes and Abbreviations:

The June 2019 sampling event was for Appendix IV constituents only. The September 2019 sampling event included Appendix IV constituents detected in the June 2019 sampling event, and all of the Appendix III constituents.

Radiological results are presented as activity plus or minus uncertainty with minimum detectable concentration (MDC).

Downgradient monitoring wells were shortened during closure of the unit, which occurred between the June annual assessment monitoring sampling event and the October semi-annual assessment monitoring sampling event.

\*Top of Casing (TOC) elevations are estimated based on surveyed ground surface elevations plus 3 feet at monitoring wells MW-8, MW-9, and MW-10 for the October and December sampling events.

Bold value: Detection above laboratory reporting limit or MDC.

μS/cm = micro Siemens per centimeter

Deg C = degrees Celsius

ft btoc = feet below top of casing

mg/L = milligrams per liter

NTU = Nephelometric Turbidity Unit

pCi/L = picoCuries per liter

su = standard unit

TDS = total dissolved solids

TOC = top of casing

# TABLE IIANNUAL ASSESSMENT GROUNDWATER MONITORING - DETECTED APPENDIX IV GWPSJUNE 2019 SAMPLING EVENTEVERGY KANSAS CENTRAL, INC.TECUMSEH ENERGY CENTERBOTTOM ASH SETTLING AREATECUMSEH, KANSAS

Well #	Background Value*	GWPS				
CCR Appendix-IV Arsenic, Total (mg/L)						
MW-7 (upgradient)	0.002	NA				
MW-10		0.118**				
MW-8		0.010				
MW-9		0.198**				
	CCR Appendix-IV Barium, Total (n	ng/L)				
MW-7 (upgradient)	0.095	NA				
MW-10		2				
MW-8		2				
MW-9		2				
	CCR Appendix-IV Cadmium, Total (	mg/L)				
MW-7 (upgradient)	0.001	NA				
MW-10		0.005				
MW-8		0.005				
MW-9		0.005				
	CCR Appendix-IV Cobalt, Total (m	ng/L)				
MW-7 (upgradient)	0.002	NA				
MW-10		0.006				
MW-8		0.006				
MW-9		0.0641**				
	CCR Appendix-IV Fluoride, Total (r	ng/L)				
MW-7 (upgradient)	0.371	NA				
MW-10		4.0				
MW-8		4.0				
MW-9		4.0				
	CCR Appendix-IV Lithium, Total (n	ng/L)				
MW-7 (upgradient)	0.03	NA				
MW-10		0.040				
MW-8		0.040				
MW-9		0.040				
	CCR Appendix-IV Molybdenum, Tota	l (mg/L)				
MW-7 (upgradient)	0.014	NA				
MW-10		0.100				
MW-8		0.100				
MW-9		0.100				
CCF	Appendix-IV Radium-226 & 228 Com	bined (pCi/L)				
MW-7 (upgradient)	5.9	NA				
MW-10		5.9				
MW-8		5.9				
MW-9		5.9				

#### Notes and Abbreviations:

\* Background value for interwell evaluation based on data collected through June 2018.

\*\* GWPS based on background value using intrawell evaluation based on data collected through June 2019.

CCR = Coal Combustion Residuals

GWPS = Groundwater Protection Standard

MCL = Maximum Contaminant Level

mg/L = milligrams per Liter

NA = Not Applicable

pCi/L = picoCuries per Liter

RSL = Regional Screening Level



**FIGURES** 



#### LEGEND



MONITORING WELL

PIEZOMETRIC OBSERVATION ONLY

BOTTOM ASH SETTLING AREA

#### NOTE

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. AERIAL IMAGERY SOURCE: ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE, APRIL 11, 2017.



150 75

SCALE IN FEET

EVERGY KANSAS CENTRAL, INC. TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

#### BOTTOM ASH SETTLING AREA MONITORING WELL LOCATION MAP

MARCH 2021 SCALE: AS SHOWN

FIGURE 1



LEGEND	
MW-8 849.64	WELL NAME AND GROUNDWATER ELEVATION (MARCH 20, 2019)
<b>•</b>	MONITORING WELL
	PIEZOMETER OBSERVATION ONLY
	GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
	ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-	GROUNDWATER FLOW DIRECTION
	BOTTOM ASH SETTLING AREA

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 20 MARCH 2019.

3. AMSL = ABOVE MEAN SEA LEVEL





LEGEND	
MW-8 849.64	WELL NAME AND GROUNDWATER ELEVATION (JUNE 25, 2019)
÷	MONITORING WELL
-	PIEZOMETER OBSERVATION ONLY
	GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
	ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-	GROUNDWATER FLOW DIRECTION
	BOTTOM ASH SETTLING AREA

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 25 JUNE 2019.

3. AMSL = ABOVE MEAN SEA LEVEL







1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 10 OCTOBER 2019. MW-11 GROUNDWATER ELEVATION WAS NOT MEASURED IN OCTOBER 2019.

3. AMSL = ABOVE MEAN SEA LEVEL







1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 05 DECEMBER 2019. MW-9 WAS DRY DURING DECEMBER 2019 AND WAS THEREFORE NOT INCLUDED IN THIS CONTOURING DATASET.

3. AMSL = ABOVE MEAN SEA LEVEL



**ATTACHMENT 1** 

Appendix IV SSL Alternate Source Demonstration for September 2018 Sampling Event for TEC Bottom Ash Settling Area

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# REPORT ON SEPTEMBER 2018 SAMPLING EVENT APPENDIX IV STATISTICALLY SIGNIFICANT LEVEL ALTERNATE SOURCE DEMONSTRATION FOR THE BOTTOM ASH SETTLING AREA TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

by Haley & Aldrich, Inc. Cleveland, Ohio

for Westar Energy, Inc. Topeka, Kansas



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В	Aerial Photographs
С	Topographic Maps

Revision No.	Date	Notes
0	February 2019	Assessment Monitoring Program September 2018 Sampling Event
		Statistically Significant Level Notification and Alternate Source
		Demonstration Update
1	October 2019	September 2018 Sampling Event Appendix IV Statistically Significant Level
		Alternate Source Demonstration for the Bottom Ash Settling Area



# 1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) was retained by Westar Energy, Inc. (Westar) to perform an evaluation of groundwater quality at the Bottom Ash Settling Area (BASA; Unit) at the Tecumseh Energy Center (TEC) located in Tecumseh, Kansas. The evaluation was performed to demonstrate if an alternate source caused the statistically significant level (SSL) above the groundwater protection standard of arsenic (at monitoring wells MW-9 and MW-10) and cobalt (at monitoring well MW-9) downgradient of the BASA. The arsenic concentrations observed for the September 2018 assessment monitoring sampling event is 0.099 milligrams per liter (mg/L) at well MW-9 and 0.040 mg/L at MW-10. The cobalt concentration observed for the September 2018 assessment monitoring sampling event is 0.011 mg/L at well MW-9. This report provides an overview of the site conditions and the results of the investigation activities conducted as part of the alternate source demonstration (ASD) for the Appendix IV constituents.

# 1.1 BACKGROUND

Consistent with Code of Federal Regulations Title 40 (40 CFR) §257.90 through §257.95, Westar has installed and certified a groundwater monitoring network at the BASA, has completed detection monitoring program activities including identifying statistically significant increases in Appendix III constituent concentrations, and established an assessment monitoring program. Westar conducted statistical analyses of the downgradient groundwater quality results from the September 2018 assessment monitoring sampling event to determine if any Appendix IV constituents were present at concentrations that exceeded groundwater protection standards set for the Unit. The analysis of the Appendix IV constituents resulted in a calculated SSL for arsenic (at monitoring wells MW-9 and MW-10) and cobalt (at monitoring well MW-9) downgradient of the BASA. The analyses described in this report were conducted to determine if alternate sources existed for the SSLs.

Pursuant to 40 CFR §257.95(g)(3)(ii), "...the owner or operator must...demonstrate that a source other than the CCR unit <sup>1</sup> caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality." The coal combustion residuals (CCR) Rule provides 90 days from determination of an SSL to complete an ASD<sup>2</sup> for applicable Appendix IV constituents. If a successful ASD is completed and certified by a qualified professional engineer, the CCR unit may continue in assessment monitoring. If, however, an alternate source of the Appendix IV SSL is not identified, the owner or operator must initiate an assessment of corrective measures and evaluation of the nature and extent of migration. This report documents the findings and conclusions of an investigation of the SSLs for arsenic at wells MW-9 and MW-10 and cobalt at MW-9.

<sup>&</sup>lt;sup>2</sup> For simplicity, this report utilizes the term ASD to account for any of the three possible explanations (allowed for in the CCR Rule) for why a calculated SSL is not related to the CCR unit being evaluated. Those include: 1) The source for the SSL originates from something other than the CCR unit in question; 2) the SSL resulted from an error in sampling, analysis, or statistical evaluation; or 3) the SSL resulted from a natural variation in groundwater quality.



<sup>&</sup>lt;sup>1</sup> Referred to in this document as an "alternate source," and the demonstration for such is referred to as an ASD.

# **1.2 PURPOSE AND SCOPE**

The purpose of this ASD is to determine whether the concentrations of arsenic and cobalt detected in groundwater at MW-9 and MW-10 are from sources other than the Unit. The scope of the demonstration includes a review of the current regional geochemical and geologic conditions, a comparison of the groundwater quality at MW-9 and MW-10 and the other monitoring well locations, and analysis of geologic sources. This evaluation was completed using existing information describing the regional and site-specific geology and groundwater monitoring data collected during detection and assessment monitoring activities.

This analysis included:

- Review of well installation logs for the variability in the aquifer materials within screened intervals of the upgradient and downgradient groundwater monitoring well locations;
- Review of analytical results for the concentration of indicator parameters including chloride and sulfate from the upgradient and downgradient monitoring wells; and
- Collection and analysis of representative samples of the bottom ash stored within the Unit for the concentration of leachable Appendix IV constituents.

# 1.3 SITE SETTING

The TEC is located in a light industrial area located northeast of Tecumseh in Shawnee County, Kansas (Figure 1). The site is located within the Central Lowland physiographic province which includes rolling hills with substantial topographic relief and the relatively horizontal orientation of the thin alternating shale and limestone beds. Geologic units that underlie the BASA are roughly horizontal with a regional dip toward the northwest and consist of glacial till and the Scranton shale formation. The BASA consists of a surface impoundment that encompasses approximately 2 acres in the current configuration and is located on the TEC plant site. The TEC plant and BASA are located in an area with natural ground surface elevations varying from approximately 870 and 920 feet above mean sea level throughout the site property.

# 1.4 SITE DESCRIPTION

The TEC facility formerly operated a system of cycled bottom ash ponds collectively known as the BASA. The coal-fired boilers at the facility have been shut down. The BASA is a single CCR impoundment that utilized a middle dike for operational purposes to separate two separate settling areas. During operations, the plant alternated use of the settling areas. The bottom ash at TEC was sluiced via gravity to the BASA where it was allowed to settle out. Excess water from the BASA continues to decant via gravity to a polishing pond on the north side of Tecumseh Creek, where it then discharges into the creek. This discharge is permitted by Kansas Pollutant Discharge Elimination System. Bottom ash was recovered from the BASA and transported by truck to the on-site Ash Landfill No. 322. The TEC BASA and associated groundwater monitoring network are shown on Figure 2.



# 2. Site Geology, Hydrogeology, Geochemistry, and Regional Conditions

Geologic and hydrogeologic conditions beneath the BASA have been characterized based on information obtained during installation and testing of the monitoring wells installed as part of the CCR groundwater monitoring network.

# 2.1 SITE GEOLOGY

The TEC plant site and the BASA are located in the Central Lowland physiographic province. The Central Lowland is characterized by horizontal sequences of predominantly marine sedimentary rocks (interbedded shales and limestones). The TEC site and the BASA lie within the area of Pleistocene glacial activity in the Dissected Till Plains region of the Central Lowlands. Geologic units that underlie the site are roughly horizontal with a regional dip to the north and northwest (AMEC, 2011). The Scranton shale formation is the only lithologic unit encountered beneath the glacial till during geologic investigations at TEC.

Surficial geologic materials in the vicinity of and beneath the TEC site and BASA include thin deposits of Pleistocene glacial till deposits and Holocene alluvium. The poorly sorted glacial deposits are composed of Kansan and Nebraskan age clays, silts, and sands. The glacial till directly underlies most of the BASA. The glacial deposits have a local maximum thickness of approximately 100 feet (AMEC, 2011). Glacial erratics are observed to occur in the vicinity of the TEC site, often in the form of quartzite boulders (AMEC, 2011).

Locally, the till may yield minor quantities of water but is not typically used as an aquifer for water supply. The glacial till deposits do represent the uppermost aquifer at the CCR unit. The Pleistocene glacial deposits are underlain by strata representing transgressions and regressions of marine and near-shore depositional environments. Immediately above the shallowest bedrock unit, a thin clay layer, 10 feet or less in thickness, has been observed at the site.

The shallowest bedrock unit present at the TEC is the Pennsylvanian-age Scranton shale formation. The Scranton shale is predominantly grey to brown comprised of five members (Zeller, 1968). From shallowest to deepest the members of the Scranton formation include: the Silver Lake shale, Rulo limestone, Cedar Vale shale, Happy Hollow limestone, and White Cloud shale members. The total Scranton formation is of undefined thickness at the TEC site; however, a typical average thickness in other areas of the state is approximately 125 feet (Zeller, 1968).

A conceptual geologic cross section across the Unit is provided in Figure 3.

# 2.2 SITE HYDROGEOLOGY AND HYDROLOGY

The BASA is sited directly on the glacial deposits which contain low to high plasticity clay with trace silt, which will impede infiltration to deeper formations. In the area of the BASA, the glacial deposits are underlain by the Scranton shale at a depth of approximately 30 feet. Given the alternating transgressive/regressive nature of the deposition (interbedded shales and limestones), many of the deeper water-bearing bedrock formations are hydraulically isolated and some are confined. The permeability of the shale units varies but generally decrease with depth, further impeding vertical groundwater movement. Horizontal fluid migration is possible above the low permeability shale and within the glacial deposits.



The uppermost aquifer at TEC consists of unconsolidated glacial deposits, hereafter referred to as the glacial aquifer. Depth to groundwater in the monitoring wells ranges from approximately 16 to 35 feet below ground surface in the immediate vicinity of the BASA. Groundwater flow in the glacial aquifer below the BASA is to the west towards Tecumseh Creek, and ultimately north toward the Kansas River.

Based on groundwater elevations measured between August 2016 and September 2018, the groundwater flow direction is consistently toward the northwest. Available historical data indicate that seasonal groundwater elevation variation does not have a significant effect on groundwater flow direction.

Hydraulic conductivity of the glacial aquifer was calculated using data generated during slug testing of one monitoring well. The hydraulic conductivity of the glacial till is calculated to be approximately 1.6x10<sup>-3</sup> centimeters per second (cm/sec).

The Silver Lake shale member of the Scranton shale formation comprises the confining unit underlying the uppermost aquifer at the BASA. The reported thickness of the confining shale at the BASA area is greater than 10 feet. The results of a packer test indicate that the hydraulic conductivity in the Silver Lake shale is  $1 \times 10^{-6}$  cm/sec. Based on the reported hydraulic conductivity, the Silver Lake member of the Scranton shale is characterized as an aquitard, meaning that the shale layer restricts flow of groundwater due its low hydraulic conductivity (i.e., prevents or inhibits vertical movement of groundwater).



# 3. Alternative Source Demonstration

Haley & Aldrich conducted an evaluation of arsenic and cobalt concentrations detected in downgradient wells at the BASA. The evaluation included review of possible alternative sources for the apparent SSLs of arsenic (MW-9 and MW-10) and cobalt (MW-9) determined by statistical analyses completed in January 2019 for the September 2018 assessment monitoring sampling event. The arsenic concentrations observed for the September 2018 assessment monitoring sampling event is 0.099 mg/L at well MW-9 and 0.040 mg/L at MW-10. The cobalt concentration observed for the September 2018 assessment monitoring sampling event is 0.011 mg/L at well MW-9.

Haley & Aldrich evaluated the following potential alternative sources in accordance with the CCR Rule:

- 1. The source for the SSL originates from something other than the CCR unit;
- 2. The SSL resulted from an error in sampling, analysis, or statistical evaluation; or
- 3. The SSL resulted from a natural variation in groundwater quality.

As part of that evaluation, Haley & Aldrich evaluated potential point and non-point sources of arsenic and/or cobalt in the vicinity of the BASA and evaluated natural geologic conditions and the effect of those conditions on native groundwater chemistry. Each of these analyses and the resulting findings are described below.

# 3.1 EVALUATION OF MATERIALS WITHIN THE UNIT

# 3.1.1 Bottom Ash Synthetic Precipitation Leaching Procedure Analyses

Representative samples of the bottom ash accumulated in the BASA were collected and analyzed for the Appendix IV constituents including two parameters that were determined to exhibit an SSL; arsenic and cobalt from the inter-well statistical evaluation with the upgradient monitoring well location (MW-7). Samples collected in July 2011 and April 2019 from multiple locations within the BASA were submitted to environmental laboratories accredited by the Kansas Department of Health and Environment (KDHE) for the analysis of leachable arsenic and cobalt after the bottom ash samples were extracted in accordance with the U.S. Environmental Protection Agency (USEPA) Method 1312 [Synthetic Precipitation Leaching Procedure (SPLP)].

The results of the SPLP analysis of the bottom ash samples collected from four locations within the Unit indicate that the leachable arsenic and cobalt concentrations were below the concentrations detected in samples collected from monitoring wells MW-8, MW-9, and MW-10. These data provide evidence that the bottom ash present in the BASA from 2011 and the second sample collected from the BASA in 2019 do not contain sufficient leachable arsenic and cobalt to produce the concentration of constituents detected in the downgradient groundwater. Westar has noted that the type of coal used for fuel and TEC plant operations have been consistent since the early 2000s.

A summary of the results of the bottom ash leachability analyses is provided in Table I and the laboratory reports are attached as Appendix A.



# 3.2 REVIEW OF SEPTEMBER 2018 FIELD SAMPLING, LABORATORY ANALYSIS, AND STATISTICAL PROCEDURES

# 3.2.1 Field Sampling Procedures

Westar and Haley & Aldrich conducted the field sampling activities in accordance with a Groundwater Sampling and Analysis Plan (SAP; Haley & Aldrich, 2017) that was prepared in accordance with §257.93 of the CCR Rule. The SAP prescribes the site-specific activities and methodologies for groundwater sampling and included procedures for field data collection, sample collection, sample preservation and shipment, interpretation, laboratory analytical methods, and reporting for groundwater sampling for the BASA. The administrative procedures and frequency for collection of groundwater elevation measurements, determination of flow directions, and gradients were also provided in the SAP.

Haley & Aldrich reviewed the field sampling and equipment calibration logs and the field indicator parameters and did not identify any apparent deviations or errors in sampling that would result in a potential SSL downgradient of the BASA.

# 3.2.2 Laboratory Analysis and Quality Control Documentation

The groundwater samples collected downgradient of the BASA were analyzed by Pace Analytical Services using USEPA analytical methods. The data generated from these laboratory analyses are stored in a project database that incorporates hydrogeologic and groundwater quality data and was established to allow efficient management of chemical and physical data collected in the field and produced in the laboratory.

Haley & Aldrich conducted a quality assurance/quality control review of each groundwater quality dataset generated for the BASA and did not identify apparent laboratory or data management errors that would result in the apparent arsenic or cobalt SSLs downgradient of the BASA.

# 3.2.3 Statistical Evaluation

Westar collected the initial assessment monitoring groundwater sample in June 2018, and a second assessment monitoring groundwater sample in September 2018 from each of the upgradient and downgradient monitoring wells at the BASA. To develop groundwater protection standards for use in the statistical analyses, data from the baseline sampling completed over a period spanning from August 2016 through June 2017 was also utilized. Statistical analysis of the analytical results was completed and reported as documented in the 2018 Annual Groundwater Monitoring and Corrective Action Report (Haley & Aldrich, 2019).

Haley & Aldrich has reviewed the statistical analysis of groundwater quality data from monitoring wells at the BASA for the September 2018 monitoring event and did not identify statistical calculation errors that would result in the apparent arsenic or cobalt SSLs. The statistical test method used met the performance standard established in the CCR Rule, and the statistical procedure complies with the requirements of the CCR Rule.



# 3.3 POTENTIAL SOURCES OTHER THAN THE BASA

Haley & Aldrich conducted a review of potential sources (both point and non-point) of arsenic and/or cobalt in the vicinity of the BASA to determine if previous or adjacent site activities, land uses, or practices might have caused, or are currently causing, elevated concentrations of arsenic and/or cobalt in groundwater downgradient of the BASA. Potential point sources would include discharging activities or other activities occurring at a discrete location that may be a source of arsenic and/or cobalt. Non-point sources would include diffuse discharging activities or practices that may result in a low level but wide-spread increase in concentrations detected at the downgradient side of the BASA.

# 3.3.1 Point Sources

Prior to construction of the BASA, the site and surrounding vicinity was undeveloped land. Review of historical United States Geological Survey (USGS) topographic maps shows undeveloped land prior to the construction of the BASA. No known industrial, agricultural, mining, or other activities were conducted at the BASA site prior to construction that would potentially constitute a point source. No point sources have been identified as a potential alternative source for arsenic and/or cobalt at the BASA.

# 3.3.2 Non-Point Sources

No mining, industrial, or other activities have been documented in the vicinity of the BASA that might constitute a non-point source of arsenic and/or cobalt in the vicinity of MW-9 and/or MW-10.

No agricultural activities have been identified upgradient of the BASA. Records reviewed included historical aerial photographs and historical topographic maps. No non-point sources have been identified as a potential alternative source for arsenic and/or cobalt at the BASA.

# 3.4 HISTORICAL LAND USE REVIEW

Haley & Aldrich assessed past usage of the site and adjoining properties through a review of the following records:

- Environmental Risk Information Services (ERIS) Aerial Photographs dated 1948, 1950, 1970, 1975, 1982, 1991, 2003, 2004, 2005, 2006, 2008, 2010, 2012, 2014, 2015, and 2017 (Appendix B); and
- ERIS Topographic Maps dated 1950, 1951, 1970, 1975, 1981, 1983, and 2012 (Appendix C).

Unless otherwise noted below, sources were reviewed dating back to 1940 or first developed use, whichever is earlier, and at 5-year intervals if the use of the property has changed within the time period.

# 3.4.1 Historical Aerial Photographs

Haley & Aldrich reviewed aerial photographs depicting the development of the site and vicinity as summarized in Table II. The historical aerial photograph search includes photographs from the Army Mapping Service, USGS, National High-Altitude Photography, and the National Agriculture Information Program (ERIS, 2018) and are included in Appendix B.



Photographs suggest that the BASA was undeveloped prior to 1970. The plant site and BASA appear to have been developed in their current configurations by 1982. Minor development continued until present day. The coal pile for the facility has been located immediately adjacent to and east of the BASA since the Unit's original construction. An above ground storage tank was also present east of the coal pile prior to the BASA construction. An historical aerial photograph review summary is included as Table II. No activities constituting potential sources of arsenic and/or cobalt (e.g., mining, smelting, etc.) have been identified based on aerial photograph review.

# 3.4.2 Historical Topographic Maps

Haley & Aldrich reviewed historical topographic maps depicting the development of the site and vicinity, as summarized in Table III. The topographic maps were provided for review by ERIS. Copies of the topographic maps are included in Appendix C. No historical development of other features constituting potential sources of arsenic and/or cobalt (e.g., mining) have been identified based on topographic map review.

# 3.5 NATURAL VARIABILITY OF ARSENIC AND/OR COBALT OCCURRENCE

Haley & Aldrich conducted an evaluation of the natural variability of groundwater quality at the BASA based on site-specific data; observations are described in the following sections.

# 3.5.1 Uppermost Groundwater Monitoring Interval Variability

Haley & Aldrich conducted an evaluation of the concentrations of the indicator parameters throughout the monitoring period from August 2016 through March 2018 to determine the natural variability of these parameters within the uppermost groundwater monitoring interval.

The average concentration of chloride and sulfate observed at the upgradient well (MW-7) were 194 and 470 mg/L, respectively. The average concentration of these indicator parameters within the downgradient monitoring wells MW-9 and MW-10 were 173 and 226 mg/L (MW-9) and 230 and 187 mg/L (MW-10), respectively. The difference in concentrations of chloride and sulfate between the upgradient and downgradient monitoring wells indicates that there is significant variability in the uppermost groundwater monitoring interval associated with the CCR Unit.

This conclusion is further supported by the difference in the boron concentrations observed during the reporting period. The average concentration of boron determined at the upgradient well (MW-7) was 0.73 mg/L while the average concentration of boron detected at the downgradient wells (MW-9 and MW-10) were significantly lower at 0.25 and 0.24 mg/L, respectively. Boron is a key Appendix III indicator parameter of potential impacts from a CCR Unit. Since boron concentrations down gradient of the Unit are lower than up gradient concentrations, it is further indicated that the BASA is not impacting groundwater quality.



# 4. Findings and Conclusions

Haley & Aldrich conducted an evaluation of groundwater quality data and information obtained as part of the detection and assessment monitoring programs and the materials contained within the BASA to identify potential sources of the arsenic and cobalt detected in the groundwater samples collected from monitoring wells MW-9 and MW-10 located downgradient of the BASA.

The evaluation included a review of sampling and analysis procedures, available laboratory analyses, and statistical analyses to determine if potential errors may have resulted in apparent SSL for arsenic and/or cobalt at the downgradient monitoring well locations. The evaluation also included a review of historical site activities based on aerial photographs and historical topographic maps, and consideration of potential point and non-point sources of arsenic and cobalt based on those activities.

To further evaluate if the materials stored within the BASA could be a source of arsenic and cobalt, results of the analysis of these materials for the concentration of leachable arsenic and cobalt from samples of bottom ash from the BASA for both past and current facility operations were reviewed and compared to the observed concentrations of these parameters within the downgradient wells during the monitoring period.

# 4.1 FINDINGS

Haley & Aldrich found no apparent errors in sampling, laboratory analysis, data management, or statistical analysis that would result in the apparent SSL for arsenic and cobalt at MW-9 and MW-10. Haley & Aldrich also found no evidence of historical point or non-point sources of arsenic and/or cobalt, or historical activities that affected the observed concentrations of arsenic and/or cobalt in groundwater downgradient of the BASA.

Haley & Aldrich evaluated available data to determine the potential for the materials stored within the BASA to be the source of the calculated SSL for arsenic and cobalt. Representative samples of bottom ash that had been stored within the BASA were obtained and submitted to a KDHE certified laboratory for the preparation of leachate samples in accordance with USEPA Method 1312, SPLP. The SPLP uses an acidic solution created using mineral acids consisting of nitric (HNO<sub>3</sub>) and sulfuric (H<sub>2</sub>SO<sub>4</sub>) acids to evaluate the potential for contaminants to leach from materials exposed to acidic precipitation. The leaching procedure is performed over a period of 18 hours with constant agitation using an extraction fluid at a pH of less than 5, which is significantly lower than the pH of the groundwater conditions at the BASA. Based on the rigorous nature of the SPLP, the results provide a conservative or worst-case estimate of the concentration of the contaminants that are likely to leach from the material tested. Arsenic and cobalt should therefore leach from the CCR material in lower concentrations in the natural environmental condition as compared to the results of the SPLP leaching tests. The results of the SPLP testing of the materials stored in the BASA are presented in Table I.

Key findings regarding the potential for the bottom ash stored in the BASA to leach arsenic and cobalt and impact groundwater quality in the uppermost aquifer include:

 The results of SPLP analyses of bottom ash samples collected from the BASA from 2011 through 2018 exhibited concentrations of arsenic and cobalt below the levels observed in all of the site monitoring wells during the reporting period.



These findings indicate that the aggressive leaching procedure used in the laboratory to evaluate bottom ash samples from the BASA could not reproduce the concentrations observed in groundwater at MW-9 and MW-10. Groundwater conditions at the BASA have less potential to leach constituents from the bottom ash than the SPLP analysis. Consequently, based on available data and information, it is unlikely that the concentrations of arsenic and cobalt observed in groundwater at MW-9 and MW-10 were derived from leaching of bottom ash material contained at the BASA by interaction with groundwater<sup>3</sup>.

# 4.2 CONCLUSIONS

Based on the direct analysis of the material stored in the BASA by an aggressive leaching procedure for the concentration of arsenic and cobalt, the natural variability in the uppermost groundwater monitoring interval observed during the monitoring period, and the absence of any errors in the sampling, analysis, and statistical evaluation of the monitoring results, the calculated SSLs for arsenic and cobalt identified at MW-9 and MW-10 are due to natural variability of the groundwater conditions around the BASA and not the materials either historically or currently stored in the Unit.

<sup>&</sup>lt;sup>3</sup> Furthermore, we note that the concentration of cobalt detected in the bottom ash SPLP leachate and all of the monitoring wells installed at the unit were below the KDHE non-residential groundwater use standards. The concentration of arsenic detected in the bottom ash SPLP leachate were below the KDHE non-residential groundwater use standards.



# 5. Certification

Pursuant to 40 CFR §257.94(e)(2), Westar conducted an alternate source evaluation to demonstrate that a source other than the BASA caused the SSL above the groundwater protection standards of arsenic and cobalt downgradient of the BASA identified during assessment monitoring.

This certification and the underlying data and evaluation performed in this report support the conclusion that a source other than the CCR unit is the cause of the SSL above the groundwater protection standards of arsenic and cobalt found during assessment monitoring of this Unit (i.e., arsenic at monitoring wells MW-9 and MW-10 and cobalt at monitoring well MW-9 downgradient of the BASA). That source has been identified as natural variability of the groundwater conditions within the uppermost aquifer underlying the BASA.

I certify that this report and all attachments were prepared by me or under my direct supervision. The information contained in this evaluation is, to the best of my knowledge, true, accurate, and complete.

HALEY & ALDRICH, INC.

Signed:

**Certifying Engineer** 

Print Name: Kansas License No.: Title: Company: Steven F. Putrich, P.E. PE24363 Principal Consultant Haley & Aldrich, Inc.



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Professional Geologist

Print Name: Kansas License No.: Title: Company: Mark D. Nicholls, P.G. 881 Lead Hydrogeologist Haley & Aldrich, Inc.



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TABLES

# TABLE I SUMMARY OF BOTTOM ASH SPLP ANALYSIS FOR TOTAL LEACHABLE METALS WESTAR ENERGY, INC.

TECUMSEH ENERGY CENTER BOTTOM ASH SETTLING AREA

TECUMSEH, KANSAS

Sample Identification	Sample Location	Sample Date	Method of Analysis	Parameter	Reporting Limit (mg/L)	Concentration (mg/L)
TEC Bottom Ash*	TEC Bottom Ash* Bottom Ash Settling Pond	7/14/2011	ICP-AES	Total Arsenic	0.005	ND
		//14/2011	ICP-AES	Total Cobalt	0.002	ND
TEC BA Inlet**	Bottom Ash Settling Pond Inlet	4/2/2019	ICP-MS	Total Arsenic	0.001	0.0025
			ICP-AES	Total Cobalt	0.005	ND
TEC BA Middle**	Bottom Ash Settling Pond	1/2/2019	ICP-MS	Total Arsenic	0.001	0.0055
TEC BA Mildule	Middle	4/2/2019	ICP-AES	Total Cobalt	0.005	ND
	Pottom Ach Sottling Road Outlat	4/2/2010	ICP-MS	Total Arsenic	0.001	0.0016
TEC BA Outlet	Bottom Ash Setting Pond Outlet	4/2/2019	ICP-AES	Total Cobalt	0.005	ND

#### Notes:

ICP-AES = Inductively Coupled Plasma Atomic Emission Spectroscopy

ICP-MS = Inductively Coupled Plasma Mass Spectroscopy

*mg/L* = *milligrams per liter or parts per million* (*ppm*)

TEC = Tecumseh Energy Center

*ND* = *Non-detect* at the reporting limit

**Bold Values** = parameter detected at a concentration greater than the reporting limits

\* Sample analyzed by Continental Analytical Services, Inc. Salina KS (KDHE Accreditation #E-10146)

\*\* Samples analyzed vt Pace Anayltical Services, LLC. Lenexa KS Kansas/NELAP Certification # E-10116/E10426



#### TABLE II

HISTORICAL AERIAL PHOTOGRAPH REVIEW SUMMARY WESTAR ENERGY, INC. TECUMSEH ENERGY CENTER BOTTOM ASH SETTLING AREA TECUMSEH, KANSAS

Dates	Description of Site	Sources
1948 – 1950	Power plant present; no development of the Bottom Ash Settling Area (BASA). Residential use of land to the west and southwest of the BASA. Coal pile and oil tank to east of future BASA site.	Aerial photos – ASCS; AMS
1970 – 1982	Development of the BASA. Residential use of land to the west of the 322 Landfill.	Aerial photos – USGS; NHAP
1991 – 2010	Continued development of the 322 Landfill. Residential use of land to the west of the 322 Landfill.	Aerial photos – USGS; NAIP
2012 – 2017	Continued use of the 322 Landfill configurations with only minor variations. Residential use of land to the west of the 322 Landfill.	Aerial photos – NAIP

Notes:

AMS = Army Mapping Service

ASCS = Agricultural and Soil Conservation Service

NAIP = National Agriculture Information Program

NHAP = National High Altitude Photography

USGS = United States Geological Survey



# **TABLE IIIHISTORICAL TOPOGRAPHIC MAP REVIEW SUMMARY**WESTAR ENERGY, INC.TECUMSEH ENERGY CENTERBOTTOM ASH SETTLING AREATECUMAETH, KANSAS

Dates	Description of Site and Adjacent Properties	Map Name
1950 – 1951	Power plant is indicated on the map. The Bottom Ash Settling Area (BASA) are undeveloped. Coal pile and above ground storage tank are due east of the BASA future area.	7.5-Minute Series, Grantville, Kansas Quadrangle
1970 – 1983	Development of the BASA. Significant development of structures and road to the east of the plant site.	7.5-Minute Series, Grantville, Kansas Quadrangle
1983	Development of the BASA.	7.5-Minute Series, Grantville, Kansas Quadrangle
2012	The plant site is no longer shown on the map. The BASA are shown on the map.	7.5-Minute Series, Grantville, Kansas Quadrangle

TECUMSEH, KANSAS

**FIGURES** 



# LEGEND

### PROPERTY BOUNDARY

KANSAS

TEC SITE 

# NOTES

- 1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
- 2. SITE COORDINATES: 39°3'13.53"N, 95°34'08.06"W
- 3. TOPOGRAPHIC IMAGERY SOURCE: ESRI.



2,000 SCALE IN FEET 4,000

WESTAR ENERGY TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

# SITE LOCATION

OCTOBER 2019 SCALE: AS SHOWN

FIGURE 1



# LEGEND



MONITORING WELL

 $\bigcirc$ 

PIEZOMETRIC OBSERVATION WELL

CROSS-SECTION

BOTTOM ASH SETTLING AREA

#### NOTE

- 1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
- 2. AMSL = ABOVE MEAN SEA LEVEL.
- 3. AERIAL IMAGERY SOURCE: ESRI, 7 NOVEMBER 2015.
- 4. GROUNDWATER ELEVATIONS ARE FROM 26 JUNE 2017.



60

SCALE IN FEET

WESTAR ENERGY TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

# BOTTOM ASH SETTLING AREA MONITORING WELL LOCATION MAP

OCTOBER 2019 SCALE: AS SHOWN

FIGURE 2

120

(NORTHWEST) APPROXIMATE BOTTOM OF MW-11 MW-10 BOTTOM ASH (PROJECTED ~100' 890 (PROJECTED ~105' SOUTHWEST) SOUTHWEST) - EXISTING GROUND MW-9 885 880 875 870 865 860 855 850





ELEVATION IN FEET

GLACIAL DEPOSITS/OVERBURDEN

TD=40' BGS



845

840

835

LIMESTONE MEMBER OF THE SCRANTON SHALE FORMATION

Α



TD=46' BGS

#### NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. VERTICAL SCALE IS EXAGGERATED 5 TIMES.

TD=42' BGS

3. PROJECTIONS ARE IN DIRECTION FROM ACTUAL LOCATION.



**APPENDIX A** 

Laboratory Reports



Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

April 09, 2019

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

# RE: Project: TEC BOTTOM ASH SPLP 2019 Pace Project No.: 60298624

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory between April 02, 2019 and April 09, 2019. 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,

Autor m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: Bob Beck, KCPL Lacygne Station HEATH HORYNA, WESTAR ENERGY Adam Kneeling, Haley & Aldrich, Inc. JARED MORRISON, WESTAR ENERGY





#### CERTIFICATIONS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

#### **Kansas Certification IDs**

9608 Loiret Boulevard, Lenexa, KS 66219 Missouri Certification Number: 10090 Arkansas Drinking Water WY STR Certification #: 2456.01 Arkansas Certification #: 18-016-0 Arkansas Drinking Water Illinois Certification #: 004455 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10116 / E10426 Louisiana Certification #: 03055 Nevada Certification #: KS000212018-1 Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407-18-11 Utah Certification #: KS000212018-8 Kansas Field Laboratory Accreditation: # E-92587 Missouri Certification: 10070 Missouri Certification Number: 10090



#### SAMPLE SUMMARY

Project:TEC BOTTOM ASH SPLP 2019Pace Project No.:60298624

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60298624001	TEC BA INLET	Solid	04/02/19 12:45	04/02/19 15:30
60298624002	TEC BA INLET LEACHATE	Water	04/05/19 10:15	04/05/19 10:16
60298624003	TEC BA MIDDLE	Solid	04/02/19 12:50	04/02/19 15:30
60298624004	TEC BA MIDDLE LEACHATE	Water	04/05/19 10:15	04/05/19 10:16
60298624005	TEC BA OUTLET	Solid	04/02/19 12:55	04/02/19 15:30
60298624006	TEC BA OUTLET LEACHATE	Water	04/05/19 10:15	04/05/19 10:16
60298624007	TEC BA INLET LEACHATE 2	Water	04/09/19 13:35	04/09/19 13:36
60298624008	TEC BA MIDDLE LEACHATE 2	Water	04/09/19 13:35	04/09/19 13:36
60298624009	TEC BA OUTLET LEACHATE 3	Water	04/09/19 13:35	04/09/19 13:36



# SAMPLE ANALYTE COUNT

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60298624001	TEC BA INLET	EPA 6010	JDE	23	PASI-K
		EPA 6020	JGP	5	PASI-K
		EPA 7470	LRS	1	PASI-K
60298624002	TEC BA INLET LEACHATE	EPA 300.0	MGS	3	PASI-K
		EPA 353.2	BLA	3	PASI-K
		EPA 365.4	RAD	1	PASI-K
60298624003	TEC BA MIDDLE	EPA 6010	JDE	23	PASI-K
		EPA 6020	JGP	5	PASI-K
		EPA 7470	LRS	1	PASI-K
60298624004	TEC BA MIDDLE LEACHATE	EPA 300.0	MGS	3	PASI-K
		EPA 353.2	BLA	3	PASI-K
		EPA 365.4	RAD	1	PASI-K
60298624005	TEC BA OUTLET	EPA 6010	JDE	23	PASI-K
		EPA 6020	JGP	5	PASI-K
		EPA 7470	LRS	1	PASI-K
60298624006	TEC BA OUTLET LEACHATE	EPA 300.0	MGS	3	PASI-K
		EPA 353.2	BLA	3	PASI-K
		EPA 365.4	RAD	1	PASI-K
60298624007	TEC BA INLET LEACHATE 2	EPA 7196	ZMH	1	PASI-K
60298624008	TEC BA MIDDLE LEACHATE 2	EPA 7196	ZMH	1	PASI-K
60298624009	TEC BA OUTLET LEACHATE 3	EPA 7196	ZMH	1	PASI-K



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA INLET	Lab ID: 6029	98624001	Collected: 04/02/1	9 12:4	5 Received: 04	/02/19 15:30 N	latrix: Solid	
Results reported on a "wet-we	ight" basis							
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP	Analytical Meth	od: EPA 60	010 Preparation Meth	nod: EF	PA 3010			
	Leachate Methe	od/Date: El	PA 1312; 04/04/19 00	:00				
Barium	ND	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:18	7440-39-3	
Beryllium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:18	7440-41-7	
Boron	0.36	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:18	7440-42-8	
Cadmium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7440-43-9	
Calcium	12.7	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:18	7440-70-2	
Chromium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7440-47-3	
Cobalt	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7440-48-4	
Copper	ND	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:18	7440-50-8	
Iron	0.22	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:18	7439-89-6	
Lead	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7439-92-1	
Magnesium	3.2	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:18	7439-95-4	
Manganese	0.0088	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7439-96-5	
Molybdenum	ND	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:18	7439-98-7	
Nickel	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7440-02-0	
Potassium	ND	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:18	7440-09-7	
Silica	6.9	mg/L	1.1	1	04/05/19 12:37	04/08/19 12:18	7631-86-9	
Silicon	3.2	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:18	7440-21-3	
Silver	ND	mg/L	0.0070	1	04/05/19 12:37	04/08/19 12:18	7440-22-4	
Sodium	7.3	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:18	7440-23-5	B,M1
Strontium	0.19	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:18	7440-24-6	
Titanium	0.012	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:18	7440-32-6	
Vanadium	0.024	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:18	7440-62-2	
Zinc	ND	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:18	7440-66-6	
6020 MET ICPM, SPLP	Analytical Meth	od: EPA 60	20 Preparation Meth	nod: EF	PA 3020			
	Leachate Meth	od/Date: El	PA 1312; 04/04/19 00	:00				
Aluminum	0.54	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:03	7429-90-5	M1
Antimony	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:03	7440-36-0	
Arsenic	0.0025	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:03	7440-38-2	
Selenium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:03	7782-49-2	
Thallium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:03	7440-28-0	
7470 Mercury, SPLP	Analytical Meth	od: EPA 74	170 Preparation Meth	nod: EF	PA 7470			
	Leachate Meth	od/Date: El	PA 1312; 04/04/19 00	:00				
Mercury	ND	mg/L	0.0020	1	04/05/19 16:19	04/08/19 12:37	7439-97-6	



#### Project: TEC BOTTOM ASH SPLP 2019

#### Pace Project No.: 60298624

Sample: TEC BA INLET LEACHATE	Lab ID: 60	<b>)298624002</b> C	Collected: 04/05/1	19 10:15	Received: 04	4/05/19 10:16 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Me	ethod: EPA 300.0	)					
Chloride	ND	mg/L	1.0	1		04/05/19 22:53	16887-00-6	
Fluoride	0.29	mg/L	0.20	1		04/05/19 22:53	16984-48-8	
Sulfate	13.2	mg/L	1.0	1		04/05/19 22:53	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Me	ethod: EPA 353.2	2					
Nitrogen, Nitrate	0.20	mg/L	0.10	1		04/05/19 14:59		В
Nitrogen, Nitrite	ND	mg/L	0.10	1		04/05/19 14:59		
Nitrogen, NO2 plus NO3	0.20	mg/L	0.10	1		04/05/19 14:59		В
365.4 Total Phosphorus	Analytical Me	ethod: EPA 365.4	ł					
Phosphorus	0.16	mg/L	0.10	1		04/06/19 10:53	7723-14-0	



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA MIDDLE	Lab ID: 602	98624003	Collected: 04/02/1	9 12:5	0 Received: 04	/02/19 15:30 N	latrix: Solid	
Results reported on a "dry we	eight" basis and are adj	usted for pe	rcent moisture, sa	mple s	size and any dilu	tions.		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP	Analytical Meth	nod: EPA 601	0 Preparation Meth	nod: EF	PA 3010			
	Leachate Meth	od/Date: EPA	A 1312; 04/04/19 00	:00				
Barium	ND	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-39-3	
Bervllium	ND	ma/L	0.0010	1	04/05/19 12:37	04/08/19 12:25	7440-41-7	
Boron	0.17	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-42-8	
Cadmium	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7440-43-9	
Calcium	27.7	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-70-2	
Chromium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7440-47-3	
Cobalt	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7440-48-4	
Copper	ND	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:25	7440-50-8	
Iron	1.9	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:25	7439-89-6	
Lead	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7439-92-1	
Magnesium	4.3	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:25	7439-95-4	
Manganese	0.019	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7439-96-5	
Molybdenum	ND	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:25	7439-98-7	
Nickel	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7440-02-0	
Potassium	4.4	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:25	7440-09-7	
Silica	20.5	mg/L	1.1	1	04/05/19 12:37	04/08/19 12:25	7631-86-9	
Silicon	9.6	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:25	7440-21-3	
Silver	ND	mg/L	0.0070	1	04/05/19 12:37	04/08/19 12:25	7440-22-4	
Sodium	31.4	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:25	7440-23-5	В
Strontium	0.25	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:25	7440-24-6	
Titanium	0.036	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:25	7440-32-6	
Vanadium	0.015	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:25	7440-62-2	
Zinc	ND	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:25	7440-66-6	
6020 MET ICPM, SPLP	Analytical Meth	nod: EPA 602	0 Preparation Meth	nod: EF	PA 3020			
	Leachate Meth	od/Date: EPA	A 1312; 04/04/19 00	:00				
Aluminum	1.9	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:08	7429-90-5	
Antimony	0.0012	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:08	7440-36-0	
Arsenic	0.0055	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:08	7440-38-2	
Selenium	0.0016	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:08	7782-49-2	
Thallium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:08	7440-28-0	
7470 Mercury, SPLP	Analytical Meth	nod: EPA 747	0 Preparation Meth	nod: EF	PA 7470			
	Leachate Meth	od/Date: EP/	A 1312; 04/04/19 00	:00				
Mercury	ND	mg/L	0.0020	1	04/05/19 16:19	04/08/19 12:44	7439-97-6	



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA MIDDLE LEACHATE	Lab ID: 60298624004		Collected: 04/05/19 10:15		Received: 04	4/05/19 10:16 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Mether	nod: EPA 300	.0					
Chloride	1.3	mg/L	1.0	1		04/05/19 23:32	16887-00-6	
Fluoride	0.39	mg/L	0.20	1		04/05/19 23:32	16984-48-8	
Sulfate	86.4	mg/L	10.0	10		04/05/19 23:44	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Meth	nod: EPA 353	.2					
Nitrogen, Nitrate	1.7	mg/L	0.10	1		04/05/19 15:00		
Nitrogen, Nitrite	1.4	mg/L	0.10	1		04/05/19 15:00		
Nitrogen, NO2 plus NO3	3.1	mg/L	0.10	1		04/05/19 15:00		
365.4 Total Phosphorus	Analytical Meth	nod: EPA 365	.4					
Phosphorus	1.1	mg/L	0.10	1		04/06/19 10:55	7723-14-0	



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA OUTLET	Lab ID: 602	98624005	Collected: 04/02/1	9 12:5	5 Received: 04	/02/19 15:30 N	latrix: Solid	
Results reported on a "dry weig	ght" basis and are adj	iusted for pe	rcent moisture, sa	mple	size and any dilu	tions.		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP	Analytical Meth	nod: EPA 601	0 Preparation Met	nod: El	PA 3010			
	Leachate Meth	nod/Date: EP/	A 1312; 04/04/19 00	0:00				
Barium	0.14	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-39-3	
Bervllium	ND	ma/L	0.0010	1	04/05/19 12:37	04/08/19 12:27	7440-41-7	
Boron	0.39	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-42-8	
Cadmium	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-43-9	
Calcium	15.5	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-70-2	
Chromium	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-47-3	
Cobalt	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-48-4	
Copper	ND	ma/L	0.010	1	04/05/19 12:37	04/08/19 12:27	7440-50-8	
Iron	0.055	ma/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7439-89-6	
Lead	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7439-92-1	
Magnesium	2.6	ma/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7439-95-4	
Manganese	ND	ma/l	0.0050	1	04/05/19 12:37	04/08/19 12:27	7439-96-5	
Molvbdenum	ND	ma/l	0.020	1	04/05/19 12:37	04/08/19 12:27	7439-98-7	
Nickel	ND	ma/l	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-02-0	
Potassium	ND	ma/l	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-09-7	
Silica	7.2	ma/l	1.1	1	04/05/19 12:37	04/08/19 12:27	7631-86-9	
Silicon	3.3	ma/l	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-21-3	
Silver		mg/L	0.0070	1	04/05/19 12:37	04/08/19 12:27	7440-22-4	
Sodium	5.5	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-23-5	в
Strontium	0.38	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:27	7440-24-6	2
Titanium		mg/L	0.010	1	04/05/19 12:37	04/08/19 12:27	7440-32-6	
Vanadium	0 043	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:27	7440-62-2	
Zinc	ND	ma/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7440-66-6	
			O Deservation Mari					
6020 MET ICPM, SPLP	Analytical Meth	100: EPA 602	D Preparation Met	100: EI	PA 3020			
	Leachate Meth	iod/Date: EP/	A 1312; 04/04/19 00	):00				
Aluminum	0.60	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:09	7429-90-5	
Antimony	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:09	7440-36-0	
Arsenic	0.0016	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:09	7440-38-2	
Selenium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:09	7782-49-2	
Thallium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:09	7440-28-0	
7470 Mercury, SPLP	Analytical Meth	nod: EPA 747	0 Preparation Met	nod: Fl	PA 7470			
	Leachate Meth	od/Date: EP/	A 1312; 04/04/19 00	):00				
Mercury		ma/l	0.0020	1	04/05/19 16.19	04/08/19 12:46	7439-07-6	
inicioury	ND	ing/L	0.0020		5-105/13 10.19	07/00/13 12.40	1-10-01-0	



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA OUTLET LEACHATE	Lab ID: 60298624006		Collected: 04/05/1	Collected: 04/05/19 10:15		4/05/19 10:16 N	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Meth	nod: EPA 300	.0					
Chloride	ND	mg/L	1.0	1		04/06/19 00:10	16887-00-6	
Fluoride	0.20	mg/L	0.20	1		04/06/19 00:10	16984-48-8	
Sulfate	16.4	mg/L	1.0	1		04/06/19 00:10	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Meth	nod: EPA 353	.2					
Nitrogen, Nitrate	0.15	mg/L	0.10	1		04/05/19 15:03		В
Nitrogen, Nitrite	ND	mg/L	0.10	1		04/05/19 15:03		
Nitrogen, NO2 plus NO3	0.15	mg/L	0.10	1		04/05/19 15:03		В
365.4 Total Phosphorus	Analytical Meth	nod: EPA 365	.4					
Phosphorus	ND	mg/L	0.10	1		04/06/19 10:58	7723-14-0	



Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample:	TEC BA INLET LEACHATE 2	Lab ID: 60	<b>298624007</b> C	ollected: 04/09/	19 13:35	Received: (	04/09/19 13:36 I	Matrix: Water	
	Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7196 Chr	omium, Hexavalent	Analytical Me	ethod: EPA 7196						
Chromiur	n, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:19	18540-29-9	



Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample:	TEC BA MIDDLE LEACHATE 2	CHATE 2 Lab ID: 60298624008		Collected: 04/09/1	9 13:35	Received: 04	4/09/19 13:36	Matrix: Water	
	Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7196 Chr	romium, Hexavalent	Analytical Met	hod: EPA 719	6					
Chromiur	n, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:21	18540-29-9	



Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample:	TEC BA OUTLET Lab ID: 60298624009 LEACHATE 3		98624009	Collected: 04/09/1	9 13:35	Received: 04	/09/19 13:36	Matrix: Water	
	Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7196 Chr	omium, Hexavalent	Analytical Met	hod: EPA 719	6					
Chromiur	n, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:2	2 18540-29-9	



Project: Pace Project No.:	TEC BOTTOM ASI 60298624	H SPLP 2019										
	E77E04		Analyzi	ia Mathad:								
QC Balch.	577594		Analysi			EPA 7470						
QC Batch Method:	EPA 7470		Analysi	Analysis Description:		7470 Mercury	SPLP					
Associated Lab San	nples: 602986240	001, 60298624003	, 602986240	005								
METHOD BLANK:	2370033		N	latrix: Wat	ter							
Associated Lab San	nples: 602986240	001.60298624003	. 602986240	005								
		,	Blank	R	eportina							
Paran	neter	Units	Result	t	Limit	Analvz	ed	Qualifiers				
					0.000		40.00		_			
Mercury		mg/∟		ND	0.0020	0 04/08/19	12.33					
LABORATORY CON	ITROL SAMPLE:	2370034										
			Spike	LCS	i	LCS	% Red	0				
Paran	neter	Units	Conc.	Resu	lt	% Rec	Limits	s Qi	ualifiers			
Mercury		mg/L	0.015		0.014	96	80	)-120		-		
MATRIX SPIKE & M	ATRIX SPIKE DUP	LICATE: 23700;	36		2370035							
			MS	MSD								
		60298624001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Мах	
Paramete	r Unit	s Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Mercury	mg/	L ND	0.015	0.015	0.014	0.015	96	97	75-125	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: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch:	577491	Analysis Method:	EPA 6010
QC Batch Method:	EPA 3010	Analysis Description:	6010 MET SPLP
Associated Lab Sam	oles: 60298624001.60298624003.6	0298624005	

Matrix: Water

METHOD BLANK: 2369565

Associated Lab Samples: 60298624001, 60298624003, 60298624005

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Barium	mg/L	ND	0.10	04/08/19 12:04	
Beryllium	mg/L	ND	0.0010	04/08/19 12:04	
Boron	mg/L	ND	0.10	04/08/19 12:04	
Cadmium	mg/L	ND	0.0050	04/08/19 12:04	
Calcium	mg/L	0.90	0.10	04/08/19 13:32	
Chromium	mg/L	ND	0.0050	04/08/19 12:04	
Cobalt	mg/L	ND	0.0050	04/08/19 12:04	
Copper	mg/L	ND	0.010	04/08/19 12:04	
Iron	mg/L	ND	0.050	04/08/19 12:04	
Lead	mg/L	ND	0.0050	04/08/19 12:04	
Magnesium	mg/L	0.082	0.050	04/08/19 12:04	
Manganese	mg/L	ND	0.0050	04/08/19 12:04	
Molybdenum	mg/L	ND	0.020	04/08/19 12:04	
Nickel	mg/L	ND	0.0050	04/08/19 12:04	
Potassium	mg/L	ND	0.50	04/08/19 12:04	
Silica	mg/L	ND	1.1	04/08/19 12:04	
Silicon	mg/L	ND	0.50	04/08/19 12:04	
Silver	mg/L	ND	0.0070	04/08/19 12:04	
Sodium	mg/L	8.6	0.50	04/08/19 13:32	
Strontium	mg/L	ND	0.020	04/08/19 12:04	
Titanium	mg/L	ND	0.010	04/08/19 12:04	
Vanadium	mg/L	ND	0.010	04/08/19 12:04	
Zinc	mg/L	ND	0.050	04/08/19 12:04	

#### LABORATORY CONTROL SAMPLE: 2369566

_		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	1	0.99	99	80-120	
Beryllium	mg/L	1	1.0	100	80-120	
Boron	mg/L	1	0.97	97	80-120	
Cadmium	mg/L	1	0.98	98	80-120	
Calcium	mg/L	10	10.2	102	80-120	
Chromium	mg/L	1	0.99	99	80-120	
Cobalt	mg/L	1	1.0	101	80-120	
Copper	mg/L	1	0.98	98	80-120	
Iron	mg/L	10	10.2	102	80-120	
Lead	mg/L	1	1.0	101	80-120	
Magnesium	mg/L	10	10	100	80-120	
Manganese	mg/L	1	0.98	98	80-120	
Molybdenum	mg/L	1	0.94	94	80-120	

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#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

#### LABORATORY CONTROL SAMPLE: 2369566

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Nickel	mg/L	1	1.0	100	80-120	
Potassium	mg/L	10	10	100	80-120	
Silica	mg/L	1	10.6	1060		
Silicon	mg/L	5	5.0	99	80-120	
Silver	mg/L	0.5	0.50	100	80-120	
Sodium	mg/L	10	9.9	99	80-120	
Strontium	mg/L	1	1.0	100	80-120	
Titanium	mg/L	1	0.99	99	80-120	
Vanadium	mg/L	1	0.99	99	80-120	
Zinc	mg/L	1	0.99	99	80-120	

MATRIX SPIKE & MATRIX S		2369568										
			MS	MSD								
	6	0298624001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	ND	1	1	1.1	1.1	103	103	75-125	1	20	
Beryllium	mg/L	ND	1	1	0.99	0.98	99	98	75-125	1	20	
Boron	mg/L	0.36	1	1	1.3	1.3	97	97	75-125	1	20	
Cadmium	mg/L	ND	1	1	0.97	0.97	97	97	93-110	1	20	
Calcium	mg/L	12.7	10	10	22.6	22.6	98	99	75-125	0	20	
Chromium	mg/L	ND	1	1	0.98	0.98	98	97	72-127	0	20	
Cobalt	mg/L	ND	1	1	1.0	0.99	99	99	90-116	0	20	
Copper	mg/L	ND	1	1	0.98	0.97	98	97	75-125	0	20	
Iron	mg/L	0.22	10	10	10.0	10	98	97	87-113	1	20	
Lead	mg/L	ND	1	1	1.0	0.99	100	99	75-125	1	20	
Magnesium	mg/L	3.2	10	10	13.4	13.4	102	101	75-125	0	20	
Manganese	mg/L	0.0088	1	1	0.98	0.97	97	96	58-158	1	20	
Molybdenum	mg/L	ND	1	1	0.93	0.93	93	93	75-125	0	20	
Nickel	mg/L	ND	1	1	0.99	0.99	99	98	75-125	1	20	
Potassium	mg/L	ND	10	10	9.9	9.7	99	97	75-125	1	20	
Silica	mg/L	6.9	1	1	16.5	16.3	965	944		1		
Silicon	mg/L	3.2	5	5	7.7	7.6	90	88	75-125	1	20	
Silver	mg/L	ND	0.5	0.5	0.50	0.49	99	98	75-125	1	20	
Sodium	mg/L	7.3	10	10	10.7	10.6	34	33	75-125	1	20	M1
Strontium	mg/L	0.19	1	1	1.2	1.2	100	100	75-125	0	20	
Titanium	mg/L	0.012	1	1	0.98	0.98	97	96	75-125	1	20	
Vanadium	mg/L	0.024	1	1	1.0	1.0	98	98	75-125	0	20	
Zinc	mg/L	ND	1	1	0.98	0.97	97	97	78-126	1	20	

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EPA 6020

6020 MET SPLP

Project: TEC BOTTOM ASH SPLP 2019

EPA 3020

Pace Project No.: 60298624

QC Batch: 577492 QC Batch Method:

Analysis Method:

Analysis Description:

Associated Lab Samples: 60298624001, 60298624003, 60298624005

METHOD BLANK: 2369569

Matrix: Water

Associated Lab Sample	es:	60298624001	60298624003	60298624005
Associated Lab Gampi	03.	00290024001,	00290024003,	00290024003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.050	04/08/19 12:00	
Antimony	mg/L	ND	0.0010	04/08/19 12:00	
Arsenic	mg/L	ND	0.0010	04/08/19 12:00	
Selenium	mg/L	ND	0.0010	04/08/19 12:00	
Thallium	mg/L	ND	0.0010	04/08/19 12:00	

#### LABORATORY CONTROL SAMPLE: 2369570

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	1	1.0	100	80-120	
Antimony	mg/L	0.04	0.038	94	80-120	
Arsenic	mg/L	0.04	0.036	91	80-120	
Selenium	mg/L	0.04	0.035	87	80-120	
Thallium	mg/L	0.04	0.037	93	80-120	

MATRIX SPIKE & MATRIX SPIK	ATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2369571 2369572											
			MS	MSD								
		60298624001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Aluminum	mg/L	0.54	1	1	1.8	1.9	131	132	75-125	1	20	M1
Antimony	mg/L	ND	0.04	0.04	0.038	0.038	94	92	75-125	2	20	
Arsenic	mg/L	0.0025	0.04	0.04	0.039	0.038	90	89	75-125	1	20	
Selenium	mg/L	ND	0.04	0.04	0.035	0.035	85	85	75-125	0	20	
Thallium	mg/L	ND	0.04	0.04	0.037	0.037	94	92	75-125	1	20	

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Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.:	60298624
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QC Batch:	577578
QC Batch Method:	EPA 300.0

Analysis Method:

Analysis Description: 300.0 IC Anions

EPA 300.0

Associated Lab Samples: 60298624002, 60298624004, 60298624006

METHOD BLANK: 23699	68	Matrix:	Water		
Associated Lab Samples:	60298624002, 60298624004,	, 60298624006			
		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	04/05/19 22:02	
Fluoride	mg/L	ND	0.20	04/05/19 22:02	
Sulfate	mg/L	ND	1.0	04/05/19 22:02	

#### LABORATORY CONTROL SAMPLE: 2369969

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L		5.0	100	90-110	
Fluoride	mg/L	2.5	2.6	104	90-110	
Sulfate	mg/L	5	5.3	105	90-110	

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Dustant	TEO DOTTON		0040
Project:	IEC BOLLOM	ASH SPLP	2019

Pace Project No.: 60298624

QC Batch:	577533
QC Batch.	57753

Associated Lab Samples:

QC Batch Method:

Analysis Method:

Analysis Description:

Matrix: Water

EPA 353.2 353.2 Nitrate + Nitrite, Unpres.

METHOD BLANK: 2369705

EPA 353.2

Associated Lab Samples:	60298624002, 60298624004, 60298624006

60298624002, 60298624004, 60298624006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	0.14	0.10	04/05/19 14:57	
Nitrogen, Nitrite	mg/L	ND	0.10	04/05/19 14:57	
Nitrogen, NO2 plus NO3	mg/L	0.14	0.10	04/05/19 14:57	

#### LABORATORY CONTROL SAMPLE: 2369706

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	0.96	96	70-130	
Nitrogen, Nitrite	mg/L	1	1.1	106	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.0	101	90-110	

MATRIX SPIKE SAMPLE:	2369707						
		60298624002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Nitrogen, Nitrate	mg/L	0.20	1	1.2	97	70-130	
Nitrogen, Nitrite	mg/L	ND	1	1.1	110	90-110	
Nitrogen, NO2 plus NO3	mg/L	0.20	2	2.3	104	90-110	

#### SAMPLE DUPLICATE: 2369708

		60298624006	Dup		Max	
Parameter	Units	Result	Result	RPD	RPD	Qualifiers
Nitrogen, Nitrate	mg/L	0.15	0.15	0	20	
Nitrogen, Nitrite	mg/L	ND	ND		20	
Nitrogen, NO2 plus NO3	mg/L	0.15	0.15	0	20	

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# **REPORT OF LABORATORY ANALYSIS**

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Project:	TEC BOTTOM AS	SH SPLP 2019						
Pace Project No .:	60298624							
QC Batch:	577541		Analysis Me	thod: E	EPA 365.4			
QC Batch Method:	EPA 365.4		Analysis De	scription: 3	365.4 Phosphoru	JS		
Associated Lab San	nples: 60298624	1002, 60298624004	4, 60298624006					
METHOD BLANK:	2369762		Matrix	: Water				
Associated Lab San	nples: 60298624	1002, 60298624004	4, 60298624006					
			Blank	Reporting				
Paran	neter	Units	Result	Limit	Analyzed	Qualifie	rs	
Phosphorus		mg/L	ND	0.10	0 04/06/19 10:	51		
LABORATORY COM	NTROL SAMPLE:	2369763						
_			Spike	LCS	LCS	% Rec	0	
Paran	neter	Units	Conc.	Result	% Rec		Qualifiers	
Phosphorus		mg/L	2	2.1	105	90-110		
MATRIX SPIKE SAI		2369764						
		2000704	60298624002	2 Spike	MS	MS	% Rec	
Paran	neter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Phosphorus		mg/L	0.	16 2	2.3	105	90-110	
	TE: 2369765							
			60298624004	Dup		Max		
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers	_
Phosphorus		mg/L	1.1	1.(	)	3 1	0	-

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Project: TEC I	BOTTOM AS	SH SPLP 2019						
Pace Project No.: 60298	3624							
QC Batch: 578	184		Analysis Me	ethod:	EPA 7196			
QC Batch Method: EPA	7196		Analysis De	scription:	7196 Chromium,	Hexavalent		
Associated Lab Samples:	60298624	007, 60298624008	3, 60298624009					
METHOD BLANK: 23723	388		Matrix	: Water				
Associated Lab Samples:	60298624	007, 60298624008	8, 60298624009					
			Blank	Reporting				
Parameter		Units	Result	Limit	Analyzed	Qualifi	ers	
Chromium, Hexavalent		mg/L	ND	0.01	0 04/09/19 14:	13		
LABORATORY CONTROL	SAMPLE:	2372389						
			Spike	LCS	LCS	% Rec	0 11/1	
Parameter		Units	Conc	Result	% Rec	Limits	Qualifiers	
Chromium, Hexavalent		mg/L	0.1	0.096	96	90-110		
MATRIX SPIKE SAMPLE		2372390						
		2012000	6029862400	7 Spike	MS	MS	% Rec	
Parameter		Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Chromium, Hexavalent		mg/L		ND 0.1	0.090	90	85-115	
	272201							
SAIVIPLE DUFLIGATE: 2	312331		60298624008	Dup		Max		
Parameter		Units	Result	Result	RPD	RPD	Qualifiers	
Chromium, Hexavalent		mg/L	ND	N	 D		20	-

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#### QUALIFIERS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

#### 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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.

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

#### ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

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



#### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:TEC BOTTOM ASH SPLP 2019Pace Project No.:60298624

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60298624001	TEC BA INLET	EPA 3010	577491	EPA 6010	577572
60298624003	TEC BA MIDDLE	EPA 3010	577491	EPA 6010	577572
60298624005	TEC BA OUTLET	EPA 3010	577491	EPA 6010	577572
60298624001	TEC BA INLET	EPA 3020	577492	EPA 6020	577571
60298624003	TEC BA MIDDLE	EPA 3020	577492	EPA 6020	577571
60298624005	TEC BA OUTLET	EPA 3020	577492	EPA 6020	577571
60298624001	TEC BA INLET	EPA 7470	577594	EPA 7470	577730
60298624003	TEC BA MIDDLE	EPA 7470	577594	EPA 7470	577730
60298624005	TEC BA OUTLET	EPA 7470	577594	EPA 7470	577730
60298624002	TEC BA INLET LEACHATE	EPA 300.0	577578		
60298624004	TEC BA MIDDLE LEACHATE	EPA 300.0	577578		
60298624006	TEC BA OUTLET LEACHATE	EPA 300.0	577578		
60298624002	TEC BA INLET LEACHATE	EPA 353.2	577533		
60298624004	TEC BA MIDDLE LEACHATE	EPA 353.2	577533		
60298624006	TEC BA OUTLET LEACHATE	EPA 353.2	577533		
60298624002	TEC BA INLET LEACHATE	EPA 365.4	577541		
60298624004	TEC BA MIDDLE LEACHATE	EPA 365.4	577541		
60298624006	TEC BA OUTLET LEACHATE	EPA 365.4	577541		
60298624007	TEC BA INLET LEACHATE 2	EPA 7196	578184		
60298624008	TEC BA MIDDLE LEACHATE 2	EPA 7196	578184		
60298624009	<b>TEC BA OUTLET LEACHATE 3</b>	EPA 7196	578184		

Pace Analytical <sup>®</sup> Sample Condition Up	oon Receipt	WO#:60298624
Client Name: Mester Energy		
Courier: FedEx UPS VIA Clay P		Pace Z Xroads Client Other C
Tracking #: Pace	e Shipping Label Use	d? Yes□ Not
Custody Seal on Cooler/Box Present: Yes 🖉 No 🗆	Seals intact: Yes	No 🗆
Packing Material:     Bubble Wrap □     Bubble Bags Ø       Thermometer Used:     ✓     Type of	f Foam ⊡ Ice:Wet Blue No	None  Other  ne
Cooler Temperature (°C): As-read $\frac{2}{5}$ Corr. Factor	or <u>- 1,0</u> Correct	ted 3,5 Date and initials of person examining contents: 4/12/19
Temperature should be above freezing to 6°C		
Chain of Custody present:	ZYes DNo DN/A	
Chain of Custody relinquished:		
Samples arrived within holding time:	Yes No N/A	
Short Hold Time analyses (<72hr):		
Rush Turn Around Time requested:	Yes No N/A	3 24/
Sufficient volume:	Yes No N/A	
Correct containers used:		
Pace containers used:	∕ ØYes □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		
Samples contain multiple phases? Matrix: 52	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 2N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
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 ØN/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/Ti	me:	
Comments/ Resolution:		
Project Manager Review:	Date	9



# CHAIN-OF-CUSTODY / Analytical Request Document

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

Section Require	A I Client Information:	Section B Required F	<b>3</b> Project	t Inform	nation:					Sec Invo	c <b>tion C</b> Nice Info	; irmatio	on:													ſ	Pa	ge:	1	of		1
Company	WESTAR ENERGY	Report To: Brandon Griffin Attention: Accounts Payable																														
Address:	2nd Dupont Road	Сору То:	Jare	d Mo	rrison, Ad	dam Kne	eling		-	Corr	npany N	lame:	WI	STA	AR E	NER	GY		_		REGULATORY AGENCY											
	Tecumseh, KS 66542		Bob	Beck						Add	ress:																					
Email To		Purchase C	Order I	No.:	10TEC-0	0000079	957			Pace	e Quote											US	т	Г	RC	RA			Г	OTHER		
Phone:	Fax:	Project Nar	ne:	TEC	Bottom /	Ash 2019	)			Pace	Project	Н	leath	er W	ilson	, 913	3-563	8-140	7		Site Location											
Request	ed Due Date/TAT: 3-5 Days	Project Nur	прег.							Pace	e Profile	#: 1	1973	,1&	2					_		s	TAT	57		KS		- 6				
								_	_	_				_				Re	que	sted	Ana	lysi	s Filt	ered	(Y/N	)						
	Section D Valid Matrix Co Required Client Information MATRIX	CODE	left)	(dF)		COLL	ECTED					P	reser	vativ	AS		NU										į					
TEM #	Kequired Lient Information     MATRIX     DRINKING WATER     WATER     WATE WATER     WATE WATER     WATE WATER     WATE WATER     WATE     NOTHER     ID     (A-Z, 0-9 /,-)     Sample IDs MUST BE UNIQUE     TISSUE	CUDE DW WT WW P SL OL WP AR OT TS	ATRIX CODE (see valid codes to	AMPLE TYPE (G=GRAB C=CON	COMPC		COMPO END/GF		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Jupreserved	1 <sub>2</sub> SO4		AaOH	Methanol	Dther	Analysis Test	010 SPLP Meatls*	470 Hn	PLP 300.0 Cl, F, SO4	PLP 353.2 Nitrates	PLP 365.4 Phosphorus	PLP Hexavalent Chromi					Residual Chlorine (Y/N)	u <sup>02</sup>	g q U	2 <sup>U</sup>	(1ab10
-	TEC BA Talet		-	0)	DATE	TIME	4/2	12215		-	+++	ŧ	20			H					0	0)	0	+				2	Pennin	Project		oto that the
1	TEC BA Middle		SL SL	G			4/2	1250			11	-ř	₽¥.	14	+			+	Н	++	$\left  \right $	+	++	+-	19	54			300	0 353 2	2 36	5.4 and
2	TEL BA Quitlet		SL	6			4/2	1255		Ħ	11	+		1V	+			1	tH	H	H	$^{\dagger}$	++	+	12	50	1	ã.	Hexava	ent Chro	-, ou	m need to be
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*Ba, Be,	B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Si,	135	N	6	we	the/		4/2/1	a	13	30		1	1	12	1	2	6				11	2110	. ,	14 T		H.	5	~	V	T	2/
**Al, As,	Na, St. 11, V, 21 Sb, Se, Tl	17	<i>.</i> ,			//1		4777	1			1	-	1	40	/	10	-	-			77.	417	1	2.0		17		t			/
Receiving Hexavale	p: Please note that the 300.0, 353.2, 365.4, and the Chromium need to be logged as a leachate sample											1																			1	
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SAMPLER NAM						ER NAME A	ND SIGN	TUF	RE																	ů		ы Б Э	ealec (/N)		ntact	
25							PRINT Nam	e of SAMP	LER:	1	lian	dir	2	61	i P	Fin	1										np in	.	eivec 9 (Y/I	ody S Mer ()		les I (γ/N)
of 25							SIGNATUR	E of SAMP	LER:	1	N	Y	V	2				DAT (MM	E Sig /DD/\	ned (Y):	04	10	2/1	9			Ten		Rec Ice	Custo Coo		Samp



08/04/2011

Page: 1

Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

Date and Time Received: 07/14/2011 09:00 Continental File No.: 7701 Continental Order No.: 57218 Project ID: TEC Purchase Auth: 901836

Dear Mr. Junod:

This laboratory report containing the samples indicated below, includes 15 pages for the analytical report, 1 page(s) for the chain of custody and/or analysis request, and 1 page(s) for the sample receipt form.

CAS LAB ID #	SAMPLE DESCRIPTION	SAMPLE TYPE	DATE SAMPLED
11070963	TEC Fly Ash-SPLP	Liquid	7/13/2011
11070964	TEC Bottom Ash -SPLP	Liquid	7/13/2011

The Appendix and Quality Control sections are integral parts of this laboratory report and may contain important data qualifiers.

All results are reported on a wet weight basis unless otherwise stated.

Samples will be retained for 120 days unless Continental is otherwise notified.

Continental is accredited by the State of Kansas through the National Environmental Laboratory Accreditation Program (NELAP). The results contained in this report were obtained using Continental's Standard Operating Procedures. These procedures are in substantial compliance with the approved methods referenced and the standards published by NELAP unless otherwise noted in the Appendix and Quality Control sections of this report.

This report may not be reproduced, except in full, without written approval from Continental Analytical Services, Inc.

Thank you for choosing Continental for this project. If you have any questions please contact me at (800)535-3076.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker Technical Manager

ram traddock

Petra M. Craddock Project Manager



525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737 785-827-1273 800-535-3076 Fax 785-823-7830 Service and the service and th

KDHE Environmental Laboratory Accreditation No. E-10146



Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Page: 2

Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Lab Number: 11070963 Sample Description: TEC Fly Ash-SPLP Date Sampled: 07/13/2011 Time Sampled: 1420

				Dilution	:
Analysis	Concentra	tion	<u>Units</u>	Factor	LOQ
Aluminum, Tot. Rec., ICP-M	IS 83400		µg/L	1.0	0.03
Antimony, Tot. Rec., ICP-M	IS ND(5)		µg/L	1.0	5
Arsenic, Total, ICP	ND(5)		µg/L	1.0	5
Barium, Total, ICP	6980		µg/L	1.0	0.10
Beryllium, Total, ICP	ND(2)		µg/L	1.0	2
Boron, Total, ICP	ND(500)		µg/L	1.0	500
Cadmium, Total, ICP	ND(2)		µg/L	1.0	2
Calcium, Total, ICP	206	,	mg/L	1.0	0.5
Chromium, Total, ICP	92		µg/L	1.0	5
Cobalt, Total, ICP	ND(2)		µg/L	1.0	2
Copper, Total, ICP	ND(10)		µg/L	1.0	10
Final pH, SPLP Extract	11.3		Std. units	1.0	
Iron, Total, ICP	ND(0.10)	ł	mg/L	1.0	0.10
Lead, Total, ICP	ND (5)		μg/L	1.0	3
Magnesium, Total, ICP	ND(0.1)		mg/L	1.0	0.1
Manganese, Total, ICP	ND (5)		μg/L	1.0	5
Mercury, Total	ND(0.2)		μg/L	1.0	0.2
Molybdenum, Total, ICP	110.		µg/L	1.0	5
Nickel, Total, ICP	ND (5)		μg/L	1.0	5
Potassium, Dissolved, ICP	0.9 B		mg/L	1.0	0.3
Selenium, Tot. Rec., ICP-M	<b>S</b> 10.		µg/L	1.0	5
Silicon as Silica	1.04 BS	0.16	mg/L	1.0	0.04
Silver, Total, ICP	ND (5)		μg/L	1.0	5
Sodium, Dissolved, ICP	13.9 BS	2.6	mg/L	1.0	0.5
Strontium, Total, ICP	11900		µg/L	1.0	5
Thallium, Tot. Rec., ICP-M	S ND(2)		µg/L	1.0	2
Titanium, Total, ICP	6		µg/L	1.0	5
Vanadium, Total, ICP	10.		µg/L	1.0	5
Zinc, Total, ICP	15 .		µg/∟	1.0	10
Chloride	1.2		mg/L	1.0	1.0
Chromium, Hexavalent	0.175		mg/L	1.0	0.010
Fluoride	2.7 E QC	3	mg/L	1.0	0.1
Nitrate, as N	ND(0.1)		mg/L	1.0	0.1
Nitrate/Nitrite, as N	ND(0.1)		mg/L	1.0	0.1
Nitrite, as N	ND(0.1)		mg/L	1.0	0.1 .
Phosphorus, Total, as P	ND(0.2)		mg/L	0	0
Sulfate	12.9		mg/L	1.0	1.0
	Date/Time	Date/Time	QC	Inst.	
Analysis	Prepared	Analyzed	Batch	Batch	Analyst Method(s)

-Continued-

525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737 785-827-1273 800-535-3076 Fax 785-823-7830 KDHE Environmental Laboratory Accreditation No. E-10146




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Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

•	Date/Time	Date/Time	QC	Inst.			
Analysis	Prepared	Analyzed	Batch	Batch	Analyst	Method(s)	
Aluminum, Tot. Rec., ICP-	M07/21/11 1200	08/02/11 1	1619 110721-3	2IP3214	JDL	6020A	
Antimony, Tot. Rec., ICP-	M07/21/11 1200	07/21/11 1	1914 110721-3	4IP3202	JDL	6020A	
Arsenic, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Barium, Total, ICP	07/21/11 1130	07/25/11 1	1338 1107 <b>21-</b> 3	3IP4206	JDL	6010B	
Beryllium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	<b>3IP4206</b>	JDL	6010B	
Boron, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-:	3IP4206	JDL	6010B	
Cadmium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	. 3I <b>P42</b> 06	JDL	6010B	
Calcium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Chromium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Cobalt, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Copper, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Final pH, SPLP Extract	N/A	07/20/11	110720-3	720BLK1	ADK	9040B	
Iron, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Lead, Total, ICP	07/21/11 1130	07/28/11 1	1351 110721-:	4IP4209	JDL	6010B	
Magnesium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Manganese, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-1	3IP4206	JDL	6010B	
Mercury, Total	07/21/11 1126	07/22/11 1	1757 110721-3	3MA3203	JDL	7470A	
Molybdenum, Total, ICP	07/21/11 1130	07/26/11 1	1807 110721-3	4IP4207	JDL	6010B	
Nickel, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Potassium, Dissolved, ICP	07/22/11 1252	08/02/11 1	1955 110722-	5 4IP4214	KMW	6010B	
Selenium, Tot. Rec., ICP-	M07/21/11 1200	07/21/11 1	1914 1 <b>10721-</b> 3	41P3202	JDL	6020A	
Silicon as Silica	07/22/11 1200	08/01/11 1	1629 110722-3	3 3IP4213	KMW	6010B	
Silver, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	$_{ m JDL}$	6010B	
Sodium, Dissolved, ICP	07/22/11 1252	08/02/11 1	1955 110722-	5 4IP4214	KMW	6010B	
Strontium, Total, ICP	07/21/11 1130	07/28/11 1	1351 110721-3	4IP4209	$_{\rm JDL}$	6010B	
Thallium, Tot. Rec., ICP-	M07/21/11 1200	07/21/11 1	1914 110721-:	4IP3202	JDL	6020A	
Titanium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B	
Vanadium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-1	3IP4206	JDL	6010B	
Zinc, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	$_{\rm JDL}$	6010B	
Chloride	N/A	07/21/11 1	1215 1IC1202	1IC1202	MLL	300.0/9056 <b>A</b>	
Chromium, Hexavalent	N/A	07/21/11 1	1107 110721-3	110721-2	JND	7196A (Modified)	
Fluoride	N/A	08/01/11 1	1437 1IC2213	1IC2213	MLL	300.0/9056A	
Nitrate, as N	N/A	07/21/11 1	1215 1IC1202	1IC1202	MLL	300.0/9056A	
Nitrate/Nitrite, as N	N/A	07/26/11				Calc.	
Nitrite, as N	N/A	07/21/11 1	1215 1IC1202	1IC1202	MLL	300.0/9056A	
Phosphorus, Total, as P	N/A	07/21/11 1	1422 110721-2	2 110721-3	КЈН	SM 4500-P(B&F) (M	
Sulfate	N/A	07/21/11 1	1215 1IC1202	1IC1202	MLL	300.0/9056A	
ICP Metals Total Preparat	ion Method					3010A	
Dissolved Metals Preparat	ion Method	•				3005A	
Mercury Total Preparation	Method					7470A	
Total Recoverable Metals	Preparation Me	thod				3005A	

Conclusion of Lab Number: 11070963





Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Page: 4

Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Lab Number: 11070964 Sample Description: TEC Bottom Ash -SPLP

Date Sampled: 07/13/2011 Time Sampled: 1430

:			Diluti	n
Analysis	Concentra	tion Unit	s Factor	LOQ
Aluminum, Tot. Rec., ICP-	MS 10400	μg/L	1.0	0.03
Antimony, Tot. Rec., ICP-	MS ND(5)	μg/I	1.0	5
Arsenic, Total, ICP	ND (5)	μg/L	1.0	5
Barium, Total, ICP	546	μg/L	1.0	0.10
Beryllium, Total, ICP	ND(2)	μg/L	1.0	2
Boron, Total, ICP	900	μg/L	1.0	500
Cadmium, Total, ICP	ND(2)	μg/L	1.0	2
Calcium, Total, ICP	87.1	mg/L	1.0	0.5
Chromium, Total, ICP	16	μg/L	1.0	5
Cobalt, Total, ICP	ND(2)	μg/L	1.0	2
Copper, Total, ICP	ND(10)	μg/L	1.0	10
Final pH, SPLP Extract	10.4	Std.	units 1.0	
Iron, Total, ICP	ND(0.10)	mg/L	1.0	0.10
Lead, Total, ICP	ND (5)	µg/L	1.0	3
Magnesium, Total, ICP	0.3	mg/L	1.0	0.1
Manganese, Total, ICP	ND(5)	μg/L	1.0	5
Mercury, Total	ND(0.2)	µg/⊥	1.0	0.2
Molybdenum, Total, ICP	12	μg/L	1.0	5
Nickel, Total, ICP	ND (5)	µg/⊥	1.0	5
Potassium, Dissolved, ICP	0.4 B	mg/L	1.0	0.3
Selenium, Tot. Rec., ICP-1	<b>1S N</b> D(5)	. μg/L	1.0	5
Silicon as Silica	3.48	mg/L	1.0	0.04
Silver, Total, ICP	ND (5)	µg/L	1.0	5
Sodium, Dissolved, ICP	6.0 BS 2	2.6 mg/L	1.0	0.5
Strontium, Total, ICP	1360	µg/L	1.0	5
Thallium, Tot. Rec., ICP-N	AS ND(2)	µg/L	1.0	2
Titanium, Total, ICP	ND (5)	μg/L	1.0	5
Vanadium, Total, ICP	51	µg/L	1.0	5
Zinc, Total, ICP	15	µg/L	1.0	10
Chloride	1.9	mg/L	1.0	1.0
Chromium, Hexavalent	0.018	mg/L	1.0	0.010
Fluoride	0.1	mg/L	1.0	0.1
Nitrate, as N	0.1	mg/L	1.0	0.1
Nitrate/Nitrite, as N	0.1	mg/L	1.0	0.1
Nitrite, as N	ND(0.1)	mg/L	1.0	0.1
Phosphorus, Total, as P	ND(0.2)	mg/L	0	0
Sulfate	148	mg/L	10	10
	Date/Time	Date/Time	QC Inst.	
Analysis	Prepared	Analyzed I	Batch Batch	Analyst Method(s)

-Continued-





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Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Analysis         Prepared         Analyzed         Batch         Batch         Analyst         Method(s)           Aluminum, Tot. Rec., ICP-M07/21/11         1200         08/02/11         1655         110721-3         3IP3214         JDL         6020A           Antimony, Tot. Rec., ICP-M07/21/11         1200         07/21/11         1941         110721-3         4IP3202         JDL         6020A	
Aluminum, Tot. Rec., ICP-M07/21/11 1200 08/02/11 1655 110721-3 3IP3214 JDL 6020A Antimony, Tot. Rec., ICP-M07/21/11 1200 07/21/11 1941 110721-3 4IP3202 JDL 6020A	
Antimony, Tot. Rec., TCP-M07/21/11 1200 07/21/11 1941 110721-3 41P3202 (TDT. 6020)	
Arsenic, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Barium, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 4IP4207 JDL 6010B	
Beryllium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Boron, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 4IP4207 JDL 6010B	
Cadmium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Calcium, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 41P4207 JDL 6010B	
Chromium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 31P4206 JDL 6010B	
Cobalt, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Copper, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Final pH, SPLP Extract N/A 07/20/11 110720-1 720BLK1 ADK 9040B	
Iron, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Lead, Total, ICP 07/21/11 1130 07/28/11 1355 110721-1 4IP4209 JDL 6010B	
Magnesium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Manganese, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Mercury, Total 07/21/11 1126 07/22/11 1828 110721-1 4MA3203 JDL 7470A	
Molybdenum, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 4IP4207 JDL 6010B	
Nickel, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Potassium, Dissolved, ICP 07/22/11 1252 08/02/11 2008 110722-5 5IP4214 KMW 6010B	
Selenium, Tot. Rec., ICP-M07/21/11 1200 07/21/11 1941 110721-3 4IP3202 JDL 6020A	
Silicon as Silica 07/22/11 1200 08/01/11 1633 110722-3 3IP4213 KMW 6010B	
Silver, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Sodium, Dissolved, ICP 07/22/11 1252 08/02/11 2008 110722-5 51P4214 KMW 6010B	
Strontium, Total, ICP 07/21/11 1130 07/28/11 1355 110721-1 4IP4209 JDL 6010B	
Thallium, Tot. Rec., ICP-M07/21/11 1200 07/21/11 1941 110721-3 4IP3202 JDL 6020A	
Titanium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 31P4206 JDL 6010B	
Vanadium, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 4IP4207 JDL 6010B	
Zinc, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 31P4206 JDL 6010B	
Chloride N/A 07/21/11 1229 1IC1202 1IC1202 MLL 300.0/9056A	
Chromium, Hexavalent N/A 07/21/11 1107 110721-1 110721-2 JND 7196A (Modifi	(ed
Fluoride N/A 07/26/11 2229 1IC2207 3IC2207 MLL 300.0/9056A	
Nitrate, as N N/A 07/21/11 1229 1IC1202 1IC1202 MLL 300.0/9056A	
Nitrate/Nitrite, as N N/A 07/26/11 Calc.	
Nitrite, as N N/A 07/21/11 1229 1IC1202 1IC1202 MLL 300.0/9056A	
Phosphorus, Total, as P N/A 07/21/11 1423 110721-2 110721-3 KJH SM 4500-P(B&F	P) (M
Sulfate N/A 07/21/11 1348 1IC1202 2IC1202 MLL 300.0/9056A	,
ICP Metals Total Preparation Method 3010A	
Dissolved Metals Preparation Method 3005A	
Mercury Total Preparation Method 7470A	
Total Recoverable Metals Preparation Method 3005A	

Conclusion of Lab Number: 11070964





APPENDIX

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Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

ND indicates not detected with the LOQ (Limit of Quantitation) in parentheses. The LOQ value has been adjusted for the dilution factor and percent solids, as applicable. Due to rounding of significant figures, the LOQ value may vary slightly from the reported concentration. The LOQ is the lowest concentration of the analytical standard that was used for calibrating the instrument. If an analytical standard is analyzed at the LOQ, an error of as much as +/- 50% can be expected.

Not all samples were received at a temperature of less than 6 degrees Celsius. Refer to the enclosed Cooler/Sample Receipt Form(s) for the affected cooler(s) and sample(s).

The following table presents the date and time sampled, the date and time analyzed, and the total time elapsed for each analysis with an EPA recommended holding time of seventy-two hours or less.

		DATE/TIME	DATE/TIME	ELAPSED
CAS LAB ID #	ANALYSIS	SAMPLED	ANALYZED	HRS:MIN
11070963	Chromium, Hexavalent	07/13/2011 1420	07/21/2011 1107	188:47
11070963	Nitrate, as N	07/13/2011 1420	07/21/2011 1215	189:55
11070963	Nitrite, as N	07/13/2011 1420	07/21/2011 1215	189:55
11070964	Chromium, Hexavalent	07/13/2011 1430	07/21/2011 1107	188:37
11070964	Nitrate, as N	07/13/2011 1430	07/21/2011 1229	189:59
11070964	Nitrite, as N	07/13/2011 1430	07/21/2011 1229	189:59

**B** - Analyte is also present in the method blank or load blank at the concentration indicated either to the right of the letter B and/or in the enclosed Quality Control Report. The reported sample concentration has not been blank corrected.

BS - This analyte was detected in a blank from the SPLP or TCLP procedure at the concentration indicated to the right of the qualifier. The sample result has not been blank corrected. The analytical method blank can be found in the QC report.

E - Concentration or reporting limit is an estimated value. Matrix interferences and/or sample heterogeneity were noted at the time of sample analysis.

QC - QC data qualifiers were noted. See the Quality Control Report.



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Date: 08/04/2011

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Continental Analytical Services, Inc. Accreditation Summary Report

Client: Westar Energy, Inc. CAS Order Number: 57218

NELAP accreditation is issued under each EPA regulatory program for a given matrix/analyte/method combination. Continental is NELAP accredited for each matrix/analyte/method and EPA program cited in this Laboratory Report, except for those listed in the table below and analysis performed in the field. For most of the analyses listed in the table, NELAP accreditation is not offered under the listed EPA program and Continental is NELAP accredited for the analysis, using the same analytical technology, but under a different EPA program. Continental's full NELAP accreditation status may be viewed at www.kdheks.gov/envlab. Note that unless qualified otherwise in the Laboratory Report, Continental performs all analyses, including each analysis listed in the table below, utilizing NELAP protocol.

		Matrix- Regulato <b>ry</b>		Accredited in Other
<u>Test</u> GL218 SL602	Analysis Phosphorus, Total, as P SPLP Prep	Program L-RCRA L-RCRA	<u>Method</u> SM 4500-P(B&F)(M)	<u>Reg. Program</u> Y N

525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737 785-827-1273 800-535-3076 Fax 785-823-7830 KOME Environmental Laboratory Accreditation No. E-10146



CAS NELAP



Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Quality Control Report Batch Summary Page: 9 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Test	Testname	QC Batch	Method Blank	LCS	MS Lab No.
SL470	Final pH, SPLP Extract	110720-1	110720BLK1	110720LCS1	
<b>S</b> L602	SPLP Prep	110720-1	110720BLK1		
Lab numb	ers associated with this batch:				
11070963	3 11070964				

SL802	Arsenic, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL303	Barium, Total, ICP	110721-1	110721BLK1	110721LCS1	1107096 <b>4MS</b>
SL304	Beryllium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL305	Boron, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL306	Cadmium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL307	Calcium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL308	Chromium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL309	Cobalt, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL313	Copper, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL326	Iron, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL311	Lead, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL331	Magnesium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL332	Manganese, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL333	Mercury, Total	110721-1	110721BLK1	110721LCS1	11070963MS
SL334	Molybdenum, Total, ICP	110721-1	110721BLK1	110721LC <b>S1</b>	11070964MS
SL336	Nickel, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL353	Silver, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL357	Strontium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
<b>SL</b> 366	Titanium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL368	Vanadium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL369	Zinc, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
Lab num	bers associated with this batch:				
1107096	3 11070964				
SL000	Aluminum, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963 <b>MS</b>
SL001	Antimony, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
SL023	Selenium, Tot. Rec., ICP-MS	110721-3	<b>1</b> 10721BLK3	110721LCS3	11070963MS

SL023 Selenium, Tot. Rec., ICP-MS SL029 Thallium, Tot. Rec., ICP-MS Lab numbers associated with this batch: 11070963 11070964

SL212 Silicon as Silica Lab numbers associated with this batch: 11070963 11070964 110722BLK3 110722LCS3

11070964MS

110721LCS3 11070963MS

SL242	Potassium, Dissolved, ICP	110722-5	110722BLK5	110722LCS5	11070964MS
SL255	Sodium, Dissolved, ICP	110722-5	110722BLK5	110722LCS5	11070964MS
Lab numb	ers associated with this batch:			-	
11070963	11070964				

110722-3

110721-3 110721BLK3





Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Quality Control Report Batch Summary Page: 10 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Test	Testname	QC Batch	Method Blank	LCS	MS Lab No.
GL502 Lab num 1107096	Chloride bers associated with this batch: 3 11070964	11C1202	BLK1IC1202	LCS1IC1202	11071334 <b>MS</b>
GL147 Lab num 1107096	Chromium, Hexavalent bers associated with this batch: 3 11070964	110721-1	110721BLK1	110721LCS1	11071608MS
GL501 Lab num 1107096	Fluoride bers associ <b>ated with this batch:</b> 4	11C2207	BLK11C2207	LCS11C2207	
GL501 Lab num 1107096	Fluoride bers associated with this batch: 3	11C2213	BLK1IC2213	LCS1IC2213	
GL505 Lab num 1107096	Nitrate, as N bers associated with this batch: 3 11070964	11C1202	BLK1IC1202	LCS1IC1202	
GL510 Lab num 1107096	Nitrate/Nitrite, as N bers associated with this batch: 3 11070964				
GL503 Lab num 1107096	Nitrite, as N bers associated with this batch: 3 11070964	11C1202	BLK1IC1202	LCS1IC1202	
GL218 Lab num 1107096	Phosphorus, Total, as P bers associated with this batch: 3 11070964	110721-2	110721BLK2	110721LCS2	11071101MS
GL506 Lab numi 1107096	Sulfate pers associated with this batch: 3 11070964	11C1202	BLK11C1202	LCS11C1202	
			<u> </u>		an teres of the alexa





Quality Control Report Method Blank, LCS, MS/MSD Data

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Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

	Blank	k Rec		Spike		Spiked (% Rec	Sample overy)		Spike		Spiked Precis	i Sample sion Data
Analysis	Data	LCS	Limits	Level	Units	MS	MSD	Limits	Level	Units	RPD	Limit
QC Batch: 110721-1	For sample:	prepar	ed on: 07/21	/2011	••	Spiked	sample: 110	070963				
Mercury, Total	ND (0.2)	89.1	80.0-120	5.0	µg/L	90.2	91.9	80.0-120	5.0	µg/⊾	1.9	20.0
C Batch: 110721-1	For sample:	prepar	ed on: 07/21	/2011		Spiked	sample: 11(	070964				4., N. M.
rsenic, Total, ICP	ND (5)	96.5	80.0-120	500	µg/ъ	98.6	97.1	80.0-120	500	µg/L	1.5	20.0
Barium, Total, ICP	ND (5)	98.0	80.0-120	1500	µg/ь	101	110.	80.0-120	1500	µg/ъ	8.5	20.0
Beryllium, Tot <b>al, ICP</b>	ND (2)	96.9	80.0-120	500	µg/ъ	104	103	80.0-120	500	µg/ъ	1.0	20.0
Soron, Total, ICP	ND (500)	96.3	80.0-120	500	μg/L	91.3	89.4	80.0-120	500	μg/L	2.1	20.0
Cadmium, Total, ICP	ND (2)	95.6	80.0-120	500	µg/L	95.8	94.4	80.0-120	500	µg/L	1.5	20.0
Calcium, Total, ICP	ND (0.5)	97.7	80.0-120	51.0	mg/L	93.0	110.	80.0-120	51.0	mg/L	16.7	20.0
Chromium, Total, ICP	ND(5)	95.2	80.0-120	500	µg/L	95.3	94.4	80.0-120	500	$\mu g/L$	0.9	20.0
Sobalt, Total, ICP	ND (2)	94.8	80.0-120	500	µg/L	94.6	92.8	80.0-120	500	µg/ц	1.9	20.0
Copper, Total, ICP	ND (10)	97.0	80.0-120	500	µg/ц	99.4	98.3	80.0-120	500	μg/L	1.1	20.0
iron, Total, ICP	ND(0.10)	93.1	80.0-120	20.5	mg/L	101	101	80.0-120	20.5	mg/L	0.0	20.0
ead. Total. ICP	ND(5)	95.1	80.0-120	500	μg/L	96.2	94.9	80.0-120	500	μg/L	1.4	20.0
Magnesium, Total, ICP	ND(0.1)	91.3	80.0-120	51.0	mg/L	98.0	98.0	80.0-120	51.0	mg/L	0.0	20.0
(anganage Total) ICP	ND (5)	97 1	80 0-120	500	ua/L	98.0	96.7	80.0-120	500	μq/L	1.3	20.0
Manyanese, local, lor Kolubdenum Totsi TCP	ND (5)	97 5	80 0-120	500	μα/τ.	98.1	97.6	80.0-120	500	μα/L	0.5	20.0
debel Webel TCD	ND(5)	97.5	80.0-120	500	μg/1 μg/1	94 6	93 1	80 0-120	500	μα/L	1.6	20.0
ickel, Total, ICP	ND (5)	94.0	80.0-120	300	μg/1 μg/1	34.0 06 0	95.1	80.0-120	100	μα/Ι.	1.5	20.0
sliver, Total, ICP	ND(5)	30.0	80.0-120	100	μg/Π 	30.3 T	33.J	80.0-120	100	µg/= µg/ī.	**	20.0
strontium, Total, ICP	ND(5)	107	80.0-120	100	μg/1. μg/1.	± 102	107	80.0-120	500	μα/τ.	1.0	20.0
itanium, Total, ICP	ND (5)	99.9	80.0-120	500	μg/L 	104	101	80.0-120	500	μg/1.	0.0	20.0
Anadium, Total, ICP	ND(5)	95.2	80.0-120	500	μg/L	33.4	34.6	80.0-120	500	μg/11 μg/1	0.0	20.0
finc, Total, ICP	ND(10)	92.9	80.0-120	500	µg/ц	90.7	89.9	60.0-120	300	μg/ D	0.9	20.0
C Batch: 110721-1	For sample	For sample analyzed on: 07/21/2011 Spikes						071608				
Chromium, Hexavalent	ND (0.010)	99.9	90.0-110	0.50	mg/L	MIN	MN	85.0-115	0.50	mg/L	**	20.0
2C Batch: 110721-2	For sample	analyze	d on: 07/21/	2011		Spiked sample: 11071101				•		
hosphorus, Total, as P	ND (0.20)	96.6	90.0-110	1.0	mg/L	MIN	MIN	71.2-135	1.0	mg/L	**	21.2
C Batch: 110721-3	For sample	. DIGDAI	ed on: 07/21	/2011		Spiked	sample: 11	070963		• #		<u> </u>
luminum. Tot. Red TCR-ME	20.1	99.6	85.0-115	51000	μer/1.	104	101	80.0-120	51000	<u>ща/</u> Б	2.9	20.0
luminum Tot Rec ICP-MS	NTD (30)	104	85 0-115	51000	ua/1			80.0-120			**	20.0
stimony Tot Rec ICP-MS	ND (5)	94 7	85 0-115	500	µa/1.	94 1	93.6	80.0-120	500	ug/L	0.5	20.0
elenium Tot Dec ICF-MS	ND (5)	102	85 0-115	500	ua/1	99.1	98.4	80.0-120	500	μα/L	0.7	20.0
Challium, Tot. Rec., ICP-MS	ND (2)	101	85.0-115	500	μg/L	97.6	103	80.0-120	500	μg/L	5.4	20.0
C Batch. 110727-3			ad on . 07/22	/2011		Spiked	semple, 11	070964		······································		
Silicon as Silica	ND(0.04)	97.0	80.0-120	1,1	mg/L	86.5	86.3	80.0-120	1.1	mg/L	0.2	20.0
			ad on - 07/22	/2011		and had	eennle. 11	070964				
A Batchi 110/22-5	o 7 pr	prepar	95 0 335	14 5	men / T	107	100 100	80 0-100	14 5	mc7/1.	a •	20 0
rotassium, pissoived, iCP	U. / BK	106	85.U-115	14.5	шу/Ц та/Т	107	100	80.0-120	11.3	μυ <sub>1</sub> /11 πνα /Τ.	0.3	20.0
sodium, Dissolved, ICP	1.5 BK	100	85.0-115	27.5	nkg/ь	102	106	80.0-120	41.3	ավչո	J.J	20.0
C Batch: 1IC1202	For sample	analyze	d on: 07/21/	2011		Spiked	sample:					
Nitrite, as N	ND(0.1)	96.1	90.0-110	2.0	mg/L	MN	MIN	78.5-127			**	10.1
	ND(0.1)	96.7	90.0-110	2.0	mg/L	MIN	MIN	79.3-118			**	12.1
Nitrate, as N												
Witrate, as W Sulfate	ND(1.0)	101	90.0-110	8.0	mg/L	MIN	MIN	81.8-125			••	10.4
Witrate, as W Sulfate 20 Batch: 1ICl202	ND(1.0) For sample	101 analyze	90.0-110 d on; 07/21/	8.0	mg/L 	MN Spiked	MN sample: 11	81.8-125				





Quality Control Report Method Blank, LCS, MS/MSD Data

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Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

Spiked Sample Spikad Sample Blank % Rec Spike (% Recovery) Spike Precision Data Analysis Level Units MS LCS Limits Limit Data MSD Limits Level Units RPD QC Batch: 11C2207 For sample analyzed on: 07/26/2011 Spiked sample: Fluoride ND (0.1) 104 90.0-110 2.0 mg/L MIN MN 67.3-113 \*\* 9.8 QC Batch: 11C2213 For sample analyzed on: 08/01/2011 Spiked sample: Fluoride ND(0,1)92.4 90.0-110 2.0 mg/L MIN MN 67.3-113 \*\* 9.8

Data Qualifiers:

I - Due to the concentration of analyte in the sample, the spike level is too low to allow accurate quantification of the spike recovery.

MN - The MS/MSD sample analyses were not performed on a sample from this Continental order number.

J - The concentration or not detected (ND) value is below the Limit of Quantitation (LOQ) and is considered an estimated value.

BK - This analyte did not meet method blank criteria. The associated sample results may be estimated.

\*\* - RPD cannot be calculated.





Quality Control Report Continuing Calibration Verification Data Summary

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Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

	Date of	Instrument	Amount in	Amount		Percent
Analysis	Analysis	Batch ID	Standard	Detected	<u>Units</u>	Recovery
Aluminum, Tot. Rec., ICP-MS	08/02/2011	2IP3214	CCV recovery	acceptable	for this	Instrument Batch.
Aluminum, Tot. Rec., ICP-MS	08/02/2011	3IP3214	CCV recovery	acceptable	for this	Instrument Batch.
Aluminum, Tot. Rec., ICP-MS	08/02/2011	4IP3214	CCV recovery	acceptable	for this	Instrument Batch.
Antimony, Tot. Rec., ICP-MS	07/21/2011	4IP3202	CCV recovery	acceptable	for this	Instrument Batch.
Antimony, Tot. Rec., ICP-MS	07/21/2011	51P3202	CCV recovery	acceptable	for this	Instrument Batch.
Arsenic, Total, ICP	07/25/2011	31P4206	CCV recovery	acceptable	for this	Instrument Batch.
Arsenic, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Barium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Barium, Total, ICP	07/25/2011	41P4206	CCV recovery	acceptable	for this	Instrument Batch.
Barium, Total, ICP	07/26/2011	4IP4207	CCV recovery	acceptable	for this	Instrument Batch.
Barium, Total, ICP	07/26/2011	5IP4207	CCV recovery	acceptable	for this	Instrument Batch.
Beryllium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Beryllium, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Boron, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Boron, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Boron, Total, ICP	07/26/2011	4IP4207	CCV recovery	acceptable	for this	Instrument Batch.
Boron, Total, ICP	07/26/2011	5IP4207	CCV recovery	acceptable	for this	Instrument Batch.
Cadmium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Cadmium, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Calcium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Calcium, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Calcium, Total, ICP	07/26/2011	4IP4207	CCV recovery	acceptable	for this	Instrument Batch.
Calcium, Total, ICP	07/26/2011	5IP4207	CCV recovery	acceptable	for this	Instrument Batch.
Chromium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Chromium, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Cobalt, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Cobalt, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Copper, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.
Copper, Total, ICP	07/25/2011	41P4206	CCV recovery	acceptable	for this	Instrument Batch.
Chromium, Hexavalent	07/21/2011	110721-2	CCV recovery	acceptable	for this	Instrument Batch.
Chromium, Hexavalent	07/21/2011	110721-3	CCV recovery	acceptable	for this	Instrument Batch.
Phosphorus, Total, as P	07/21/2011	<b>11</b> 0721-3	CCV recovery	acceptable	for this	Instrument Batch.
Phosphorus, Total, as P	07/21/2011	110721-4	CCV recovery	acceptable	for this	Instrument Batch.
Fluoride	07/26/2011	31C2207	CCV recovery	acceptable	for this	Instrument Batch
Fluoride	07/26/2011	4IC2207	CCV recovery	acceptable	for this	Instrument Batch.
Fluoride	08/01/2011	1IC2213	CCV recovery	acceptable	for this	Instrument Batch.
Fluoride	08/01/2011	2IC2213	2.00	1.70	mg/L	85.0 CL
Samples associate	d with this (	Continuing Ca	libration Ver	ification:		
Laboratory Number	Instrument Ba	atch	Sample Descr:	ption		
11070963	1IC2213		TEC Fly Ash-S	SPLP		
	Date of	Instrument	Amount in	Amount		Percent
Analysis	Analysis	Batch ID	Standard	Detected	Units	Recovery
Chloride	07/21/2011	11C1202	CCV recovery	acceptable	for this	Instrument Batch.



Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

#### Quality Control Report Continuing Calibration Verification Data Summary

Page: 14

Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Chloride	07/21/2011	21C1202	CCV	recovery	acceptable	for	this	Instrument	Batch.
Nitrite, <b>as N</b>	07/21/20 <b>11</b>	1IC1202	CC	' recovery	acceptable	for	this	Instrument	Batch,
Nitrite, as N	07/21/2011	2IC1202	CCA	' recovery	acceptable	for	this	Instrument	Batch.
Nitrate, as N	07/21/2011	11C1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Nitrate, as N	07/21/2011	21C1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Sulfate	07/21/2011	1IC1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Sulfate	07/21/2011	2IC1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Sulfate	07/21/2011	3IC1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Iron, Total, ICP	07/25/2011	31P4206	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Iron, Total, ICP	07/25/2011	4IP4206	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Lead, Total, ICP	07/28/2011	4IP4209	CCV	recovery	acceptable	for	this	Instrument	Batch.
Lead, Total, ICP	07/28/2011	5IP4209	CCV	recovery	acceptable	for	this	Instrument	Batch.
Magnesium, Total, ICP	07/25/2011	3IP4206	CCV	reco <b>very</b>	acceptable	for	this	Instrument	Batch.
Magnesium, Total, ICP	07/25/2011	4IP4206	CCV	recovery	acceptable	for	this	Instrument	Batch.
Manganese, Total, ICP	07/25/2011	3IP4206	CCV	recovery	acceptable	for	this	Instrument	Batch.
Manganese, Total, ICP	07/25/2011	4IP4206	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Mercury, Total	07/22/2011	3MA3203	CCV	recovery	acceptable	for	this	Instrument	Batch.
Mercury, Total	07/22/2011	4MA3203	CCV	recovery	acceptable	for	this	Instrument	Batch.
Mercury, Total	07/22/2011	5MA3203	CCV	recovery	acceptable	for	this	Instrument	Batch.
Molybdenum, Total, ICP	07/26/2011	41P4207	CCV	recovery	acceptable	for	this	Instrument	Batch.
Molybdenum, Total, ICP	07/26/2011	5IP4207	CCV	recovery	acceptable	for	this	Instrument	Batch.
Nickel, Total, ICP	07/25/2011	3IP4206	CCV	recovery	acceptable	for	this	Instrument	Batch.
Nickel, Total, ICP	07/25/2011	41P4206	CCV	recovery	acceptable	for	this	Instrument	Batch.
Potassium, Dissolved, ICP	08/02/2011	4IP4214	çcv	recovery	acceptable	for	this	Instrument	Batch.
Potassium, Dissolved, ICP	08/02/2011	5IP4214	CCV	recovery	acceptable	for	this	Instrument	Batch.
Potassium, Dissolved, ICP	08/02/2011	6IP4214	CCV	recovery	acceptable	for	this	Instrument	Batch.
Selenium, Tot. Rec., ICP-MS	07/21/2011	4IP3202	ccv	recovery	acceptable	for	this	Instrument	Batch.
Selenium, Tot. Rec., ICP-MS	07/21/2011	51P3202	CCV	recovery	acceptable	for	this	Instrument	Batch.
Silicon as Silica	08/01/2011	3IP4213	ccv	recovery	acceptable	for	this	Instrument	Batch.
Silicon as Silica	08/01/2011	4IP4213	ccv	recovery	acceptable	for	this	Instrument	Batch.
Silver, Total, ICP	07/25/2011	3IP4206	ccv	recovery	acceptable	for	this	Instrument	Batch.
Silver, Total, ICP	07/25/2011	4IP4206	ccv	recovery	acceptable	for	this	Instrument	Batch.
Sodium, Dissolved, ICP	08/02/2011	4IP4214	ccv	recovery	acceptable	for	this	Instrument	Batch.
Sodium, Dissolved, ICP	08/02/2011	5IP4214	ccv	recovery	acceptable	for	this	Instrument	Batch.
Sodium, Dissolved, ICP	08/02/2011	6IP4214	ccv	recovery	acceptable	for	this	Instrument	Batch.
Strontium, Total, ICP	07/28/2011	4IP4209	ccv	recoverv	acceptable	for	this	Instrument	Batch
Strontium, Total, ICP	07/28/2011	5IP4209	CCV	recovery	acceptable	for	this	Instrument	Batch.
Thallium, Tot. Rec., ICP-MS	07/21/2011	4193202	ccv	recovery	acceptable	for	this	Instrument	Batch
Thallium, Tot. Rec., ICP-MS	07/21/2011	51P3202	CCV	recoverv	acceptable	for	this	Instrument	Batch
Titanium, Total, ICP	07/25/2011	3IP4206	CCV	recoverv	acceptable	for	this	Instrument	Batch
Titanium, Total, ICP	07/25/2011	4IP4206	ccv	recoverv	acceptable	for	this	Instrument	Batch
Vanadium, Total, ICP	07/25/2011	3IP4206	ccv	recoverv	acceptable	for	this	Instrument	Batch
Vanadium, Total, ICP	07/25/2011	4IP4206	ccv	recoverv	acceptable	for	this	Instrument	Batch
Vanadium, Total, ICP	07/26/2011	4IF4207	CCV	recoverv	acceptable	for	this	Instrument	Batch.
Vanadium, Total, ICP	07/26/2011	5IP4207	ĊĊV	recoverv	acceptable	for	this	Instrument	Batch.



		Quality Col	itroi keport	Page: 15
•		Continuing Calibration	Verification Data Summary	
Client:	Westar Energy, Inc.			Date Reported: 08/04/2011
	Attn: Stone Junod			Date Received: 07/14/2011
	P.O. Box 889			Continental File No: 7701
	Topeka, KS 66601			Continental Order No: 57218
		:		
			· · · · ·	· · · · · · · · · · · · · · · · · · ·

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Zinc,	Total,	ICP	07/25/2011	3IP4206	CCV reco	overy acceptable	for this	Instrument	Batch.
Zinc,	Total,	ICP	07/25/2011	4IP4206	CCV reco	overy acceptable	for this	Instrument	Batch.

#### Data Qualifiers:

CL - The continuing calibration verification (CCV) standard recovery for this analyte was below the method or SOP limit. The reported concentration for this analyte may be biased low.

- Laboratory Report Conclusion -





525 N. 8th Street, Salina, KS 67401 (785)827-1273 (800)535-3076 Fax (785)823-7830 www.cas-lab.com



BID

1

Continental Order Number:

Client/Reporting Information					Invoice Information						PARAMETERS/CONTAINER TYPE C							СОММ	IENTS					
Company Name Company Name Wastar Energy				y Name:									1			·		1	T					
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STONE JUNOD				Contact: DICK FINGER		- - 						, 106	-									• •		
E-mail: E-mail:											le ar													
stone.junod@westarenergy.com dick.finger'd				westaren	лду.с	0 <b>m</b>							sam											
Phone Number: 1785-575-6435	Fax Numb 785-575	er:		Phone Number:				Fax	Numb	er:				list										
Sampler's Name:(Printed)	185-575	Sampler's	Name:(Signat	ure)	7 785-575-8039 Purchase Order Number: 901836						PLP													
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SAM <b>PLE IDE</b> NT (30 Character	IFICATION s or less)	Matrix (Sample Type)	Regulatory Program	Date Sampled	Time Sampled	Comp C-Camp	Total Contain	HCI	NaOH	EONH	H2SO4	Na2S2O3	OTHER P											
TEC Fly Ash		s	R	7/13/2011	14:20	С	1	1-					x	x			1							
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Matrix (Sample Type):	DW=Drinking Water,	GW=G	round Water	; <b>WW</b> =Wa	ste Water,	W=	Wipe	L	S=So	lid/S	LLI Soil,	SL	=Slud	lge, A	=Air.	OL= Oil	/Organic	Liquid	<b>0</b> =0t	7 'her	1	ľ		
Regulatory Program. <u>N</u> =	NPDES, <u>R</u> =RCRA	∧, <u>D</u> =D	rinking Wat	ter, SL=50	3 Sludge		=Othe	г								(Please note	if non-stand	ard turnarou	und. Rush &	Emergency	subject to ad	ditional char	ge)	
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Coolar / of )	for this CAS Order No.				
Cooler Identification:	CAS Cooler #: Other:		/Client's Cooler Box/Letter/Hand Deliv	vered	:
Date/Time Cooler Received:		9	:00		
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Custody Seal:	Present: Intact / Broken A	Absent:	× Seal No:		· · · · ·
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Chain of Custody incomp	lete [see detail below]	п	Cooler temperature exceeded 0.1 - 6.0	°C requirement	0 11111
Chain of Custody missing da	ate/time sampled (excl. TB or Dup)		[Do not mark if samples do not require	e cooling to 0.1 - 6.0 °C.]	
Date or Time sampled obta	ined from container label		Broken or leaking containers (detail ac	tions below)	
Chain of Custody missing	sampler's name		Sample container type or labeled ch	emical preservation inap	propriate
Chain of Custody missing	g matrix (sample type)		Other discrepancies:	· · · · · · · · · · · · · · · · · · ·	
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.

**APPENDIX B** 

**Aerial Photographs** 



# **HISTORICAL AERIAL REPORT**

for the site: **TEC** 5530 SE 2nd Street Tecumseh, KS 66542 PO #:

Report ID: 20180302347 Completed: 3/14/2018

#### **ERIS Information Inc.**

Environmental Risk Information Services (ERIS) A division of Glacier Media Inc. T: 1.866.517.5204 E: info@erisinfo.com

www.erisinfo.com

# **Search Results Summary**

Date	Source	Scale	Comment
2017	NAIP - National Agriculture Information Program	1"=1300'	
2015	NAIP - National Agriculture Information Program	1"=1300'	
2014	NAIP - National Agriculture Information Program	1"=1300'	
2012	NAIP - National Agriculture Information Program	1"=1300'	
2010	NAIP - National Agriculture Information Program	1"=1300'	
2008	NAIP - National Agriculture Information Program	1"=1300'	
2006	NAIP - National Agriculture Information Program	1"=1300'	
2005	NAIP - National Agriculture Information Program	1"=1300'	
2004	NAIP - National Agriculture Information Program	1"=1300'	
2003	NAIP - National Agriculture Information Program	1"=1300'	
1991	USGS - US Geological Survey	1"=1300'	
1982	NHAP - National High Altitude Photography	1"=1300'	
1975	USGS - US Geological Survey	1"=1300'	
1970	USGS - US Geological Survey	1"=1300'	
1950	AMS - Army Mapping Service	1"=1300'	
1948	ASCS - Agriculture and Soil Conservation Service	1"=1300'	BEST COPY AVAILABLE



2017 NAIP 1" to 1300'







2015 NAIP 1" to 1300'







2014 NAIP 1" to 1300'







2012 NAIP 1" to 1300'







2010 NAIP 1" to 1300'

N



Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

## www.erisinfo.com | 1.866.517.5204



2008 NAIP 1" to 1300'

N





2006 NAIP 1" to 1300'







2005 NAIP 1" to 1300'





Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

www.erisinfo.com | 1.866.517.5204



2004 NAIP 1" to 1300'

N





2003 NAIP 1" to 1300'





Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

## www.erisinfo.com | 1.866.517.5204



1991 USGS 1" to 1300'

N



Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

## www.erisinfo.com | 1.866.517.5204



1982 NHAP 1" to 1300'

N





1975 USGS 1" to 1300'







1970 USGS 1" to 1300'

N



Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

## www.erisinfo.com | 1.866.517.5204



AMS 1" to 1300'





Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

www.erisinfo.com | 1.866.517.5204



**1948 ASCS 1" to 1300'** *BEST COPY AVAILABLE* 

N



**APPENDIX C** 

Topographic Maps



# TOPOGRAPHIC MAP RESEARCH RESULTS Date: 2018-03-02

#### Project Property: 5530 Se 2Nd Street, Tecumseh, KS

ERIS Order Number: 20180302347

We have searched USGS collections of current topographic maps and historical topographic maps for the project property. Below is a list of maps found for the project property and adjacent area. Maps are from 7.5 and 15 minute topographic map series, if available.

Map Series
7.5
7.5
7.5
7.5
7.5
7.5
7.5

Topographic Maps included in this report are produced by the USGS and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property.

No warranty of Accuracy or Liability for ERIS: The information contained in this report has been produced by ERIS Information Inc. (in the US) and ERIS Information Limited Partnership (in Canada), both doing business as 'ERIS', using Topographic Maps produced by the USGS. This maps contained herein does not purport to be and does not constitute a guarantee of the accuracy of the information contained herein. Although ERIS has endeavored to present you with information that is accurate, ERIS disclaims, any and all liability for any errors, omissions, or inaccuracies in such information and data, whether attributable to inadvertence, negligence or otherwise, and for any consequences arising therefrom. Liability on the part of ERIS is limited to the monetary value paid for this report.

Address: 38 Lesmill Road Unit 2, Toronto, ON M3B 2T5 Phone: 1-866-517-5204 Fax: 416-447-7658 info@erisinfo.com www.erisinfo.com



Quadrangle(s): Grantville,KS



Source: USGS 7.5 Minute Topographic Map


Quadrangle(s): Grantville,KS





























Quadrangle(s): Grantville,KS



# ATTACHMENT 2

Appendix IV SSL Alternate Source Demonstration for March 2019 Sampling Event for TEC Bottom Ash Settling Area



HALEY & ALDRICH, INC. 6500 Rockside Road Suite 200 Independence, OH 44131 216.706.1303

14 October 2019 File No. 129778-020

Evergy Kansas Central, Inc. 818 South Kansas Avenue Topeka, Kansas 66612

Attention: Jared Morrison – Manager, Water and Waste Programs

Subject: Assessment Monitoring Program March 2019 Sampling Event Alternate Source Demonstration Tecumseh Energy Center, Tecumseh, Kansas

Dear Mr. Morrison:

Haley & Aldrich, Inc. (Haley & Aldrich) was retained by Evergy Kansas Central, Inc. (Evergy; formerly Westar Energy, Inc.) to perform an evaluation of groundwater quality at the Bottom Ash Settling Area (BASA; Unit) at the Tecumseh Energy Center (TEC) located in Tecumseh, Kansas. The evaluation was performed to demonstrate if an alternative source caused the statistically significant level (SSL) above the groundwater protection standard of arsenic (at monitoring well MW-9 and MW-10) and cobalt (at monitoring well MW-9) for the March 2019 sampling event.

Previously, Haley & Aldrich finalized statistical analysis of the groundwater quality data generated from the Assessment Monitoring event conducted in September 2018, which identified SSLs above the groundwater protection standard of arsenic (at monitoring well MW-9 and MW-10) and cobalt (at monitoring well MW-9) downgradient of the BASA. Following identification of the SSLs at the BASA, an Alternate Source Demonstration (ASD) evaluation, certified by a qualified Professional Engineer, titled "September 2018 Sampling Event, Appendix IV Statistically Significant Level, Alternate Source Demonstration for the Bottom Ash Settling Area, Tecumseh Energy Center" (September 2018 ASD), was completed and successful demonstration made in accordance with Title 40 Code of Federal Regulations § 257.95(g)(3)(ii). The ASD indicated that a source other than the coal combustion residuals unit caused the SSLs. This demonstration is attached.

The constituents identified as SSLs above the groundwater protection standards for the March 2019 sampling event are the same constituents found at similar concentrations in the same monitoring wells identified in the successful September 2018 ASD. The constituents and concentrations for both events are presented in Table 1 below. Haley & Aldrich certifies this evaluation to be the ASD required by § 257.95(g)(3)(ii).

Evergy Kansas Central, Inc. Tecumseh Energy Center 14 October 2019 Page 2

#### TABLE I STATISTICALLY SIGNIFICANT LEVELS OF APPENDIX IV CONSTITUENTS

Well ID	Constituent	September 2018 Concentration (mg/L)	March 2019 Concentration (mg/L)
N/M/-9	Arsenic	0.099	0.04
10100-3	Cobalt	0.011	0.048
MW-10	Arsenic	0.04	0.028
Notes: mg/L = milligrams per liter	L		

We appreciate the opportunity to provide environmental consulting services on this project.

Sincerely yours, 1 11 2 A A A HALEY & ALDRICH, INC. Ulle. M Steve Putrich, P.E. 1O Mark Nicholls, P.G. **Project Principal** Lead Hydrogeologist SS/ONA Man Hannahan

Attachment:

September 2018 Sampling Event, Appendix IV Statistically Significant Level, Alternate Source Demonstration for the Bottom Ash Settling Area, Tecumseh Energy Center, Tecumseh, Kansas

\\haleyaldrich.com\share\phx\_common\Projects\Westar\Tecumseh Energy Center (TEC)\Deliverables\ASD\_AppIV\_Update\2019-1014\_Westar\_TEC\_ASD Update Letter\_Mar 2019 Event\_F.docx



www.haleyaldrich.com



# REPORT ON SEPTEMBER 2018 SAMPLING EVENT APPENDIX IV STATISTICALLY SIGNIFICANT LEVEL ALTERNATE SOURCE DEMONSTRATION FOR THE BOTTOM ASH SETTLING AREA TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

by Haley & Aldrich, Inc. Cleveland, Ohio

for Westar Energy, Inc. Topeka, Kansas



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2	Bottom Ash Settling Area Monitoring Well Location Map
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A	Laboratory Reports
В	Aerial Photographs
С	Topographic Maps

Revision No.	Date	Notes
0	February 2019	Assessment Monitoring Program September 2018 Sampling Event
		Statistically Significant Level Notification and Alternate Source
		Demonstration Update
1	October 2019	September 2018 Sampling Event Appendix IV Statistically Significant Level
		Alternate Source Demonstration for the Bottom Ash Settling Area



### 1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) was retained by Westar Energy, Inc. (Westar) to perform an evaluation of groundwater quality at the Bottom Ash Settling Area (BASA; Unit) at the Tecumseh Energy Center (TEC) located in Tecumseh, Kansas. The evaluation was performed to demonstrate if an alternate source caused the statistically significant level (SSL) above the groundwater protection standard of arsenic (at monitoring wells MW-9 and MW-10) and cobalt (at monitoring well MW-9) downgradient of the BASA. The arsenic concentrations observed for the September 2018 assessment monitoring sampling event is 0.099 milligrams per liter (mg/L) at well MW-9 and 0.040 mg/L at MW-10. The cobalt concentration observed for the September 2018 assessment monitoring sampling event is 0.011 mg/L at well MW-9. This report provides an overview of the site conditions and the results of the investigation activities conducted as part of the alternate source demonstration (ASD) for the Appendix IV constituents.

#### 1.1 BACKGROUND

Consistent with Code of Federal Regulations Title 40 (40 CFR) §257.90 through §257.95, Westar has installed and certified a groundwater monitoring network at the BASA, has completed detection monitoring program activities including identifying statistically significant increases in Appendix III constituent concentrations, and established an assessment monitoring program. Westar conducted statistical analyses of the downgradient groundwater quality results from the September 2018 assessment monitoring sampling event to determine if any Appendix IV constituents were present at concentrations that exceeded groundwater protection standards set for the Unit. The analysis of the Appendix IV constituents resulted in a calculated SSL for arsenic (at monitoring wells MW-9 and MW-10) and cobalt (at monitoring well MW-9) downgradient of the BASA. The analyses described in this report were conducted to determine if alternate sources existed for the SSLs.

Pursuant to 40 CFR §257.95(g)(3)(ii), "...the owner or operator must...demonstrate that a source other than the CCR unit <sup>1</sup> caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality." The coal combustion residuals (CCR) Rule provides 90 days from determination of an SSL to complete an ASD<sup>2</sup> for applicable Appendix IV constituents. If a successful ASD is completed and certified by a qualified professional engineer, the CCR unit may continue in assessment monitoring. If, however, an alternate source of the Appendix IV SSL is not identified, the owner or operator must initiate an assessment of corrective measures and evaluation of the nature and extent of migration. This report documents the findings and conclusions of an investigation of the SSLs for arsenic at wells MW-9 and MW-10 and cobalt at MW-9.

<sup>&</sup>lt;sup>2</sup> For simplicity, this report utilizes the term ASD to account for any of the three possible explanations (allowed for in the CCR Rule) for why a calculated SSL is not related to the CCR unit being evaluated. Those include: 1) The source for the SSL originates from something other than the CCR unit in question; 2) the SSL resulted from an error in sampling, analysis, or statistical evaluation; or 3) the SSL resulted from a natural variation in groundwater quality.



<sup>&</sup>lt;sup>1</sup> Referred to in this document as an "alternate source," and the demonstration for such is referred to as an ASD.

#### **1.2 PURPOSE AND SCOPE**

The purpose of this ASD is to determine whether the concentrations of arsenic and cobalt detected in groundwater at MW-9 and MW-10 are from sources other than the Unit. The scope of the demonstration includes a review of the current regional geochemical and geologic conditions, a comparison of the groundwater quality at MW-9 and MW-10 and the other monitoring well locations, and analysis of geologic sources. This evaluation was completed using existing information describing the regional and site-specific geology and groundwater monitoring data collected during detection and assessment monitoring activities.

This analysis included:

- Review of well installation logs for the variability in the aquifer materials within screened intervals of the upgradient and downgradient groundwater monitoring well locations;
- Review of analytical results for the concentration of indicator parameters including chloride and sulfate from the upgradient and downgradient monitoring wells; and
- Collection and analysis of representative samples of the bottom ash stored within the Unit for the concentration of leachable Appendix IV constituents.

#### 1.3 SITE SETTING

The TEC is located in a light industrial area located northeast of Tecumseh in Shawnee County, Kansas (Figure 1). The site is located within the Central Lowland physiographic province which includes rolling hills with substantial topographic relief and the relatively horizontal orientation of the thin alternating shale and limestone beds. Geologic units that underlie the BASA are roughly horizontal with a regional dip toward the northwest and consist of glacial till and the Scranton shale formation. The BASA consists of a surface impoundment that encompasses approximately 2 acres in the current configuration and is located on the TEC plant site. The TEC plant and BASA are located in an area with natural ground surface elevations varying from approximately 870 and 920 feet above mean sea level throughout the site property.

#### 1.4 SITE DESCRIPTION

The TEC facility formerly operated a system of cycled bottom ash ponds collectively known as the BASA. The coal-fired boilers at the facility have been shut down. The BASA is a single CCR impoundment that utilized a middle dike for operational purposes to separate two separate settling areas. During operations, the plant alternated use of the settling areas. The bottom ash at TEC was sluiced via gravity to the BASA where it was allowed to settle out. Excess water from the BASA continues to decant via gravity to a polishing pond on the north side of Tecumseh Creek, where it then discharges into the creek. This discharge is permitted by Kansas Pollutant Discharge Elimination System. Bottom ash was recovered from the BASA and transported by truck to the on-site Ash Landfill No. 322. The TEC BASA and associated groundwater monitoring network are shown on Figure 2.



## 2. Site Geology, Hydrogeology, Geochemistry, and Regional Conditions

Geologic and hydrogeologic conditions beneath the BASA have been characterized based on information obtained during installation and testing of the monitoring wells installed as part of the CCR groundwater monitoring network.

#### 2.1 SITE GEOLOGY

The TEC plant site and the BASA are located in the Central Lowland physiographic province. The Central Lowland is characterized by horizontal sequences of predominantly marine sedimentary rocks (interbedded shales and limestones). The TEC site and the BASA lie within the area of Pleistocene glacial activity in the Dissected Till Plains region of the Central Lowlands. Geologic units that underlie the site are roughly horizontal with a regional dip to the north and northwest (AMEC, 2011). The Scranton shale formation is the only lithologic unit encountered beneath the glacial till during geologic investigations at TEC.

Surficial geologic materials in the vicinity of and beneath the TEC site and BASA include thin deposits of Pleistocene glacial till deposits and Holocene alluvium. The poorly sorted glacial deposits are composed of Kansan and Nebraskan age clays, silts, and sands. The glacial till directly underlies most of the BASA. The glacial deposits have a local maximum thickness of approximately 100 feet (AMEC, 2011). Glacial erratics are observed to occur in the vicinity of the TEC site, often in the form of quartzite boulders (AMEC, 2011).

Locally, the till may yield minor quantities of water but is not typically used as an aquifer for water supply. The glacial till deposits do represent the uppermost aquifer at the CCR unit. The Pleistocene glacial deposits are underlain by strata representing transgressions and regressions of marine and near-shore depositional environments. Immediately above the shallowest bedrock unit, a thin clay layer, 10 feet or less in thickness, has been observed at the site.

The shallowest bedrock unit present at the TEC is the Pennsylvanian-age Scranton shale formation. The Scranton shale is predominantly grey to brown comprised of five members (Zeller, 1968). From shallowest to deepest the members of the Scranton formation include: the Silver Lake shale, Rulo limestone, Cedar Vale shale, Happy Hollow limestone, and White Cloud shale members. The total Scranton formation is of undefined thickness at the TEC site; however, a typical average thickness in other areas of the state is approximately 125 feet (Zeller, 1968).

A conceptual geologic cross section across the Unit is provided in Figure 3.

#### 2.2 SITE HYDROGEOLOGY AND HYDROLOGY

The BASA is sited directly on the glacial deposits which contain low to high plasticity clay with trace silt, which will impede infiltration to deeper formations. In the area of the BASA, the glacial deposits are underlain by the Scranton shale at a depth of approximately 30 feet. Given the alternating transgressive/regressive nature of the deposition (interbedded shales and limestones), many of the deeper water-bearing bedrock formations are hydraulically isolated and some are confined. The permeability of the shale units varies but generally decrease with depth, further impeding vertical groundwater movement. Horizontal fluid migration is possible above the low permeability shale and within the glacial deposits.



The uppermost aquifer at TEC consists of unconsolidated glacial deposits, hereafter referred to as the glacial aquifer. Depth to groundwater in the monitoring wells ranges from approximately 16 to 35 feet below ground surface in the immediate vicinity of the BASA. Groundwater flow in the glacial aquifer below the BASA is to the west towards Tecumseh Creek, and ultimately north toward the Kansas River.

Based on groundwater elevations measured between August 2016 and September 2018, the groundwater flow direction is consistently toward the northwest. Available historical data indicate that seasonal groundwater elevation variation does not have a significant effect on groundwater flow direction.

Hydraulic conductivity of the glacial aquifer was calculated using data generated during slug testing of one monitoring well. The hydraulic conductivity of the glacial till is calculated to be approximately 1.6x10<sup>-3</sup> centimeters per second (cm/sec).

The Silver Lake shale member of the Scranton shale formation comprises the confining unit underlying the uppermost aquifer at the BASA. The reported thickness of the confining shale at the BASA area is greater than 10 feet. The results of a packer test indicate that the hydraulic conductivity in the Silver Lake shale is  $1 \times 10^{-6}$  cm/sec. Based on the reported hydraulic conductivity, the Silver Lake member of the Scranton shale is characterized as an aquitard, meaning that the shale layer restricts flow of groundwater due its low hydraulic conductivity (i.e., prevents or inhibits vertical movement of groundwater).



# 3. Alternative Source Demonstration

Haley & Aldrich conducted an evaluation of arsenic and cobalt concentrations detected in downgradient wells at the BASA. The evaluation included review of possible alternative sources for the apparent SSLs of arsenic (MW-9 and MW-10) and cobalt (MW-9) determined by statistical analyses completed in January 2019 for the September 2018 assessment monitoring sampling event. The arsenic concentrations observed for the September 2018 assessment monitoring sampling event is 0.099 mg/L at well MW-9 and 0.040 mg/L at MW-10. The cobalt concentration observed for the September 2018 assessment monitoring sampling event is 0.011 mg/L at well MW-9.

Haley & Aldrich evaluated the following potential alternative sources in accordance with the CCR Rule:

- 1. The source for the SSL originates from something other than the CCR unit;
- 2. The SSL resulted from an error in sampling, analysis, or statistical evaluation; or
- 3. The SSL resulted from a natural variation in groundwater quality.

As part of that evaluation, Haley & Aldrich evaluated potential point and non-point sources of arsenic and/or cobalt in the vicinity of the BASA and evaluated natural geologic conditions and the effect of those conditions on native groundwater chemistry. Each of these analyses and the resulting findings are described below.

#### 3.1 EVALUATION OF MATERIALS WITHIN THE UNIT

#### 3.1.1 Bottom Ash Synthetic Precipitation Leaching Procedure Analyses

Representative samples of the bottom ash accumulated in the BASA were collected and analyzed for the Appendix IV constituents including two parameters that were determined to exhibit an SSL; arsenic and cobalt from the inter-well statistical evaluation with the upgradient monitoring well location (MW-7). Samples collected in July 2011 and April 2019 from multiple locations within the BASA were submitted to environmental laboratories accredited by the Kansas Department of Health and Environment (KDHE) for the analysis of leachable arsenic and cobalt after the bottom ash samples were extracted in accordance with the U.S. Environmental Protection Agency (USEPA) Method 1312 [Synthetic Precipitation Leaching Procedure (SPLP)].

The results of the SPLP analysis of the bottom ash samples collected from four locations within the Unit indicate that the leachable arsenic and cobalt concentrations were below the concentrations detected in samples collected from monitoring wells MW-8, MW-9, and MW-10. These data provide evidence that the bottom ash present in the BASA from 2011 and the second sample collected from the BASA in 2019 do not contain sufficient leachable arsenic and cobalt to produce the concentration of constituents detected in the downgradient groundwater. Westar has noted that the type of coal used for fuel and TEC plant operations have been consistent since the early 2000s.

A summary of the results of the bottom ash leachability analyses is provided in Table I and the laboratory reports are attached as Appendix A.



# 3.2 REVIEW OF SEPTEMBER 2018 FIELD SAMPLING, LABORATORY ANALYSIS, AND STATISTICAL PROCEDURES

#### 3.2.1 Field Sampling Procedures

Westar and Haley & Aldrich conducted the field sampling activities in accordance with a Groundwater Sampling and Analysis Plan (SAP; Haley & Aldrich, 2017) that was prepared in accordance with §257.93 of the CCR Rule. The SAP prescribes the site-specific activities and methodologies for groundwater sampling and included procedures for field data collection, sample collection, sample preservation and shipment, interpretation, laboratory analytical methods, and reporting for groundwater sampling for the BASA. The administrative procedures and frequency for collection of groundwater elevation measurements, determination of flow directions, and gradients were also provided in the SAP.

Haley & Aldrich reviewed the field sampling and equipment calibration logs and the field indicator parameters and did not identify any apparent deviations or errors in sampling that would result in a potential SSL downgradient of the BASA.

#### 3.2.2 Laboratory Analysis and Quality Control Documentation

The groundwater samples collected downgradient of the BASA were analyzed by Pace Analytical Services using USEPA analytical methods. The data generated from these laboratory analyses are stored in a project database that incorporates hydrogeologic and groundwater quality data and was established to allow efficient management of chemical and physical data collected in the field and produced in the laboratory.

Haley & Aldrich conducted a quality assurance/quality control review of each groundwater quality dataset generated for the BASA and did not identify apparent laboratory or data management errors that would result in the apparent arsenic or cobalt SSLs downgradient of the BASA.

#### 3.2.3 Statistical Evaluation

Westar collected the initial assessment monitoring groundwater sample in June 2018, and a second assessment monitoring groundwater sample in September 2018 from each of the upgradient and downgradient monitoring wells at the BASA. To develop groundwater protection standards for use in the statistical analyses, data from the baseline sampling completed over a period spanning from August 2016 through June 2017 was also utilized. Statistical analysis of the analytical results was completed and reported as documented in the 2018 Annual Groundwater Monitoring and Corrective Action Report (Haley & Aldrich, 2019).

Haley & Aldrich has reviewed the statistical analysis of groundwater quality data from monitoring wells at the BASA for the September 2018 monitoring event and did not identify statistical calculation errors that would result in the apparent arsenic or cobalt SSLs. The statistical test method used met the performance standard established in the CCR Rule, and the statistical procedure complies with the requirements of the CCR Rule.



#### 3.3 POTENTIAL SOURCES OTHER THAN THE BASA

Haley & Aldrich conducted a review of potential sources (both point and non-point) of arsenic and/or cobalt in the vicinity of the BASA to determine if previous or adjacent site activities, land uses, or practices might have caused, or are currently causing, elevated concentrations of arsenic and/or cobalt in groundwater downgradient of the BASA. Potential point sources would include discharging activities or other activities occurring at a discrete location that may be a source of arsenic and/or cobalt. Non-point sources would include diffuse discharging activities or practices that may result in a low level but wide-spread increase in concentrations detected at the downgradient side of the BASA.

#### 3.3.1 Point Sources

Prior to construction of the BASA, the site and surrounding vicinity was undeveloped land. Review of historical United States Geological Survey (USGS) topographic maps shows undeveloped land prior to the construction of the BASA. No known industrial, agricultural, mining, or other activities were conducted at the BASA site prior to construction that would potentially constitute a point source. No point sources have been identified as a potential alternative source for arsenic and/or cobalt at the BASA.

#### 3.3.2 Non-Point Sources

No mining, industrial, or other activities have been documented in the vicinity of the BASA that might constitute a non-point source of arsenic and/or cobalt in the vicinity of MW-9 and/or MW-10.

No agricultural activities have been identified upgradient of the BASA. Records reviewed included historical aerial photographs and historical topographic maps. No non-point sources have been identified as a potential alternative source for arsenic and/or cobalt at the BASA.

#### 3.4 HISTORICAL LAND USE REVIEW

Haley & Aldrich assessed past usage of the site and adjoining properties through a review of the following records:

- Environmental Risk Information Services (ERIS) Aerial Photographs dated 1948, 1950, 1970, 1975, 1982, 1991, 2003, 2004, 2005, 2006, 2008, 2010, 2012, 2014, 2015, and 2017 (Appendix B); and
- ERIS Topographic Maps dated 1950, 1951, 1970, 1975, 1981, 1983, and 2012 (Appendix C).

Unless otherwise noted below, sources were reviewed dating back to 1940 or first developed use, whichever is earlier, and at 5-year intervals if the use of the property has changed within the time period.

#### 3.4.1 Historical Aerial Photographs

Haley & Aldrich reviewed aerial photographs depicting the development of the site and vicinity as summarized in Table II. The historical aerial photograph search includes photographs from the Army Mapping Service, USGS, National High-Altitude Photography, and the National Agriculture Information Program (ERIS, 2018) and are included in Appendix B.



Photographs suggest that the BASA was undeveloped prior to 1970. The plant site and BASA appear to have been developed in their current configurations by 1982. Minor development continued until present day. The coal pile for the facility has been located immediately adjacent to and east of the BASA since the Unit's original construction. An above ground storage tank was also present east of the coal pile prior to the BASA construction. An historical aerial photograph review summary is included as Table II. No activities constituting potential sources of arsenic and/or cobalt (e.g., mining, smelting, etc.) have been identified based on aerial photograph review.

#### 3.4.2 Historical Topographic Maps

Haley & Aldrich reviewed historical topographic maps depicting the development of the site and vicinity, as summarized in Table III. The topographic maps were provided for review by ERIS. Copies of the topographic maps are included in Appendix C. No historical development of other features constituting potential sources of arsenic and/or cobalt (e.g., mining) have been identified based on topographic map review.

#### 3.5 NATURAL VARIABILITY OF ARSENIC AND/OR COBALT OCCURRENCE

Haley & Aldrich conducted an evaluation of the natural variability of groundwater quality at the BASA based on site-specific data; observations are described in the following sections.

#### 3.5.1 Uppermost Groundwater Monitoring Interval Variability

Haley & Aldrich conducted an evaluation of the concentrations of the indicator parameters throughout the monitoring period from August 2016 through March 2018 to determine the natural variability of these parameters within the uppermost groundwater monitoring interval.

The average concentration of chloride and sulfate observed at the upgradient well (MW-7) were 194 and 470 mg/L, respectively. The average concentration of these indicator parameters within the downgradient monitoring wells MW-9 and MW-10 were 173 and 226 mg/L (MW-9) and 230 and 187 mg/L (MW-10), respectively. The difference in concentrations of chloride and sulfate between the upgradient and downgradient monitoring wells indicates that there is significant variability in the uppermost groundwater monitoring interval associated with the CCR Unit.

This conclusion is further supported by the difference in the boron concentrations observed during the reporting period. The average concentration of boron determined at the upgradient well (MW-7) was 0.73 mg/L while the average concentration of boron detected at the downgradient wells (MW-9 and MW-10) were significantly lower at 0.25 and 0.24 mg/L, respectively. Boron is a key Appendix III indicator parameter of potential impacts from a CCR Unit. Since boron concentrations down gradient of the Unit are lower than up gradient concentrations, it is further indicated that the BASA is not impacting groundwater quality.



# 4. Findings and Conclusions

Haley & Aldrich conducted an evaluation of groundwater quality data and information obtained as part of the detection and assessment monitoring programs and the materials contained within the BASA to identify potential sources of the arsenic and cobalt detected in the groundwater samples collected from monitoring wells MW-9 and MW-10 located downgradient of the BASA.

The evaluation included a review of sampling and analysis procedures, available laboratory analyses, and statistical analyses to determine if potential errors may have resulted in apparent SSL for arsenic and/or cobalt at the downgradient monitoring well locations. The evaluation also included a review of historical site activities based on aerial photographs and historical topographic maps, and consideration of potential point and non-point sources of arsenic and cobalt based on those activities.

To further evaluate if the materials stored within the BASA could be a source of arsenic and cobalt, results of the analysis of these materials for the concentration of leachable arsenic and cobalt from samples of bottom ash from the BASA for both past and current facility operations were reviewed and compared to the observed concentrations of these parameters within the downgradient wells during the monitoring period.

#### 4.1 FINDINGS

Haley & Aldrich found no apparent errors in sampling, laboratory analysis, data management, or statistical analysis that would result in the apparent SSL for arsenic and cobalt at MW-9 and MW-10. Haley & Aldrich also found no evidence of historical point or non-point sources of arsenic and/or cobalt, or historical activities that affected the observed concentrations of arsenic and/or cobalt in groundwater downgradient of the BASA.

Haley & Aldrich evaluated available data to determine the potential for the materials stored within the BASA to be the source of the calculated SSL for arsenic and cobalt. Representative samples of bottom ash that had been stored within the BASA were obtained and submitted to a KDHE certified laboratory for the preparation of leachate samples in accordance with USEPA Method 1312, SPLP. The SPLP uses an acidic solution created using mineral acids consisting of nitric (HNO<sub>3</sub>) and sulfuric (H<sub>2</sub>SO<sub>4</sub>) acids to evaluate the potential for contaminants to leach from materials exposed to acidic precipitation. The leaching procedure is performed over a period of 18 hours with constant agitation using an extraction fluid at a pH of less than 5, which is significantly lower than the pH of the groundwater conditions at the BASA. Based on the rigorous nature of the SPLP, the results provide a conservative or worst-case estimate of the concentration of the contaminants that are likely to leach from the material tested. Arsenic and cobalt should therefore leach from the CCR material in lower concentrations in the natural environmental condition as compared to the results of the SPLP leaching tests. The results of the SPLP testing of the materials stored in the BASA are presented in Table I.

Key findings regarding the potential for the bottom ash stored in the BASA to leach arsenic and cobalt and impact groundwater quality in the uppermost aquifer include:

 The results of SPLP analyses of bottom ash samples collected from the BASA from 2011 through 2018 exhibited concentrations of arsenic and cobalt below the levels observed in all of the site monitoring wells during the reporting period.



These findings indicate that the aggressive leaching procedure used in the laboratory to evaluate bottom ash samples from the BASA could not reproduce the concentrations observed in groundwater at MW-9 and MW-10. Groundwater conditions at the BASA have less potential to leach constituents from the bottom ash than the SPLP analysis. Consequently, based on available data and information, it is unlikely that the concentrations of arsenic and cobalt observed in groundwater at MW-9 and MW-10 were derived from leaching of bottom ash material contained at the BASA by interaction with groundwater<sup>3</sup>.

#### 4.2 CONCLUSIONS

Based on the direct analysis of the material stored in the BASA by an aggressive leaching procedure for the concentration of arsenic and cobalt, the natural variability in the uppermost groundwater monitoring interval observed during the monitoring period, and the absence of any errors in the sampling, analysis, and statistical evaluation of the monitoring results, the calculated SSLs for arsenic and cobalt identified at MW-9 and MW-10 are due to natural variability of the groundwater conditions around the BASA and not the materials either historically or currently stored in the Unit.

<sup>&</sup>lt;sup>3</sup> Furthermore, we note that the concentration of cobalt detected in the bottom ash SPLP leachate and all of the monitoring wells installed at the unit were below the KDHE non-residential groundwater use standards. The concentration of arsenic detected in the bottom ash SPLP leachate were below the KDHE non-residential groundwater use standards.



#### 5. Certification

Pursuant to 40 CFR §257.94(e)(2), Westar conducted an alternate source evaluation to demonstrate that a source other than the BASA caused the SSL above the groundwater protection standards of arsenic and cobalt downgradient of the BASA identified during assessment monitoring.

This certification and the underlying data and evaluation performed in this report support the conclusion that a source other than the CCR unit is the cause of the SSL above the groundwater protection standards of arsenic and cobalt found during assessment monitoring of this Unit (i.e., arsenic at monitoring wells MW-9 and MW-10 and cobalt at monitoring well MW-9 downgradient of the BASA). That source has been identified as natural variability of the groundwater conditions within the uppermost aquifer underlying the BASA.

I certify that this report and all attachments were prepared by me or under my direct supervision. The information contained in this evaluation is, to the best of my knowledge, true, accurate, and complete.

HALEY & ALDRICH, INC.

Signed:

**Certifying Engineer** 

Print Name: Kansas License No.: Title: Company: Steven F. Putrich, P.E. PE24363 Principal Consultant Haley & Aldrich, Inc.



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Professional Geologist

Print Name: Kansas License No.: Title: Company: Mark D. Nicholls, P.G. 881 Lead Hydrogeologist Haley & Aldrich, Inc.



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TABLES

# TABLE I SUMMARY OF BOTTOM ASH SPLP ANALYSIS FOR TOTAL LEACHABLE METALS WESTAR ENERGY, INC.

TECUMSEH ENERGY CENTER BOTTOM ASH SETTLING AREA

TECUMSEH, KANSAS

Sample Identification	Sample Location	Sample Date	Method of Analysis	Parameter	Reporting Limit (mg/L)	Concentration (mg/L)
TEC Bottom Ash*	Bottom Ash Settling Pond	7/14/2011	ICP-AES	Total Arsenic	0.005	ND
			ICP-AES	Total Cobalt	0.002	ND
TEC BA Inlet**	Bottom Ash Settling Pond Inlet	4/2/2019	ICP-MS	Total Arsenic	0.001	0.0025
			ICP-AES	Total Cobalt	0.005	ND
TEC BA Middle**	Bottom Ash Settling Pond Middle	4/2/2019	ICP-MS	Total Arsenic	0.001	0.0055
			ICP-AES	Total Cobalt	0.005	ND
TEC BA Outlet**	Bottom Ash Settling Pond Outlet	4/2/2019	ICP-MS	Total Arsenic	0.001	0.0016
			ICP-AES	Total Cobalt	0.005	ND

#### Notes:

ICP-AES = Inductively Coupled Plasma Atomic Emission Spectroscopy

ICP-MS = Inductively Coupled Plasma Mass Spectroscopy

*mg/L* = *milligrams per liter or parts per million* (*ppm*)

TEC = Tecumseh Energy Center

*ND* = *Non-detect* at the reporting limit

**Bold Values** = parameter detected at a concentration greater than the reporting limits

\* Sample analyzed by Continental Analytical Services, Inc. Salina KS (KDHE Accreditation #E-10146)

\*\* Samples analyzed vt Pace Anayltical Services, LLC. Lenexa KS Kansas/NELAP Certification # E-10116/E10426



#### TABLE II

HISTORICAL AERIAL PHOTOGRAPH REVIEW SUMMARY WESTAR ENERGY, INC. TECUMSEH ENERGY CENTER BOTTOM ASH SETTLING AREA TECUMSEH, KANSAS

Dates	Description of Site	Sources
1948 – 1950	Power plant present; no development of the Bottom Ash Settling Area (BASA). Residential use of land to the west and southwest of the BASA. Coal pile and oil tank to east of future BASA site.	Aerial photos – ASCS; AMS
1970 – 1982	Development of the BASA. Residential use of land to the west of the 322 Landfill.	Aerial photos – USGS; NHAP
1991 – 2010	Continued development of the 322 Landfill. Residential use of land to the west of the 322 Landfill.	Aerial photos – USGS; NAIP
2012 – 2017	Continued use of the 322 Landfill configurations with only minor variations. Residential use of land to the west of the 322 Landfill.	Aerial photos – NAIP

Notes:

AMS = Army Mapping Service

ASCS = Agricultural and Soil Conservation Service

NAIP = National Agriculture Information Program

NHAP = National High Altitude Photography

USGS = United States Geological Survey



# **TABLE IIIHISTORICAL TOPOGRAPHIC MAP REVIEW SUMMARY**WESTAR ENERGY, INC.TECUMSEH ENERGY CENTERBOTTOM ASH SETTLING AREATECUMAETH, KANSAS

Dates	Description of Site and Adjacent Properties	Map Name	
1950 – 1951	Power plant is indicated on the map. The Bottom Ash Settling Area (BASA) are undeveloped. Coal pile and above ground storage tank are due east of the BASA future area.	7.5-Minute Series, Grantville, Kansas Quadrangle	
1970 – 1983	Development of the BASA. Significant development of structures and road to the east of the plant site.	7.5-Minute Series, Grantville, Kansas Quadrangle	
1983	Development of the BASA.	7.5-Minute Series, Grantville, Kansas Quadrangle	
2012	The plant site is no longer shown on the map. The BASA are shown on the map.	7.5-Minute Series, Grantville, Kansas Quadrangle	

TECUMSEH, KANSAS

**FIGURES** 



#### LEGEND

#### PROPERTY BOUNDARY

KANSAS

TEC SITE 

#### NOTES

- 1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
- 2. SITE COORDINATES: 39°3'13.53"N, 95°34'08.06"W
- 3. TOPOGRAPHIC IMAGERY SOURCE: ESRI.



2,000 SCALE IN FEET 4,000

WESTAR ENERGY TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

#### SITE LOCATION

OCTOBER 2019 SCALE: AS SHOWN

FIGURE 1



#### LEGEND



MONITORING WELL

 $\bigcirc$ 

PIEZOMETRIC OBSERVATION WELL

CROSS-SECTION

BOTTOM ASH SETTLING AREA

#### NOTE

- 1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
- 2. AMSL = ABOVE MEAN SEA LEVEL.
- 3. AERIAL IMAGERY SOURCE: ESRI, 7 NOVEMBER 2015.
- 4. GROUNDWATER ELEVATIONS ARE FROM 26 JUNE 2017.



60

SCALE IN FEET

WESTAR ENERGY TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

#### BOTTOM ASH SETTLING AREA MONITORING WELL LOCATION MAP

OCTOBER 2019 SCALE: AS SHOWN

FIGURE 2

120

(NORTHWEST) APPROXIMATE BOTTOM OF MW-11 MW-10 BOTTOM ASH (PROJECTED ~100' 890 (PROJECTED ~105' SOUTHWEST) SOUTHWEST) - EXISTING GROUND MW-9 885 880 875 870 865 860 855 850





ELEVATION IN FEET

GLACIAL DEPOSITS/OVERBURDEN

TD=40' BGS



845

840

835

LIMESTONE MEMBER OF THE SCRANTON SHALE FORMATION

Α



TD=46' BGS

#### NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. VERTICAL SCALE IS EXAGGERATED 5 TIMES.

TD=42' BGS

3. PROJECTIONS ARE IN DIRECTION FROM ACTUAL LOCATION.



**APPENDIX A** 

Laboratory Reports



Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

April 09, 2019

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

#### RE: Project: TEC BOTTOM ASH SPLP 2019 Pace Project No.: 60298624

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory between April 02, 2019 and April 09, 2019. 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,

Autor m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: Bob Beck, KCPL Lacygne Station HEATH HORYNA, WESTAR ENERGY Adam Kneeling, Haley & Aldrich, Inc. JARED MORRISON, WESTAR ENERGY



#### **REPORT OF LABORATORY ANALYSIS**



#### CERTIFICATIONS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

#### **Kansas Certification IDs**

9608 Loiret Boulevard, Lenexa, KS 66219 Missouri Certification Number: 10090 Arkansas Drinking Water WY STR Certification #: 2456.01 Arkansas Certification #: 18-016-0 Arkansas Drinking Water Illinois Certification #: 004455 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10116 / E10426 Louisiana Certification #: 03055 Nevada Certification #: KS000212018-1 Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407-18-11 Utah Certification #: KS000212018-8 Kansas Field Laboratory Accreditation: # E-92587 Missouri Certification: 10070 Missouri Certification Number: 10090

#### **REPORT OF LABORATORY ANALYSIS**



#### SAMPLE SUMMARY

Project:TEC BOTTOM ASH SPLP 2019Pace Project No.:60298624

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60298624001	TEC BA INLET	Solid	04/02/19 12:45	04/02/19 15:30
60298624002	TEC BA INLET LEACHATE	Water	04/05/19 10:15	04/05/19 10:16
60298624003	TEC BA MIDDLE	Solid	04/02/19 12:50	04/02/19 15:30
60298624004	TEC BA MIDDLE LEACHATE	Water	04/05/19 10:15	04/05/19 10:16
60298624005	TEC BA OUTLET	Solid	04/02/19 12:55	04/02/19 15:30
60298624006	TEC BA OUTLET LEACHATE	Water	04/05/19 10:15	04/05/19 10:16
60298624007	TEC BA INLET LEACHATE 2	Water	04/09/19 13:35	04/09/19 13:36
60298624008	TEC BA MIDDLE LEACHATE 2	Water	04/09/19 13:35	04/09/19 13:36
60298624009	TEC BA OUTLET LEACHATE 3	Water	04/09/19 13:35	04/09/19 13:36

**REPORT OF LABORATORY ANALYSIS**


# SAMPLE ANALYTE COUNT

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60298624001	TEC BA INLET	EPA 6010	JDE	23	PASI-K
		EPA 6020	JGP	5	PASI-K
		EPA 7470	LRS	1	PASI-K
60298624002	TEC BA INLET LEACHATE	EPA 300.0	MGS	3	PASI-K
		EPA 353.2	BLA	3	PASI-K
		EPA 365.4	RAD	1	PASI-K
60298624003	TEC BA MIDDLE	EPA 6010	JDE	23	PASI-K
		EPA 6020	JGP	5	PASI-K
		EPA 7470	LRS	1	PASI-K
60298624004	TEC BA MIDDLE LEACHATE	EPA 300.0	MGS	3	PASI-K
		EPA 353.2	BLA	3	PASI-K
		EPA 365.4	RAD	1	PASI-K
60298624005	TEC BA OUTLET	EPA 6010	JDE	23	PASI-K
		EPA 6020	JGP	5	PASI-K
		EPA 7470	LRS	1	PASI-K
60298624006	TEC BA OUTLET LEACHATE	EPA 300.0	MGS	3	PASI-K
		EPA 353.2	BLA	3	PASI-K
		EPA 365.4	RAD	1	PASI-K
60298624007	TEC BA INLET LEACHATE 2	EPA 7196	ZMH	1	PASI-K
60298624008	TEC BA MIDDLE LEACHATE 2	EPA 7196	ZMH	1	PASI-K
60298624009	TEC BA OUTLET LEACHATE 3	EPA 7196	ZMH	1	PASI-K



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA INLET	Lab ID: 6029	98624001	Collected: 04/02/1	9 12:4	5 Received: 04	/02/19 15:30 N	latrix: Solid	
Results reported on a "wet-we	ight" basis							
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP	Analytical Meth	od: EPA 60	010 Preparation Meth	nod: EF	PA 3010			
	Leachate Methe	od/Date: El	PA 1312; 04/04/19 00	:00				
Barium	ND	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:18	7440-39-3	
Beryllium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:18	7440-41-7	
Boron	0.36	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:18	7440-42-8	
Cadmium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7440-43-9	
Calcium	12.7	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:18	7440-70-2	
Chromium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7440-47-3	
Cobalt	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7440-48-4	
Copper	ND	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:18	7440-50-8	
Iron	0.22	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:18	7439-89-6	
Lead	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7439-92-1	
Magnesium	3.2	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:18	7439-95-4	
Manganese	0.0088	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7439-96-5	
Molybdenum	ND	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:18	7439-98-7	
Nickel	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:18	7440-02-0	
Potassium	ND	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:18	7440-09-7	
Silica	6.9	mg/L	1.1	1	04/05/19 12:37	04/08/19 12:18	7631-86-9	
Silicon	3.2	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:18	7440-21-3	
Silver	ND	mg/L	0.0070	1	04/05/19 12:37	04/08/19 12:18	7440-22-4	
Sodium	7.3	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:18	7440-23-5	B,M1
Strontium	0.19	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:18	7440-24-6	
Titanium	0.012	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:18	7440-32-6	
Vanadium	0.024	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:18	7440-62-2	
Zinc	ND	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:18	7440-66-6	
6020 MET ICPM, SPLP	Analytical Meth	od: EPA 60	20 Preparation Meth	nod: EF	PA 3020			
	Leachate Meth	od/Date: El	PA 1312; 04/04/19 00	:00				
Aluminum	0.54	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:03	7429-90-5	M1
Antimony	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:03	7440-36-0	
Arsenic	0.0025	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:03	7440-38-2	
Selenium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:03	7782-49-2	
Thallium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:03	7440-28-0	
7470 Mercury, SPLP	Analytical Meth	od: EPA 74	170 Preparation Meth	nod: EF	PA 7470			
	Leachate Meth	od/Date: El	PA 1312; 04/04/19 00	:00				
Mercury	ND	mg/L	0.0020	1	04/05/19 16:19	04/08/19 12:37	7439-97-6	



#### Project: TEC BOTTOM ASH SPLP 2019

#### Pace Project No.: 60298624

Sample: TEC BA INLET LEACHATE	Lab ID: 60	<b>)298624002</b> C	Collected: 04/05/1	19 10:15	Received: 04	4/05/19 10:16 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Me	ethod: EPA 300.0	)					
Chloride	ND	mg/L	1.0	1		04/05/19 22:53	16887-00-6	
Fluoride	0.29	mg/L	0.20	1		04/05/19 22:53	16984-48-8	
Sulfate	13.2	mg/L	1.0	1		04/05/19 22:53	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Me	ethod: EPA 353.2	2					
Nitrogen, Nitrate	0.20	mg/L	0.10	1		04/05/19 14:59		В
Nitrogen, Nitrite	ND	mg/L	0.10	1		04/05/19 14:59		
Nitrogen, NO2 plus NO3	0.20	mg/L	0.10	1		04/05/19 14:59		В
365.4 Total Phosphorus	Analytical Me	ethod: EPA 365.4	ł					
Phosphorus	0.16	mg/L	0.10	1		04/06/19 10:53	7723-14-0	



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA MIDDLE	Lab ID: 602	98624003	Collected: 04/02/1	9 12:5	0 Received: 04	/02/19 15:30 N	latrix: Solid	
Results reported on a "dry we	eight" basis and are adj	usted for pe	rcent moisture, sa	mple s	size and any dilu	tions.		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP	Analytical Meth	nod: EPA 601	0 Preparation Meth	nod: EF	PA 3010			
	Leachate Meth	od/Date: EPA	A 1312; 04/04/19 00	:00				
Barium	ND	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-39-3	
Bervllium	ND	ma/L	0.0010	1	04/05/19 12:37	04/08/19 12:25	7440-41-7	
Boron	0.17	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-42-8	
Cadmium	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7440-43-9	
Calcium	27.7	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-70-2	
Chromium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7440-47-3	
Cobalt	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7440-48-4	
Copper	ND	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:25	7440-50-8	
Iron	1.9	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:25	7439-89-6	
Lead	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7439-92-1	
Magnesium	4.3	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:25	7439-95-4	
Manganese	0.019	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7439-96-5	
Molybdenum	ND	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:25	7439-98-7	
Nickel	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:25	7440-02-0	
Potassium	4.4	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:25	7440-09-7	
Silica	20.5	mg/L	1.1	1	04/05/19 12:37	04/08/19 12:25	7631-86-9	
Silicon	9.6	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:25	7440-21-3	
Silver	ND	mg/L	0.0070	1	04/05/19 12:37	04/08/19 12:25	7440-22-4	
Sodium	31.4	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:25	7440-23-5	В
Strontium	0.25	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:25	7440-24-6	
Titanium	0.036	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:25	7440-32-6	
Vanadium	0.015	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:25	7440-62-2	
Zinc	ND	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:25	7440-66-6	
6020 MET ICPM, SPLP	Analytical Meth	nod: EPA 602	0 Preparation Meth	nod: EF	PA 3020			
	Leachate Meth	od/Date: EPA	A 1312; 04/04/19 00	:00				
Aluminum	1.9	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:08	7429-90-5	
Antimony	0.0012	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:08	7440-36-0	
Arsenic	0.0055	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:08	7440-38-2	
Selenium	0.0016	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:08	7782-49-2	
Thallium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:08	7440-28-0	
7470 Mercury, SPLP	Analytical Meth	nod: EPA 747	0 Preparation Meth	nod: EF	PA 7470			
	Leachate Meth	od/Date: EP/	A 1312; 04/04/19 00	:00				
Mercury	ND	mg/L	0.0020	1	04/05/19 16:19	04/08/19 12:44	7439-97-6	



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA MIDDLE LEACHATE	Lab ID: 602	98624004	Collected: 04/05/1	9 10:15	Received: 04	4/05/19 10:16 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Mether	nod: EPA 300	.0					
Chloride	1.3	mg/L	1.0	1		04/05/19 23:32	16887-00-6	
Fluoride	0.39	mg/L	0.20	1		04/05/19 23:32	16984-48-8	
Sulfate	86.4	mg/L	10.0	10		04/05/19 23:44	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Meth	nod: EPA 353	.2					
Nitrogen, Nitrate	1.7	mg/L	0.10	1		04/05/19 15:00		
Nitrogen, Nitrite	1.4	mg/L	0.10	1		04/05/19 15:00		
Nitrogen, NO2 plus NO3	3.1	mg/L	0.10	1		04/05/19 15:00		
365.4 Total Phosphorus	Analytical Meth	nod: EPA 365	.4					
Phosphorus	1.1	mg/L	0.10	1		04/06/19 10:55	7723-14-0	



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA OUTLET	Lab ID: 602	98624005	Collected: 04/02/1	9 12:5	5 Received: 04	/02/19 15:30 N	latrix: Solid	
Results reported on a "dry weig	ght" basis and are adj	iusted for pe	rcent moisture, sa	mple	size and any dilu	tions.		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP	Analytical Meth	nod: EPA 601	0 Preparation Met	nod: El	PA 3010			
	Leachate Meth	nod/Date: EP/	A 1312; 04/04/19 00	0:00				
Barium	0.14	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-39-3	
Bervllium	ND	ma/L	0.0010	1	04/05/19 12:37	04/08/19 12:27	7440-41-7	
Boron	0.39	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-42-8	
Cadmium	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-43-9	
Calcium	15.5	ma/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-70-2	
Chromium	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-47-3	
Cobalt	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-48-4	
Copper	ND	ma/L	0.010	1	04/05/19 12:37	04/08/19 12:27	7440-50-8	
Iron	0.055	ma/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7439-89-6	
Lead	ND	ma/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7439-92-1	
Magnesium	2.6	ma/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7439-95-4	
Manganese	ND	ma/l	0.0050	1	04/05/19 12:37	04/08/19 12:27	7439-96-5	
Molvbdenum	ND	ma/l	0.020	1	04/05/19 12:37	04/08/19 12:27	7439-98-7	
Nickel	ND	ma/l	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-02-0	
Potassium	ND	ma/l	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-09-7	
Silica	7.2	ma/l	1.1	1	04/05/19 12:37	04/08/19 12:27	7631-86-9	
Silicon	3.3	ma/l	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-21-3	
Silver		mg/L	0.0070	1	04/05/19 12:37	04/08/19 12:27	7440-22-4	
Sodium	5.5	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-23-5	в
Strontium	0.38	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:27	7440-24-6	2
Titanium		mg/L	0.010	1	04/05/19 12:37	04/08/19 12:27	7440-32-6	
Vanadium	0 043	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:27	7440-62-2	
Zinc	ND	ma/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7440-66-6	
			O Deservation Mari					
6020 MET ICPM, SPLP	Analytical Meth	100: EPA 602	D Preparation Met	100: EI	PA 3020			
	Leachate Meth	iod/Date: EP/	A 1312; 04/04/19 00	):00				
Aluminum	0.60	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:09	7429-90-5	
Antimony	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:09	7440-36-0	
Arsenic	0.0016	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:09	7440-38-2	
Selenium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:09	7782-49-2	
Thallium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:09	7440-28-0	
7470 Mercury, SPLP	Analytical Meth	nod: EPA 747	0 Preparation Met	nod: Fl	PA 7470			
	Leachate Meth	od/Date: EP/	A 1312; 04/04/19 00	):00				
Mercury		ma/l	0.0020	1	04/05/19 16.19	04/08/19 12:46	7439-07-6	
inicioury	ND	ing/L	0.0020		5-105/13 10.19	07/00/13 12.40	1-10-01-0	



#### Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA OUTLET LEACHATE	Lab ID: 602	98624006	Collected: 04/05/1	9 10:15	Received: 0	4/05/19 10:16 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Meth	nod: EPA 300	.0					
Chloride	ND	mg/L	1.0	1		04/06/19 00:10	16887-00-6	
Fluoride	0.20	mg/L	0.20	1		04/06/19 00:10	16984-48-8	
Sulfate	16.4	mg/L	1.0	1		04/06/19 00:10	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Meth	nod: EPA 353	.2					
Nitrogen, Nitrate	0.15	mg/L	0.10	1		04/05/19 15:03		В
Nitrogen, Nitrite	ND	mg/L	0.10	1		04/05/19 15:03		
Nitrogen, NO2 plus NO3	0.15	mg/L	0.10	1		04/05/19 15:03		В
365.4 Total Phosphorus	Analytical Meth	nod: EPA 365	.4					
Phosphorus	ND	mg/L	0.10	1		04/06/19 10:58	7723-14-0	



Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample:	TEC BA INLET LEACHATE 2	Lab ID: 60	<b>298624007</b> C	ollected: 04/09/	19 13:35	Received: (	04/09/19 13:36	Matrix: Water	
	Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7196 Chr	omium, Hexavalent	Analytical Me	ethod: EPA 7196						
Chromiur	n, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:19	18540-29-9	



Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample:	TEC BA MIDDLE LEACHATE 2	Lab ID: 602	98624008	Collected: 04/09/1	9 13:35	Received: 04	4/09/19 13:36	Matrix: Water	
	Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7196 Chr	romium, Hexavalent	Analytical Met	hod: EPA 719	6					
Chromiur	n, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:21	18540-29-9	



Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample:	TEC BA OUTLET LEACHATE 3	Lab ID: 602	98624009	Collected: 04/09/1	9 13:35	Received: 04	/09/19 13:36	Matrix: Water	
	Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7196 Chr	omium, Hexavalent	Analytical Met	hod: EPA 719	6					
Chromiur	n, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:2	2 18540-29-9	



Project: Pace Project No.:	TEC BOTTOM ASI 60298624	H SPLP 2019										
	677604		Analyzi	ia Mathad:								
QC Balch.	577594		Analysi			EPA 7470						
QC Batch Method:	EPA 7470		Analysi	is Descript	ion: 7	7470 Mercury	SPLP					
Associated Lab San	nples: 602986240	001, 60298624003	, 602986240	005								
METHOD BLANK:	2370033		N	latrix: Wat	ter							
Associated Lab San	nples: 602986240	001.60298624003	. 602986240	005								
		,	Blank	R	eportina							
Paran	neter	Units	Result	t	Limit	Analvz	ed	Qualifiers				
					0.000		40.00		_			
Mercury		mg/∟		ND	0.0020	0 04/08/19	12.33					
LABORATORY CON	ITROL SAMPLE:	2370034										
			Spike	LCS	i	LCS	% Red	0				
Paran	neter	Units	Conc.	Resu	lt	% Rec	Limits	s Qi	ualifiers			
Mercury		mg/L	0.015		0.014	96	80	)-120		-		
MATRIX SPIKE & M	ATRIX SPIKE DUP	LICATE: 23700;	36		2370035							
			MS	MSD								
		60298624001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Мах	
Paramete	r Unit	s Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Mercury	mg/	L ND	0.015	0.015	0.014	0.015	96	97	75-125	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: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch:	577491	Analysis Method:	EPA 6010
QC Batch Method:	EPA 3010	Analysis Description:	6010 MET SPLP
Associated Lab Sam	oles: 60298624001.60298624003.6	0298624005	

Matrix: Water

METHOD BLANK: 2369565

Associated Lab Samples: 60298624001, 60298624003, 60298624005

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Barium	mg/L	ND	0.10	04/08/19 12:04	
Beryllium	mg/L	ND	0.0010	04/08/19 12:04	
Boron	mg/L	ND	0.10	04/08/19 12:04	
Cadmium	mg/L	ND	0.0050	04/08/19 12:04	
Calcium	mg/L	0.90	0.10	04/08/19 13:32	
Chromium	mg/L	ND	0.0050	04/08/19 12:04	
Cobalt	mg/L	ND	0.0050	04/08/19 12:04	
Copper	mg/L	ND	0.010	04/08/19 12:04	
Iron	mg/L	ND	0.050	04/08/19 12:04	
Lead	mg/L	ND	0.0050	04/08/19 12:04	
Magnesium	mg/L	0.082	0.050	04/08/19 12:04	
Manganese	mg/L	ND	0.0050	04/08/19 12:04	
Molybdenum	mg/L	ND	0.020	04/08/19 12:04	
Nickel	mg/L	ND	0.0050	04/08/19 12:04	
Potassium	mg/L	ND	0.50	04/08/19 12:04	
Silica	mg/L	ND	1.1	04/08/19 12:04	
Silicon	mg/L	ND	0.50	04/08/19 12:04	
Silver	mg/L	ND	0.0070	04/08/19 12:04	
Sodium	mg/L	8.6	0.50	04/08/19 13:32	
Strontium	mg/L	ND	0.020	04/08/19 12:04	
Titanium	mg/L	ND	0.010	04/08/19 12:04	
Vanadium	mg/L	ND	0.010	04/08/19 12:04	
Zinc	mg/L	ND	0.050	04/08/19 12:04	

#### LABORATORY CONTROL SAMPLE: 2369566

_		Spike	Spike LCS		% Rec	o ""	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers	
Barium	mg/L	1	0.99	99	80-120		
Beryllium	mg/L	1	1.0	100	80-120		
Boron	mg/L	1	0.97	97	80-120		
Cadmium	mg/L	1	0.98	98	80-120		
Calcium	mg/L	10	10.2	102	80-120		
Chromium	mg/L	1	0.99	99	80-120		
Cobalt	mg/L	1	1.0	101	80-120		
Copper	mg/L	1	0.98	98	80-120		
Iron	mg/L	10	10.2	102	80-120		
Lead	mg/L	1	1.0	101	80-120		
Magnesium	mg/L	10	10	100	80-120		
Manganese	mg/L	1	0.98	98	80-120		
Molybdenum	mg/L	1	0.94	94	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: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

#### LABORATORY CONTROL SAMPLE: 2369566

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Nickel	mg/L	1	1.0	100	80-120	
Potassium	mg/L	10	10	100	80-120	
Silica	mg/L	1	10.6	1060		
Silicon	mg/L	5	5.0	99	80-120	
Silver	mg/L	0.5	0.50	100	80-120	
Sodium	mg/L	10	9.9	99	80-120	
Strontium	mg/L	1	1.0	100	80-120	
Titanium	mg/L	1	0.99	99	80-120	
Vanadium	mg/L	1	0.99	99	80-120	
Zinc	mg/L	1	0.99	99	80-120	

MATRIX SPIKE & MATRIX S	PIKE DUPLICA	ATE: 23695	67		2369568							
			MS	MSD								
	6	0298624001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	ND	1	1	1.1	1.1	103	103	75-125	1	20	
Beryllium	mg/L	ND	1	1	0.99	0.98	99	98	75-125	1	20	
Boron	mg/L	0.36	1	1	1.3	1.3	97	97	75-125	1	20	
Cadmium	mg/L	ND	1	1	0.97	0.97	97	97	93-110	1	20	
Calcium	mg/L	12.7	10	10	22.6	22.6	98	99	75-125	0	20	
Chromium	mg/L	ND	1	1	0.98	0.98	98	97	72-127	0	20	
Cobalt	mg/L	ND	1	1	1.0	0.99	99	99	90-116	0	20	
Copper	mg/L	ND	1	1	0.98	0.97	98	97	75-125	0	20	
Iron	mg/L	0.22	10	10	10.0	10	98	97	87-113	1	20	
Lead	mg/L	ND	1	1	1.0	0.99	100	99	75-125	1	20	
Magnesium	mg/L	3.2	10	10	13.4	13.4	102	101	75-125	0	20	
Manganese	mg/L	0.0088	1	1	0.98	0.97	97	96	58-158	1	20	
Molybdenum	mg/L	ND	1	1	0.93	0.93	93	93	75-125	0	20	
Nickel	mg/L	ND	1	1	0.99	0.99	99	98	75-125	1	20	
Potassium	mg/L	ND	10	10	9.9	9.7	99	97	75-125	1	20	
Silica	mg/L	6.9	1	1	16.5	16.3	965	944		1		
Silicon	mg/L	3.2	5	5	7.7	7.6	90	88	75-125	1	20	
Silver	mg/L	ND	0.5	0.5	0.50	0.49	99	98	75-125	1	20	
Sodium	mg/L	7.3	10	10	10.7	10.6	34	33	75-125	1	20	M1
Strontium	mg/L	0.19	1	1	1.2	1.2	100	100	75-125	0	20	
Titanium	mg/L	0.012	1	1	0.98	0.98	97	96	75-125	1	20	
Vanadium	mg/L	0.024	1	1	1.0	1.0	98	98	75-125	0	20	
Zinc	mg/L	ND	1	1	0.98	0.97	97	97	78-126	1	20	

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#### **REPORT OF LABORATORY ANALYSIS**

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EPA 6020

6020 MET SPLP

Project: TEC BOTTOM ASH SPLP 2019

EPA 3020

Pace Project No.: 60298624

QC Batch: 577492 QC Batch Method:

Analysis Method:

Analysis Description:

Associated Lab Samples: 60298624001, 60298624003, 60298624005

METHOD BLANK: 2369569

Matrix: Water

Associated Lab Sample	es:	60298624001	60298624003	60298624005
Associated Lab Gampi	03.	00290024001,	00290024003,	00290024003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.050	04/08/19 12:00	
Antimony	mg/L	ND	0.0010	04/08/19 12:00	
Arsenic	mg/L	ND	0.0010	04/08/19 12:00	
Selenium	mg/L	ND	0.0010	04/08/19 12:00	
Thallium	mg/L	ND	0.0010	04/08/19 12:00	

#### LABORATORY CONTROL SAMPLE: 2369570

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	1	1.0	100	80-120	
Antimony	mg/L	0.04	0.038	94	80-120	
Arsenic	mg/L	0.04	0.036	91	80-120	
Selenium	mg/L	0.04	0.035	87	80-120	
Thallium	mg/L	0.04	0.037	93	80-120	

IATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2369571 2369572												
			MS	MSD								
		60298624001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Aluminum	mg/L	0.54	1	1	1.8	1.9	131	132	75-125	1	20	M1
Antimony	mg/L	ND	0.04	0.04	0.038	0.038	94	92	75-125	2	20	
Arsenic	mg/L	0.0025	0.04	0.04	0.039	0.038	90	89	75-125	1	20	
Selenium	mg/L	ND	0.04	0.04	0.035	0.035	85	85	75-125	0	20	
Thallium	mg/L	ND	0.04	0.04	0.037	0.037	94	92	75-125	1	20	

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# **REPORT OF LABORATORY ANALYSIS**

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Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.:	60298624
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QC Batch:	577578
QC Batch Method:	EPA 300.0

Analysis Method:

Analysis Description: 300.0 IC Anions

EPA 300.0

Associated Lab Samples: 60298624002, 60298624004, 60298624006

METHOD BLANK: 23699	68	Matrix:	Water		
Associated Lab Samples:	60298624002, 60298624004,	, 60298624006			
		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	04/05/19 22:02	
Fluoride	mg/L	ND	0.20	04/05/19 22:02	
Sulfate	mg/L	ND	1.0	04/05/19 22:02	

#### LABORATORY CONTROL SAMPLE: 2369969

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L		5.0	100	90-110	
Fluoride	mg/L	2.5	2.6	104	90-110	
Sulfate	mg/L	5	5.3	105	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.



Dustant	TEO DOTTON		0040
Project:	IEC BOLLOM	ASH SPLP	2019

Pace Project No.: 60298624

QC Batch:	577533
QC Batch.	57753

Associated Lab Samples:

QC Batch Method:

Analysis Method:

Analysis Description:

Matrix: Water

EPA 353.2 353.2 Nitrate + Nitrite, Unpres.

METHOD BLANK: 2369705

EPA 353.2

Associated Lab Samples:	60298624002, 60298624004, 60298624006

60298624002, 60298624004, 60298624006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	0.14	0.10	04/05/19 14:57	
Nitrogen, Nitrite	mg/L	ND	0.10	04/05/19 14:57	
Nitrogen, NO2 plus NO3	mg/L	0.14	0.10	04/05/19 14:57	

#### LABORATORY CONTROL SAMPLE: 2369706

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	1	0.96	96	70-130	
Nitrogen, Nitrite	mg/L	1	1.1	106	90-110	
Nitrogen, NO2 plus NO3	mg/L	2	2.0	101	90-110	

MATRIX SPIKE SAMPLE:	2369707						
		60298624002	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Nitrogen, Nitrate	mg/L	0.20	1	1.2	97	70-130	
Nitrogen, Nitrite	mg/L	ND	1	1.1	110	90-110	
Nitrogen, NO2 plus NO3	mg/L	0.20	2	2.3	104	90-110	

#### SAMPLE DUPLICATE: 2369708

		60298624006	Dup		Max	
Parameter	Units	Result	Result	RPD	RPD	Qualifiers
Nitrogen, Nitrate	mg/L	0.15	0.15	0	20	
Nitrogen, Nitrite	mg/L	ND	ND		20	
Nitrogen, NO2 plus NO3	mg/L	0.15	0.15	0	20	

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# **REPORT OF LABORATORY ANALYSIS**

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Project:	TEC BOTTOM AS	SH SPLP 2019						
Pace Project No .:	60298624							
QC Batch:	577541		Analysis Me	thod: E	EPA 365.4			
QC Batch Method:	EPA 365.4		Analysis De	scription: 3	365.4 Phosphoru	JS		
Associated Lab San	nples: 60298624	1002, 60298624004	4, 60298624006					
METHOD BLANK:	2369762		Matrix	: Water				
Associated Lab San	nples: 60298624	1002, 60298624004	4, 60298624006					
			Blank	Reporting				
Paran	neter	Units	Result	Limit	Analyzed	Qualifie	rs	
Phosphorus		mg/L	ND	0.10	0 04/06/19 10:	51		
LABORATORY COM	NTROL SAMPLE:	2369763						
_			Spike	LCS	LCS	% Rec	0	
Paran	neter	Units	Conc.	Result	% Rec		Qualifiers	
Phosphorus		mg/L	2	2.1	105	90-110		
MATRIX SPIKE SAI		2369764						
		2000704	60298624002	2 Spike	MS	MS	% Rec	
Paran	neter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Phosphorus		mg/L	0.	16 2	2.3	105	90-110	
	TE: 2369765							
			60298624004	Dup		Max		
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers	_
Phosphorus		mg/L	1.1	1.(	)	3 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: TEC I	BOTTOM AS	SH SPLP 2019						
Pace Project No.: 60298	3624							
QC Batch: 578	184		Analysis Me	ethod:	EPA 7196			
QC Batch Method: EPA	7196		Analysis De	scription:	7196 Chromium,	Hexavalent		
Associated Lab Samples:	60298624	007, 60298624008	3, 60298624009					
METHOD BLANK: 23723	388		Matrix	: Water				
Associated Lab Samples:	60298624	007, 60298624008	8, 60298624009					
			Blank	Reporting				
Parameter		Units	Result	Limit	Analyzed	Qualifi	ers	
Chromium, Hexavalent		mg/L	ND	0.01	0 04/09/19 14:	13		
LABORATORY CONTROL	SAMPLE:	2372389						
			Spike	LCS	LCS	% Rec	0 11/1	
Parameter		Units	Conc	Result	% Rec	Limits	Qualifiers	
Chromium, Hexavalent		mg/L	0.1	0.096	96	90-110		
MATRIX SPIKE SAMPLE		2372390						
		2012000	6029862400	7 Spike	MS	MS	% Rec	
Parameter		Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Chromium, Hexavalent		mg/L		ND 0.1	0.090	90	85-115	
	272201							
SAWFLE DUFLIGATE: 2	312331		60298624008	Dup		Max		
Parameter		Units	Result	Result	RPD	RPD	Qualifiers	
Chromium, Hexavalent		mg/L	ND	N	 D		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: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

#### 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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.

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

#### ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

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



## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:TEC BOTTOM ASH SPLP 2019Pace Project No.:60298624

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60298624001	TEC BA INLET	EPA 3010	577491	EPA 6010	577572
60298624003	TEC BA MIDDLE	EPA 3010	577491	EPA 6010	577572
60298624005	TEC BA OUTLET	EPA 3010	577491	EPA 6010	577572
60298624001	TEC BA INLET	EPA 3020	577492	EPA 6020	577571
60298624003	TEC BA MIDDLE	EPA 3020	577492	EPA 6020	577571
60298624005	TEC BA OUTLET	EPA 3020	577492	EPA 6020	577571
60298624001	TEC BA INLET	EPA 7470	577594	EPA 7470	577730
60298624003	TEC BA MIDDLE	EPA 7470	577594	EPA 7470	577730
60298624005	TEC BA OUTLET	EPA 7470	577594	EPA 7470	577730
60298624002	TEC BA INLET LEACHATE	EPA 300.0	577578		
60298624004	TEC BA MIDDLE LEACHATE	EPA 300.0	577578		
60298624006	TEC BA OUTLET LEACHATE	EPA 300.0	577578		
60298624002	TEC BA INLET LEACHATE	EPA 353.2	577533		
60298624004	TEC BA MIDDLE LEACHATE	EPA 353.2	577533		
60298624006	TEC BA OUTLET LEACHATE	EPA 353.2	577533		
60298624002	TEC BA INLET LEACHATE	EPA 365.4	577541		
60298624004	TEC BA MIDDLE LEACHATE	EPA 365.4	577541		
60298624006	TEC BA OUTLET LEACHATE	EPA 365.4	577541		
60298624007	TEC BA INLET LEACHATE 2	EPA 7196	578184		
60298624008	TEC BA MIDDLE LEACHATE 2	EPA 7196	578184		
60298624009	<b>TEC BA OUTLET LEACHATE 3</b>	EPA 7196	578184		

Pace Analytical <sup>®</sup> Sample Condition Up	oon Receipt	WO# : 60298624
Client Name: Mester Freed		
Courier: FedEx UPS VIA Clay P	EX 🗆 🛛 ECI 🗆	Pace Z Xroads Client Other C
Tracking #: Pace	e Shipping Label Use	d? Yes□ Not
Custody Seal on Cooler/Box Present: Yes 🖉 No 🗆	Seals intact: Yes	No 🗆
Packing Material:     Bubble Wrap □     Bubble Bags Ø       Thermometer Used:     ✓     Type of	Foam □ Ice:Wet Blue No	None  Other  ne
Cooler Temperature (°C): As-read $\frac{2}{5}$ Corr. Facto	Correct	ted 3.5 Date and initials of person examining contents: 4/12/19
Temperature should be above freezing to 6°C		
Chain of Custody present:	ZYes DNo DN/A	
Chain of Custody relinquished:		
Samples arrived within holding time:		
Short Hold Time analyses (<72hr):		
Rush Turn Around Time requested:	Yes No N/A	3 2/
Sufficient volume:	ZYes No N/A	
Correct containers used:	Yes No N/A	
Pace containers used:	∕ ØYes □No □N/A	
Containers intact:	Yes No N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No 🗖 VA	
Filtered volume received for dissolved tests?	□Yes □No ØN/A	
Sample labels match COC: Date / time / ID / analyses	Yes No N/A	
Samples contain multiple phases? Matrix: 52	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 ØN/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
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 ØN/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	Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/Til	me:	
Comments/ Resolution:		
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.

Section Require	A I Client Information:	Section B         Section C           Regulared Project Information:         Invoice Information:														ſ	Pa	ige:	I	of		1										
Company	WESTAR ENERGY	Report To:	Report To: Brandon Griffin Attention: Accounts Payable										1																			
Address:	2nd Dupont Road	Сору То:	Copy To: Jared Morrison, Adam Kneeling								Company Name: WESTAR ENERGY							REGULATORY AGENCY														
	Tecumseh, KS 66542		Bob	Beck						Add	ress:										3	NF	DES	Г	GR	OUN	ID W		R Г	DRINKI	N DI	/ATER
Email To		Purchase C	Order I	No.:	10TEC-0	0000079	957			Pace	e Quote											US	т	Г	RC	RA			Г	OTHER		
Phone:	Fax:	Project Nar	ne:	TEC	Bottom /	Ash 2019	)			Pace	Project	Н	leath	er W	ilson	, 913	3-563	8-140	7		Si	te Lo	ocatio	n				E	//////	//////	111	
Request	ed Due Date/TAT: 3-5 Days	Project Nur	прег.							Pace	e Profile	#: 1	1973	,1&	2					_		s	TAT	<b>:</b> ;		KS		- [				
			Requested									Ana	lysi	s Filt	ered	(Y/N	)															
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08/04/2011

Page: 1

Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

Date and Time Received: 07/14/2011 09:00 Continental File No.: 7701 Continental Order No.: 57218 Project ID: TEC Purchase Auth: 901836

Dear Mr. Junod:

This laboratory report containing the samples indicated below, includes 15 pages for the analytical report, 1 page(s) for the chain of custody and/or analysis request, and 1 page(s) for the sample receipt form.

CAS LAB ID #	SAMPLE DESCRIPTION	SAMPLE TYPE	DATE SAMPLED
11070963	TEC Fly Ash-SPLP	Liquid	7/13/2011
11070964	TEC Bottom Ash -SPLP	Liquid	7/13/2011

The Appendix and Quality Control sections are integral parts of this laboratory report and may contain important data qualifiers.

All results are reported on a wet weight basis unless otherwise stated.

Samples will be retained for 120 days unless Continental is otherwise notified.

Continental is accredited by the State of Kansas through the National Environmental Laboratory Accreditation Program (NELAP). The results contained in this report were obtained using Continental's Standard Operating Procedures. These procedures are in substantial compliance with the approved methods referenced and the standards published by NELAP unless otherwise noted in the Appendix and Quality Control sections of this report.

This report may not be reproduced, except in full, without written approval from Continental Analytical Services, Inc.

Thank you for choosing Continental for this project. If you have any questions please contact me at (800)535-3076.

CONTINENTAL ANALYTICAL SERVICES, INC.

Clifford J. Baker Technical Manager

ram traddock

Petra M. Craddock Project Manager



525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737 785-827-1273 800-535-3076 Fax 785-823-7830 Vite state income

KDHE Environmental Laboratory Accreditation No. E-10146



Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Page: 2

Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Lab Number: 11070963 Sample Description: TEC Fly Ash-SPLP Date Sampled: 07/13/2011 Time Sampled: 1420

				Dilution	n
Analysis	Concentr	ation <u>t</u>	Jnits	Factor	LOQ
Aluminum, Tot. Rec., ICP-N	<b>IS 83400</b>	ŀ	ıg/L	1.0	0.03
Antimony, Tot. Rec., ICP-N	1S ND(5)	Ļ	ıg/L	1.0	5
Arsenic, Total, ICP	ND(5)	ļ	ıg/L	1.0	5
Barium, Total, ICP	6980	ļ	ıg/L	1.0	0.10
Beryllium, Total, ICP	ND(2)	ļ	ıg/L	1.0	2
Boron, Total, ICP	ND(500)	ļ	₄g/L	1.0	500
Cadmium, Total, ICP	ND(2)	ŀ	ıg/L	1.0	2
Calcium, Total, ICP	206	, IJ	ng/L	1.0	0.5
Chromium, Total, ICP	92	ŀ	ıg/L	1.0	5
Cobalt, Total, ICP	ND(2)	ŀ	ıg/L	1.0	2
Copper, Total, ICP	ND(10)	ŀ	ıg∕L	1.0	10
Final pH, SPLP Extract	11.3	5	Std. units	1.0	
Iron, Total, ICP	ND(0.10	) п	ng/L	1.0	0.10
Lead, Total, ICP	ND(5)	Ļ	ıg/L	1.0	3
Magnesium, Total, ICP	ND(0.1)	n	ng/L	1.0	0.1
Manganese, Total, ICP	ND(5)	Ļ	ιg/L	1.0	5
Mercury, Total	ND(0.2)	, J	ιg/L	1.0	0.2
Molybdenum, Total, ICP	110.	, J	ig/L	1.0	5
Nickel, Total, ICP	ND (5)	ļ	ιġ/L	1.0	5
Potassium, Dissolved, ICP	0.9 B	n	ng/L	1.0	0.3
Selenium, Tot. Rec., ICP-M	<b>IS</b> 10.	Ļ	ıg/L	1.0	5
Silicon as Silica	1.04 BS	0.16 n	ng/L	1.0	0.04
Silver, Total, ICP	ND(5)	Ļ	ιg/L	1.0	5
Sodium, Dissolved, ICP	13.9 BS	2.6 п	ng/L	1.0	0.5
Strontium, Total, ICP	11900	Ļ	ιg/L	1.0	5
Thallium, Tot. Rec., ICP-M	I <b>S N</b> D(2)	Þ	ıg/L	1.0	2
Titanium, Total, ICP	6	4	ıg/L	1.0	5
Vanadium, Total, ICP	10.	· 4	ıg/L	1.0	5
Zinc, Total, ICP	15 .	ŀ	ıg/L	1.0	10
Chloride	1.2	п	ng/L	1.0	1.0
Chromium, Hexavalent	0.175	п	ng/L	1.0	0.010
Fluoride	2.7 E Q	C n	ng/L	1.0	0.1
Nitrate, as N	ND(0.1)	п	ng/L	1.0	0.1
Nitrate/Nitrite, as N	ND(0.1)	π	ng/L	1.0	0.1
Nitrite, as N	ND(0.1)	ń	ng/L	1.0	0.1 .
Phosphorus, Total, as P	ND(0.2)	n	ng/L	0	0
Sulfate	12.9	n	ng/L	1.0	1.0
	Date/Time	Date/Time	QC	Inst.	
Analysis	Prepared	Analyzed	Batch	Batch	Analyst Method(s)

-Continued-





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Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

•	Date/Time	Date/Time	QC	Inst.	_	
Analysis	Prepared	Analyzed	Batch	Batch	Analyst	Method(s)
Aluminum, Tot. Rec., ICP-	M07/21/11 1200	08/02/11 1	1619 110721-3	2IP3214	JDL	6020A
Antimony, Tot. Rec., ICP-	M07/21/11 1200	07/21/11 1	1914 110721-3	4IP3202	JDL	6020A
Arsenic, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Barium, Total, ICP	07/21/11 1130	07/25/11 1	1338 1107 <b>21-</b> 3	3IP4206	JDL	6010B
Beryllium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	<b>3IP4206</b>	JDL	6010B
Boron, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-:	3IP4206	JDL	6010B
Cadmium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	. 3I <b>P42</b> 06	JDL	6010B
Calcium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Chromium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Cobalt, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Copper, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Final pH, SPLP Extract	N/A	07/20/11	110720-	720BLK1	ADK	9040B
Iron, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Lead, Total, ICP	07/21/11 1130	07/28/11 1	1351 110721-3	4IP4209	JDL	6010B
Magnesium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Manganese, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-1	3IP4206	JDL	6010B
Mercury, Total	07/21/11 1126	07/22/11 1	1757 110721-3	3MA3203	JDL	7470A
Molybdenum, Total, ICP	07/21/11 1130	07/26/11 1	1807 110721-3	4IP4207	JDL	6010B
Nickel, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Potassium, Dissolved, ICP	07/22/11 1252	08/02/11 1	1955 110722-	5 4IP4214	KMW	6010B
Selenium, Tot. Rec., ICP-	M07/21/11 1200	07/21/11 1	1914 1 <b>10721-</b> 3	41P3202	JDL	6020A
Silicon as Silica	07/22/11 1200	08/01/11 1	1629 110722-3	3 3IP4213	KMW	6010B
Silver, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	$_{ m JDL}$	6010B
Sodium, Dissolved, ICP	07/22/11 1252	08/02/11 1	1955 110722-	5 4IP4214	KMW	6010B
Strontium, Total, ICP	07/21/11 1130	07/28/11 1	1351 110721-3	4IP4209	$_{\rm JDL}$	6010B
Thallium, Tot. Rec., ICP-	M07/21/11 1200	07/21/11 1	1914 110721-:	4IP3202	JDL	6020A
Titanium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	JDL	6010B
Vanadium, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-1	3IP4206	JDL	6010B
Zinc, Total, ICP	07/21/11 1130	07/25/11 1	1338 110721-3	3IP4206	$_{\rm JDL}$	6010B
Chloride	N/A	07/21/11 1	1215 1IC1202	1IC1202	MLL	300.0/9056 <b>A</b>
Chromium, Hexavalent	N/A	07/21/11 1	1107 110721-3	110721-2	JND	7196A (Modified)
Fluoride	N/A	08/01/11 1	1437 1IC2213	1IC2213	MLL	300.0/9056A
Nitrate, as N	N/A	07/21/11 1	1215 1IC1202	1IC1202	MLL	300.0/9056A
Nitrate/Nitrite, as N	N/A	07/26/11				Calc.
Nitrite, as N	N/A	07/21/11 ]	1215 1IC1202	1IC1202	MLL	300.0/9056A
Phosphorus, Total, as P	N/A	07/21/11 1	1422 110721-2	2 110721-3	КЈН	SM 4500-P(B&F) (M
Sulfate	N/A	07/21/11 1	1215 1IC1202	1IC1202	MLL	300.0/9056A
ICP Metals Total Preparat	ion Method					3010A
Dissolved Metals Preparat	ion Method	•				3005A
Mercury Total Preparation	Method					7470A
Total Recoverable Metals	Preparation Me	thod				3005A

Conclusion of Lab Number: 11070963





Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Page: 4

Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Lab Number: 11070964 Sample Description: TEC Bottom Ash -SPLP

Date Sampled: 07/13/2011 Time Sampled: 1430

:			Diluti	n
Analysis	Concentra	tion Unit	s Factor	LOQ
Aluminum, Tot. Rec., ICP-	MS 10400	μg/L	1.0	0.03
Antimony, Tot. Rec., ICP-	MS ND(5)	μg/I	1.0	5
Arsenic, Total, ICP	ND (5)	μg/L	1.0	5
Barium, Total, ICP	546	μg/L	1.0	0.10
Beryllium, Total, ICP	ND (2)	μg/L	1.0	2
Boron, Total, ICP	900	μg/L	1.0	500
Cadmium, Total, ICP	ND(2)	μg/L	1.0	2
Calcium, Total, ICP	87.1	mg/L	1.0	0.5
Chromium, Total, ICP	16	μg/L	1.0	5
Cobalt, Total, ICP	ND(2)	μg/L	1.0	2
Copper, Total, ICP	ND(10)	μg/L	1.0	10
Final pH, SPLP Extract	10.4	Std.	units 1.0	
Iron, Total, ICP	ND(0.10)	mg/L	1.0	0.10
Lead, Total, ICP	ND (5)	µg/L	1.0	3
Magnesium, Total, ICP	0.3	mg/L	1.0	0.1
Manganese, Total, ICP	ND(5)	μg/L	1.0	5
Mercury, Total	ND(0.2)	µg/⊥	1.0	0.2
Molybdenum, Total, ICP	12	μg/L	1.0	5
Nickel, Total, ICP	ND (5)	µg/⊥	1.0	5
Potassium, Dissolved, ICP	0.4 B	mg/L	1.0	0.3
Selenium, Tot. Rec., ICP-1	<b>1S N</b> D(5)	. μg/L	1.0	5
Silicon as Silica	3.48	mg/L	1.0	0.04
Silver, Total, ICP	ND (5)	µg/L	1.0	5
Sodium, Dissolved, ICP	6.0 BS 2	2.6 mg/L	1.0	0.5
Strontium, Total, ICP	1360	µg/L	1.0	5
Thallium, Tot. Rec., ICP-N	AS ND(2)	µg/L	1.0	2
Titanium, Total, ICP	ND (5)	μg/L	1.0	5
Vanadium, Total, ICP	51	µg/L	1.0	5
Zinc, Total, ICP	15	µg/L	1.0	10
Chloride	1.9	mg/L	1.0	1.0
Chromium, Hexavalent	0.018	mg/L	1.0	0.010
Fluoride	0.1	mg/L	1.0	0.1
Nitrate, as N	0.1	mg/L	1.0	0.1
Nitrate/Nitrite, as N	0.1	mg/L	1.0	0.1
Nitrite, as N	ND(0.1)	mg/L	1.0	0.1
Phosphorus, Total, as P	ND(0.2)	mg/L	0	0
Sulfate	148	mg/L	10	10
	Date/Time	Date/Time	QC Inst.	
Analysis	Prepared	Analyzed I	Batch Batch	Analyst Method(s)

-Continued-





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Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Analysis         Prepared         Analyzed         Batch         Batch         Analyst         Method(s)           Aluminum, Tot. Rec., ICP-M07/21/11         1200         08/02/11         1655         110721-3         3IP3214         JDL         6020A           Antimony, Tot. Rec., ICP-M07/21/11         1200         07/21/11         1941         110721-3         4IP3202         JDL         6020A	
Aluminum, Tot. Rec., ICP-M07/21/11 1200 08/02/11 1655 110721-3 3IP3214 JDL 6020A Antimony, Tot. Rec., ICP-M07/21/11 1200 07/21/11 1941 110721-3 4IP3202 JDL 6020A	
Antimony, Tot. Rec., TCP-M07/21/11 1200 07/21/11 1941 110721-3 41P3202 (TDT. 6020)	
Arsenic, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Barium, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 4IP4207 JDL 6010B	
Beryllium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Boron, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 4IP4207 JDL 6010B	
Cadmium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Calcium, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 41P4207 JDL 6010B	
Chromium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 31P4206 JDL 6010B	
Cobalt, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Copper, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Final pH, SPLP Extract N/A 07/20/11 110720-1 720BLK1 ADK 9040B	
Iron, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Lead, Total, ICP 07/21/11 1130 07/28/11 1355 110721-1 4IP4209 JDL 6010B	
Magnesium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Manganese, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Mercury, Total 07/21/11 1126 07/22/11 1828 110721-1 4MA3203 JDL 7470A	
Molybdenum, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 4IP4207 JDL 6010B	
Nickel, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Potassium, Dissolved, ICP 07/22/11 1252 08/02/11 2008 110722-5 5IP4214 KMW 6010B	
Selenium, Tot. Rec., ICP-M07/21/11 1200 07/21/11 1941 110721-3 4IP3202 JDL 6020A	
Silicon as Silica 07/22/11 1200 08/01/11 1633 110722-3 3IP4213 KMW 6010B	
Silver, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 3IP4206 JDL 6010B	
Sodium, Dissolved, ICP 07/22/11 1252 08/02/11 2008 110722-5 51P4214 KMW 6010B	
Strontium, Total, ICP 07/21/11 1130 07/28/11 1355 110721-1 4IP4209 JDL 6010B	
Thallium, Tot. Rec., ICP-M07/21/11 1200 07/21/11 1941 110721-3 4IP3202 JDL 6020A	
Titanium, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 31P4206 JDL 6010B	
Vanadium, Total, ICP 07/21/11 1130 07/26/11 1811 110721-1 4IP4207 JDL 6010B	
Zinc, Total, ICP 07/21/11 1130 07/25/11 1343 110721-1 31P4206 JDL 6010B	
Chloride N/A 07/21/11 1229 1IC1202 1IC1202 MLL 300.0/9056A	
Chromium, Hexavalent N/A 07/21/11 1107 110721-1 110721-2 JND 7196A (Modifi	(ed
Fluoride N/A 07/26/11 2229 1IC2207 3IC2207 MLL 300.0/9056A	
Nitrate, as N N/A 07/21/11 1229 1IC1202 1IC1202 MLL 300.0/9056A	
Nitrate/Nitrite, as N N/A 07/26/11 Calc.	
Nitrite, as N N/A 07/21/11 1229 1IC1202 1IC1202 MLL 300.0/9056A	
Phosphorus, Total, as P N/A 07/21/11 1423 110721-2 110721-3 KJH SM 4500-P(B&F	P) (M
Sulfate N/A 07/21/11 1348 1IC1202 2IC1202 MLL 300.0/9056A	,
ICP Metals Total Preparation Method 3010A	
Dissolved Metals Preparation Method 3005A	
Mercury Total Preparation Method 7470A	
Total Recoverable Metals Preparation Method 3005A	

Conclusion of Lab Number: 11070964





APPENDIX

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Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

ND indicates not detected with the LOQ (Limit of Quantitation) in parentheses. The LOQ value has been adjusted for the dilution factor and percent solids, as applicable. Due to rounding of significant figures, the LOQ value may vary slightly from the reported concentration. The LOQ is the lowest concentration of the analytical standard that was used for calibrating the instrument. If an analytical standard is analyzed at the LOQ, an error of as much as +/- 50% can be expected.

Not all samples were received at a temperature of less than 6 degrees Celsius. Refer to the enclosed Cooler/Sample Receipt Form(s) for the affected cooler(s) and sample(s).

The following table presents the date and time sampled, the date and time analyzed, and the total time elapsed for each analysis with an EPA recommended holding time of seventy-two hours or less.

		DATE/TIME	DATE/TIME	ELAPSED
CAS LAB ID #	ANALYSIS	SAMPLED	ANALYZED	HRS:MIN
11070963	Chromium, Hexavalent	07/13/2011 1420	07/21/2011 1107	188:47
11070963	Nitrate, as N	07/13/2011 1420	07/21/2011 1215	189:55
11070963	Nitrite, as N	07/13/2011 1420	07/21/2011 1215	189:55
11070964	Chromium, Hexavalent	07/13/2011 1430	07/21/2011 1107	188:37
11070964	Nitrate, as N	07/13/2011 1430	07/21/2011 1229	189:59
11070964	Nitrite, as N	07/13/2011 1430	07/21/2011 1229	189:59

**B** - Analyte is also present in the method blank or load blank at the concentration indicated either to the right of the letter B and/or in the enclosed Quality Control Report. The reported sample concentration has not been blank corrected.

BS - This analyte was detected in a blank from the SPLP or TCLP procedure at the concentration indicated to the right of the qualifier. The sample result has not been blank corrected. The analytical method blank can be found in the QC report.

E - Concentration or reporting limit is an estimated value. Matrix interferences and/or sample heterogeneity were noted at the time of sample analysis.

QC - QC data qualifiers were noted. See the Quality Control Report.



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Continental Analytical Services, Inc. Accreditation Summary Report

Client: Westar Energy, Inc. CAS Order Number: 57218

NELAP accreditation is issued under each EPA regulatory program for a given matrix/analyte/method combination. Continental is NELAP accredited for each matrix/analyte/method and EPA program cited in this Laboratory Report, except for those listed in the table below and analysis performed in the field. For most of the analyses listed in the table, NELAP accreditation is not offered under the listed EPA program and Continental is NELAP accredited for the analysis, using the same analytical technology, but under a different EPA program. Continental's full NELAP accreditation status may be viewed at www.kdheks.gov/envlab. Note that unless qualified otherwise in the Laboratory Report, Continental performs all analyses, including each analysis listed in the table below, utilizing NELAP protocol.

		Matrix- Regulato <b>ry</b>		Accredited in Other
<u>Test</u> GL218 SL602	Analysis Phosphorus, Total, as P SPLP Prep	Program L-RCRA L-RCRA	<u>Method</u> SM 4500-P(B&F)(M)	<u>Reg. Program</u> Y N

525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737 785-827-1273 800-535-3076 Fax 785-823-7830 KOME Environmental Laboratory Accreditation No. E-10146



CAS NELAP



Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Quality Control Report Batch Summary Page: 9 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Test	Testname	QC Batch	Method Blank	LCS	MS Lab No.
SL470	Final pH, SPLP Extract	110720-1	110720BLK1	110720LCS1	
<b>S</b> L602	SPLP Prep	110720-1	110720BLK1		
Lab numb	ers associated with this batch:				
11070963	3 11070964				

SL802	Arsenic, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL303	Barium, Total, ICP	110721-1	110721BLK1	110721LCS1	1107096 <b>4MS</b>
SL304	Beryllium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL305	Boron, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL306	Cadmium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL307	Calcium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL308	Chromium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL309	Cobalt, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL313	Copper, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL326	Iron, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL311	Lead, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL331	Magnesium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL332	Manganese, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL333	Mercury, Total	110721-1	110721BLK1	110721LCS1	11070963MS
SL334	Molybdenum, Total, ICP	110721-1	110721BLK1	110721LC <b>S1</b>	11070964MS
SL336	Nickel, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL353	Silver, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL357	Strontium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
<b>SL</b> 366	Titanium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL368	Vanadium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964 <b>MS</b>
SL369	Zinc, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
Lab num	bers associated with this batch:				
1107096	3 11070964				
SL000	Aluminum, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963 <b>MS</b>
SL001	Antimony, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
SL023	Selenium, Tot. Rec., ICP-MS	110721-3	<b>1</b> 10721BLK3	110721LCS3	11070963MS

SL023 Selenium, Tot. Rec., ICP-MS SL029 Thallium, Tot. Rec., ICP-MS Lab numbers associated with this batch: 11070963 11070964

SL212 Silicon as Silica Lab numbers associated with this batch: 11070963 11070964 110722BLK3 110722LCS3

11070964MS

110721LCS3 11070963MS

SL242	Potassium, Dissolved, ICP	110722-5	110722BLK5	110722LCS5	11070964MS
SL255	Sodium, Dissolved, ICP	110722-5	110722BLK5	110722LCS5	11070964MS
Lab numb	ers associated with this batch:			-	
11070963	11070964				

110722-3

110721-3 110721BLK3





Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601 Quality Control Report Batch Summary Page: 10 Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Test	Testname	QC Batch	Method Blank	LCS	MS Lab No.
GL502 Lab num 1107096	Chloride bers associated with this batch: 3 11070964	11C1202	BLK1IC1202	LCS1IC1202	11071334 <b>MS</b>
GL147 Lab num 1107096	Chromium, Hexavalent bers associated with this batch: 3 11070964	110721-1	110721BLK1	110721LCS1	11071608MS
GL501 Lab num 1107096	Fluoride bers associ <b>ated with this batch:</b> 4	11C2207	BLK11C2207	LCS11C2207	
GL501 Lab num 1107096	Fluoride bers associated with this batch: 3	11C2213	BLK1IC2213	LCS1IC2213	
GL505 Lab num 1107096	Nitrate, as N bers associated with this batch: 3 11070964	11C1202	BLK1IC1202	LCS1IC1202	
GL510 Lab num 1107096	Nitrate/Nitrite, as N bers associated with this batch: 3 11070964				
GL503 Lab num 1107096	Nitrite, as N bers associated with this batch: 3 11070964	11C1202	BLK1IC1202	LCS1IC1202	
GL218 Lab num 1107096	Phosphorus, Total, as P bers associated with this batch: 3 11070964	110721-2	110721BLK2	110721LCS2	11071101MS
GL506 Lab numi 1107096	Sulfate pers associated with this batch: 3 11070964	11C1202	BLK11C1202	LCS11C1202	
			<u> </u>		an teres of the alexa





Quality Control Report Method Blank, LCS, MS/MSD Data

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Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

	Blank	k Rec	IC	Spike		Spiked Sample (% Recovery)			Spike		Spiked Sample Precision Data	
Analysis	Data	LCS	Limits	Level	Units	MS	MSD	Limits	Level	Units	RPD	Limit
QC Batch: 110721-1	For sample:	prepar	ed on: 07/21	/2011	••	Spiked	sample: 110	070963				
Mercury, Total	ND (0.2)	89.1	80.0-120	5.0	µg/L	90.2	91.9	80.0-120	5.0	µg/⊾	1.9	20.0
C Batch: 110721-1	For sample:	prepar	ed on: 07/21	/2011		Spiked	sample: 11(	070964				4., NATUR
rsenic, Total, ICP	ND (5)	96.5	80.0-120	500	µg/ъ	98.6	97.1	80.0-120	500	µg/L	1.5	20.0
Barium, Total, ICP	ND (5)	98.0	80.0-120	1500	µg/ь	101	110.	80.0-120	1500	µg/ъ	8.5	20.0
Beryllium, Tot <b>al, ICP</b>	ND (2)	96.9	80.0-120	500	µg/ъ	104	103	80.0-120	500	µg/ъ	1.0	20.0
Soron, Total, ICP	ND (500)	96.3	80.0-120	500	μg/L	91.3	89.4	80.0-120	500	μg/L	2.1	20.0
Cadmium, Total, ICP	ND (2)	95.6	80.0-120	500	µg/L	95.8	94.4	80.0-120	500	µg/L	1.5	20.0
Calcium, Total, ICP	ND (0.5)	97.7	80.0-120	51.0	mg/L	93.0	110.	80.0-120	51.0	mg/L	16.7	20.0
Chromium, Total, ICP	ND(5)	95.2	80.0-120	500	µg/L	95.3	94.4	80.0-120	500	$\mu g/L$	0.9	20.0
Sobalt, Total, ICP	ND (2)	94.8	80.0-120	500	µg/L	94.6	92.8	80.0-120	500	µg/ц	1.9	20.0
Copper, Total, ICP	ND (10)	97.0	80.0-120	500	µg/ц	99.4	98.3	80.0-120	500	μg/L	1.1	20.0
iron, Total, ICP	ND(0.10)	93.1	80.0-120	20.5	mg/L	101	101	80.0-120	20.5	mg/L	0.0	20.0
ead. Total. ICP	ND(5)	95.1	80.0-120	500	μg/L	96.2	94.9	80.0-120	500	μg/L	1.4	20.0
Magnesium, Total, ICP	ND(0.1)	91.3	80.0-120	51.0	mg/L	98.0	98.0	80.0-120	51.0	mg/L	0.0	20.0
(anganage Total) ICP	ND (5)	97 1	80 0-120	500	ua/L	98.0	96.7	80.0-120	500	μq/L	1.3	20.0
Manyanese, local, lor Kolubdenum Totsi TCP	ND (5)	97 5	80 0-120	500	μα/τ.	98.1	97.6	80.0-120	500	μα/L	0.5	20.0
debel Webel TCD	ND(5)	97.5	80.0-120	500	μg/1 μg/1	94 6	93 1	80 0-120	500	μα/L	1.6	20.0
ickel, Total, ICP	ND (5)	94.0	80.0-120	300	μg/1 μg/1	34.0 06 0	95.1	80.0-120	100	μα/Ι.	1.5	20.0
sliver, Total, ICP	ND(5)	30.0	80.0-120	100	μg/Π 	30.3 T	33.J	80.0-120	100	µg/= µg/ī.	**	20.0
strontium, Total, ICP	ND(5)	107	80.0-120	100	μg/1. μg/1.	± 102	107	80.0-120	500	μα/τ.	1.0	20.0
itanium, Total, ICP	ND (5)	99.9	80.0-120	500	μg/L 	104	101	80.0-120	500	μg/1.	0.0	20.0
Anadium, Total, ICP	ND(5)	95.2	80.0-120	500	μg/L	33.4	34.6	80.0-120	500	μg/11 μg/1	0.0	20.0
finc, Total, ICP	ND(10)	92.9	80.0-120	500	µg/ц	90.7	89.9	60.0-120	300	μg/ D	0.9	20.0
C Batch: 110721-1	For sample	analyze	d on: 07/21/	2011		Spiked	sample: 11	071608				
Chromium, Hexavalent	ND (0.010)	99.9	90.0-110	0.50	mg/L	MIN	MN	85.0-115	0.50	mg/L	**	20.0
2C Batch: 110721-2	For sample	analyze	d on: 07/21/	2011		Spiked	sample: 11	071101		•		
hosphorus, Total, as P	ND (0.20)	96.6	90.0-110	1.0	mg/L	MIN	MIN	71.2-135	1.0	mg/L	**	21.2
C Batch: 110721-3	For sample	. DIGDAI	ed on: 07/21	/2011		Spiked	sample: 11	070963		• #		<u> </u>
luminum. Tot. Red TCR-ME	20.1	99.6	85.0-115	51000	μer/1.	104	101	80.0-120	51000	<u>ща/</u> Б	2.9	20.0
luminum Tot Rec ICP-MS	NTD (30)	104	85 0-115	51000	ua/1			80.0-120			**	20.0
stimony Tot Rec ICP-MS	ND (5)	94 7	85 0-115	500	µa/1.	94 1	93.6	80.0-120	500	ug/L	0.5	20.0
elenium Tot Dec ICF-MS	ND (5)	102	85 0-115	500	ua/1	99.1	98.4	80.0-120	500	μα/L	0.7	20.0
Challium, Tot. Rec., ICP-MS	ND (2)	101	85.0-115	500	μg/L	97.6	103	80.0-120	500	μg/L	5.4	20.0
C Batch. 110727-3			ad on . 07/22	/2011		Spiked	semple, 11	070964		······································		
Silicon as Silica	ND(0.04)	97.0	80.0-120	1,1	mg/L	86.5	86.3	80.0-120	1.1	mg/L	0.2	20.0
			ad on - 07/22	/2011		and had	eennle. 11	070964				
A Batchi 110/22-5	o 7 pr	prepar	95 0 335	14 5	men / T	107	100 100	80 0-100	14 5	mc7/1.	a •	20 0
rotassium, pissoived, iCP	U. / BK	106	85.U-115	14.5	шу/Ц та/Т	107	100	80.0-120	11.3	.ung/⊔ mor/T.	0.3	20.0
sodium, Dissolved, ICP	1.5 BK	100	85.0-115	27.5	nkg/ь	102	106	80.0-120	41.3	ավչո	J.J	20.0
C Batch: 1IC1202	For sample	analyze	d on: 07/21/	2011		Spiked	sample:					
Nitrite, as N	ND(0.1)	96.1	90.0-110	2.0	mg/L	MN	MIN	78.5-127			**	10.1
	ND(0.1)	96.7	90.0-110	2.0	mg/L	MIN	MIN	79.3-118			**	12.1
Nitrate, as N												
Witrate, as W Sulfate	ND(1.0)	101	90.0-110	8.0	mg/L	MIN	MIN	81.8-125			••	10.4
Witrate, as W Sulfate 20 Batch: 1ICl202	ND(1.0) For sample	101 analyze	90.0-110 d on; 07/21/	8.0	mg/L 	MN Spiked	MN sample: 11	81.8-125				





Quality Control Report Method Blank, LCS, MS/MSD Data

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Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

Spiked Sample Spikad Sample Blank % Rec Spike (% Recovery) Spike Precision Data Analysis Level Units MS LCS Limits Limit Data MSD Limits Level Units RPD QC Batch: 1IC2207 For sample analyzed on: 07/26/2011 Spiked sample: Fluoride ND (0.1) 104 90.0-110 2.0 mg/L MIN MN 67.3-113 \*\* 9.8 QC Batch: 11C2213 For sample analyzed on: 08/01/2011 Spiked sample: Fluoride ND(0,1)92.4 90.0-110 2.0 mg/L MIN MN 67.3-113 \*\* 9.8

Data Qualifiers:

I - Due to the concentration of analyte in the sample, the spike level is too low to allow accurate quantification of the spike recovery.

MN - The MS/MSD sample analyses were not performed on a sample from this Continental order number.

J - The concentration or not detected (ND) value is below the Limit of Quantitation (LOQ) and is considered an estimated value.

BK - This analyte did not meet method blank criteria. The associated sample results may be estimated.

\*\* - RPD cannot be calculated.





Quality Control Report Continuing Calibration Verification Data Summary

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Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

	Date of	Instrument	Amount in	Amount		Percent	
Analysis	Analysis	Batch ID	Standard	Detected Units		Recovery	
Aluminum, Tot. Rec., ICP-MS	08/02/2011	2IP3214	CCV recovery	acceptable	for this	Instrument Batch.	
Aluminum, Tot. Rec., ICP-MS	08/02/2011	3IP3214	CCV recovery	acceptable	for this	Instrument Batch.	
Aluminum, Tot. Rec., ICP-MS	08/02/2011	4IP3214	CCV recovery	acceptable	for this	Instrument Batch.	
Antimony, Tot. Rec., ICP-MS	07/21/2011	4IP3202	CCV recovery	acceptable	for this	Instrument Batch.	
Antimony, Tot. Rec., ICP-MS	07/21/2011	5IP3202	CCV recovery	acceptable	for this	Instrument Batch.	
Arsenic, Total, ICP	07/25/2011	31P4206	CCV recovery	acceptable	for this	Instrument Batch.	
Arsenic, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Barium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Barium, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Barium, Total, ICP	07/26/2011	4IP4207	CCV recovery	acceptable	for this	Instrument Batch.	
Barium, Total, ICP	07/26/2011	5IP4207	CCV recovery	acceptable	for this	Instrument Batch.	
Beryllium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Beryllium, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Boron, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Boron, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Boron, Total, ICP	07/26/2011	4IP4207	CCV recovery	acceptable	for this	Instrument Batch.	
Boron, Total, ICP	07/26/2011	5IP4207	CCV recovery	acceptable	for this	Instrument Batch.	
Cadmium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Cadmium, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Calcium, Total, ICP	07/25/2011	31P4206	CCV recovery	acceptable	for this	Instrument Batch.	
Calcium, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Calcium, Total, ICP	07/26/2011	41P4207	CCV recovery	acceptable	for this	Instrument Batch	
Calcium, Total, ICP	07/26/2011	5IP4207	CCV recovery	acceptable	for this	Instrument Batch.	
Chromium, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Chromium, Total, ICP	07/25/2011	4TP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Cobalt, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch	
Cobalt, Total, ICP	07/25/2011	4IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Copper, Total, ICP	07/25/2011	3IP4206	CCV recovery	acceptable	for this	Instrument Batch.	
Copper, Total, ICP	07/25/2011	4TP4206	CCV recovery	acceptable	for this	Instrument Batch	
Chromium, Hexavalent	07/21/2011	110721-7	CCV recovery	acceptable	for this	Instrument Batch	
Chromium, Hexavalent	07/21/2011	110721-3	COV recovery	acceptable	for this	Instrument Batch.	
Phosphorus, Total, as P	07/21/2011	110721-3	CCV recovery	acceptable	for this	Instrument Batch.	
Phosphorus Total as P	07/21/2011	110721-4	CCV recovery	acceptable	for this	Instrument Batch.	
Fluoride	07/26/2011	3102207	CCV recovery	acceptable	for this	Instrument Batch.	
Fluoride	07/26/2011	4102207	CCV recovery	acceptable	for this	Instrument Batch.	
Fluoride	08/01/2011	1102213	CCV recovery	acceptable	for this	Instrument Batch.	
Fluoride	08/01/2011	2102213	2 00	1 70	mar/L	AF A CT	
Samples associate	d with this (	Cantinuing Ca	libration Ver	ification.	шg/ ц	85.0 CL	
Laboratory Number	Instrument Ba	tch	Sample Descri	ntion			
11070963	11C2213	1102213		PLP			
			THE FLY ADD-2				
	Date of	Instrument	Amount in	Amount		Percent	
Analysis	Analysis	Batch ID	Standard	Detected	Unite	Recovery	
Chloride	07/21/2011	11C1202	CCV recovery	acceptable	for this	Instrument Batch.	



Client: Westar Energy, Inc. Attn: Stone Junod P.O. Box 889 Topeka, KS 66601

#### Quality Control Report Continuing Calibration Verification Data Summary

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Date Reported: 08/04/2011 Date Received: 07/14/2011 Continental File No: 7701 Continental Order No: 57218

Chloride	07/21/2011	21C1202	CCV	recovery	acceptable	for	this	Instrument	Batch.
Nitrite, <b>as N</b>	07/21/20 <b>11</b>	1IC1202	CC	' recovery	acceptable	for	this	Instrument	Batch,
Nitrite, as N	07/21/2011	2IC1202	CCA	' recovery	acceptable	for	this	Instrument	Batch.
Nitrate, as N	07/21/2011	11C1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Nitrate, as N	07/21/2011	21C1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Sulfate	07/21/2011	1IC1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Sulfate	07/21/2011	2IC1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Sulfate	07/21/2011	3IC1202	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Iron, Total, ICP	07/25/2011	31P4206	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Iron, Total, ICP	07/25/2011	4IP4206	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Lead, Total, ICP	07/28/2011	4IP4209	CCV	recovery	acceptable	for	this	Instrument	Batch.
Lead, Total, ICP	07/28/2011	5IP4209	CCV	recovery	acceptable	for	this	Instrument	Batch.
Magnesium, Total, ICP	07/25/2011	3IP4206	CCV	reco <b>very</b>	acceptable	for	this	Instrument	Batch.
Magnesium, Total, ICP	07/25/2011	4IP4206	CCV	recovery	acceptable	for	this	Instrument	Batch.
Manganese, Total, ICP	07/25/2011	3IP4206	CCV	recovery	acceptable	for	this	Instrument	Batch.
Manganese, Total, ICP	07/25/2011	4IP4206	CCV	' recovery	acceptable	for	this	Instrument	Batch.
Mercury, Total	07/22/2011	3MA3203	CCV	recovery	acceptable	for	this	Instrument	Batch.
Mercury, Total	07/22/2011	4MA3203	CCV	recovery	acceptable	for	this	Instrument	Batch.
Mercury, Total	07/22/2011	5MA3203	CCV	recovery	acceptable	for	this	Instrument	Batch.
Molybdenum, Total, ICP	07/26/2011	41P4207	CCV	recovery	acceptable	for	this	Instrument	Batch.
Molybdenum, Total, ICP	07/26/2011	5IP4207	CCV	recovery	acceptable	for	this	Instrument	Batch.
Nickel, Total, ICP	07/25/2011	3IP4206	CCV	recovery	acceptable	for	this	Instrument	Batch.
Nickel, Total, ICP	07/25/2011	41P4206	CCV	recovery	acceptable	for	this	Instrument	Batch.
Potassium, Dissolved, ICP	08/02/2011	4IP4214	çcv	recovery	acceptable	for	this	Instrument	Batch.
Potassium, Dissolved, ICP	08/02/2011	5IP4214	CCV	recovery	acceptable	for	this	Instrument	Batch.
Potassium, Dissolved, ICP	08/02/2011	6IP4214	CCV	recovery	acceptable	for	this	Instrument	Batch.
Selenium, Tot. Rec., ICP-MS	07/21/2011	4IP3202	ccv	recovery	acceptable	for	this	Instrument	Batch.
Selenium, Tot. Rec., ICP-MS	07/21/2011	51P3202	CCV	recovery	acceptable	for	this	Instrument	Batch.
Silicon as Silica	08/01/2011	3IP4213	ccv	recovery	acceptable	for	this	Instrument	Batch.
Silicon as Silica	08/01/2011	4IP4213	ccv	recovery	acceptable	for	this	Instrument	Batch.
Silver, Total, ICP	07/25/2011	3IP4206	ccv	recovery	acceptable	for	this	Instrument	Batch.
Silver, Total, ICP	07/25/2011	4IP4206	ccv	recovery	acceptable	for	this	Instrument	Batch.
Sodium, Dissolved, ICP	08/02/2011	4IP4214	ccv	recovery	acceptable	for	this	Instrument	Batch.
Sodium, Dissolved, ICP	08/02/2011	5IP4214	ccv	recovery	acceptable	for	this	Instrument	Batch.
Sodium, Dissolved, ICP	08/02/2011	6IP4214	ccv	recovery	acceptable	for	this	Instrument	Batch.
Strontium, Total, ICP	07/28/2011	4IP4209	ccv	recoverv	acceptable	for	this	Instrument	Batch
Strontium, Total, ICP	07/28/2011	5IP4209	CCV	recovery	acceptable	for	this	Instrument	Batch.
Thallium, Tot. Rec., ICP-MS	07/21/2011	4193202	ccv	recovery	acceptable	for	this	Instrument	Batch
Thallium, Tot. Rec., ICP-MS	07/21/2011	5IP3202	CCV	recovery	acceptable	for	this	Instrument	Batch
Titanium, Total, ICP	07/25/2011	3IP4206	CCV	recoverv	acceptable	for	this	Instrument	Batch
Titanium, Total, ICP	07/25/2011	4IP4206	ccv	recoverv	acceptable	for	this	Instrument	Batch
Vanadium, Total, ICP	07/25/2011	3IP4206	ccv	recoverv	acceptable	for	this	Instrument	Batch
Vanadium, Total, ICP	07/25/2011	4IP4206	ccv	recoverv	acceptable	for	this	Instrument	Batch
Vanadium, Total, ICP	07/26/2011	4IF4207	CCV	recoverv	acceptable	for	this	Instrument	Batch.
Vanadium, Total, ICP	07/26/2011	5IP4207	ĊĊV	recoverv	acceptable	for	this	Instrument	Batch.


		Quality Col	itroi keport	Page: 15
•		Continuing Calibration	Verification Data Summary	
Client:	Westar Energy, Inc.			Date Reported: 08/04/2011
	Attn: Stone Junod			Date Received: 07/14/2011
	P.O. Box 889			Continental File No: 7701
	Topeka, KS 66601			Continental Order No: 57218
		:		
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Zinc,	Total,	ICP	07/25/2011	3IP4206	CCV reco	overy acceptable	for this	Instrument	Batch.
Zinc,	Total,	ICP	07/25/2011	4IP4206	CCV reco	overy acceptable	for this	Instrument	Batch.

#### Data Qualifiers:

CL - The continuing calibration verification (CCV) standard recovery for this analyte was below the method or SOP limit. The reported concentration for this analyte may be biased low.

- Laboratory Report Conclusion -

525 N. Eighth St. - P.O. Box 3737 - Salina, KS 67402-3737 785-827-1273 800-535-3076 Fax 785-823-7830 KDHE Environmental Laboratory Accreditation No. E-10146





525 N. 8th Street, Salina, KS 67401 (785)827-1273 (800)535-3076 Fax (785)823-7830 www.cas-lab.com



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Continental Order Number:

Client/Reporting Information			Invoice Information							PARAMETERS/CONTAINER TYPE									СОММ	COMMENTS				
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TOPEKA	<u>KS</u>	66601		TOPEKA				KS	· · ·		666	501		12)								ł	ľ	
STONE JUNOD				Contact: DICK FINGER	R						106	-									• •			
E-mail:				E-mail:										le ar										
stone.junod@westarener	gy.com			dick.finger@	westaren	лду.с	0 <b>m</b>							sam										
Phone Number: 1785-575-6435	Fax Numb 785-575	er:		Phone Number:				Fax	Numb	er:	•			list										
Sampler's Name:(Printed)	185-575	Sampler's	Name:(Signat	ure)	785-575-8039						PLP													
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TEC Bottom Ash		s	R	7/13/2011	14.30	C	,				1		x	x	<u> </u>	<u> </u>			-		<u> </u>			
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Matrix (Sample Type):	DW=Drinking Water,	GW=G	round Water	; <b>WW</b> =Wa	ste Water,	W=	Wipe	L	S=So	lid/S	LLI Soil,	SL	=Slud	lge, A	=Air.	OL= Oil	/Organic	Liquid	<b>0</b> =0t	7 'her	1	ľ		
Regulatory Program. <u>N</u> =	NPDES, <u>R</u> =rcra	∧, <u>D</u> =D	rinking Wat	ter, SL=50	3 Sludge		=Othe	г								(Please note	if non-stand	ard turnarou	und. Rush &	Emergency	subject to ad	ditional char	ge)	
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	· · · · · · · · · · · · · · · · · · ·		<u> </u>	u	
Coolar / of )	for this CAS Order No.				
Cooler Identification:	CAS Cooler #: Other:		/Client's Cooler Box/Letter/Hand Deliv	vered	:
Date/Time Cooler Received:		9	:00		
Delivered By:	UPS/FedX/AB Express/ASAP	/Land	Air Exp/Field Svcs/Mail/Walk-In/Other:	:	
Custody Seal:	Present: Intact / Broken A	Absent:	× Seal No:		· · · · ·
	Seal Name:	_	Seal Date:		
	Seal matches Chain of Custody	· Y	es / No / N/A		
Type of Packing Material	Blue Ice/Ice/Melted Ic	/Foarr	/Paner/Deanuts/Vermiculite/ None/Othe	**	
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Chain of Custody incomp	lete [see detail below]	п	Cooler temperature exceeded 0.1 - 6.0	°C requirement	0 11111
Chain of Custody missing da	ate/time sampled (excl. TB or Dup)		[Do not mark if samples do not require	e cooling to 0.1 - 6.0 °C.]	
Date or Time sampled obta	ined from container label		Broken or leaking containers (detail ac	tions below)	
Chain of Custody missing	sampler's name		Sample container type or labeled ch	emical preservation inap	propriate
Chain of Custody missing	g matrix (sample type)		Other discrepancies:	· · · · · · · · · · · · · · · · · · ·	
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Completed by:	Date Completed: 7-1	<u> </u>			

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**APPENDIX B** 

**Aerial Photographs** 



# **HISTORICAL AERIAL REPORT**

for the site: **TEC** 5530 SE 2nd Street Tecumseh, KS 66542 PO #:

Report ID: 20180302347 Completed: 3/14/2018

## **ERIS Information Inc.**

Environmental Risk Information Services (ERIS) A division of Glacier Media Inc. T: 1.866.517.5204 E: info@erisinfo.com

www.erisinfo.com

# **Search Results Summary**

Date	Source	Scale	Comment
2017	NAIP - National Agriculture Information Program	1"=1300'	
2015	NAIP - National Agriculture Information Program	1"=1300'	
2014	NAIP - National Agriculture Information Program	1"=1300'	
2012	NAIP - National Agriculture Information Program	1"=1300'	
2010	NAIP - National Agriculture Information Program	1"=1300'	
2008	NAIP - National Agriculture Information Program	1"=1300'	
2006	NAIP - National Agriculture Information Program	1"=1300'	
2005	NAIP - National Agriculture Information Program	1"=1300'	
2004	NAIP - National Agriculture Information Program	1"=1300'	
2003	NAIP - National Agriculture Information Program	1"=1300'	
1991	USGS - US Geological Survey	1"=1300'	
1982	NHAP - National High Altitude Photography	1"=1300'	
1975	USGS - US Geological Survey	1"=1300'	
1970	USGS - US Geological Survey	1"=1300'	
1950	AMS - Army Mapping Service	1"=1300'	
1948	ASCS - Agriculture and Soil Conservation Service	1"=1300'	BEST COPY AVAILABLE



2017 NAIP 1" to 1300'







2015 NAIP 1" to 1300'







2014 NAIP 1" to 1300'







2012 NAIP 1" to 1300'







2010 NAIP 1" to 1300'

N



Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

# www.erisinfo.com | 1.866.517.5204



2008 NAIP 1" to 1300'

N





2006 NAIP 1" to 1300'







2005 NAIP 1" to 1300'





Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

www.erisinfo.com | 1.866.517.5204



2004 NAIP 1" to 1300'

N





2003 NAIP 1" to 1300'





Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

# www.erisinfo.com | 1.866.517.5204



1991 USGS 1" to 1300'

N



Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

# www.erisinfo.com | 1.866.517.5204



1982 NHAP 1" to 1300'

N





1975 USGS 1" to 1300'







1970 USGS 1" to 1300'

N



Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

# www.erisinfo.com | 1.866.517.5204



AMS 1" to 1300'





Subject: 5530 Se 2Nd Street Tecumseh KS Approx Center: 39.05151 / -95.56510

www.erisinfo.com | 1.866.517.5204



**1948 ASCS 1" to 1300'** *BEST COPY AVAILABLE* 

N



**APPENDIX C** 

Topographic Maps



# TOPOGRAPHIC MAP RESEARCH RESULTS Date: 2018-03-02

## Project Property: 5530 Se 2Nd Street, Tecumseh, KS

ERIS Order Number: 20180302347

We have searched USGS collections of current topographic maps and historical topographic maps for the project property. Below is a list of maps found for the project property and adjacent area. Maps are from 7.5 and 15 minute topographic map series, if available.

Map Series
7.5
7.5
7.5
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7.5

Topographic Maps included in this report are produced by the USGS and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property.

No warranty of Accuracy or Liability for ERIS: The information contained in this report has been produced by ERIS Information Inc. (in the US) and ERIS Information Limited Partnership (in Canada), both doing business as 'ERIS', using Topographic Maps produced by the USGS. This maps contained herein does not purport to be and does not constitute a guarantee of the accuracy of the information contained herein. Although ERIS has endeavored to present you with information that is accurate, ERIS disclaims, any and all liability for any errors, omissions, or inaccuracies in such information and data, whether attributable to inadvertence, negligence or otherwise, and for any consequences arising therefrom. Liability on the part of ERIS is limited to the monetary value paid for this report.

Address: 38 Lesmill Road Unit 2, Toronto, ON M3B 2T5 Phone: 1-866-517-5204 Fax: 416-447-7658 info@erisinfo.com www.erisinfo.com



Quadrangle(s): Grantville,KS





Quadrangle(s): Grantville,KS





























Quadrangle(s): Grantville,KS





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



March 18, 2022 Project No. 0204993-000

TO:	Evergy Kansas Central, Inc.
	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:	2019 Annual Groundwater Monitoring and Corrective Action Report Addendum
	Evergy Kansas Central, Inc. (Evergy)
	Bottom Ash Settling Area
	Tecumseh Energy Center – Tecumseh, Kansas

The Bottom Ash Settling Area (BASA) at the Evergy Tecumseh Energy Center (TEC) 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 2019 for the BASA was completed and placed in the facility's operating record on January 31, 2020, 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 2019 sampling events are included in Attachment 1, and a discussion of the applicable statistical analyses completed in 2019 are included in Attachment 2 of this addendum. Revision 1 of the 2019 GWMCA Report does include a "Groundwater Potentiometric Elevation Contour Map" for each of the 2019 sampling events as

Evergy Kansas Central, Inc. March 18, 2022 Page 2

Figures 2, 3, 4, and 5. In those figures, the measured groundwater elevations for each well are listed. Those maps have been duplicated in this addendum and were modified to include the calculated groundwater flow rate and direction.

The attachments to this addendum are as follows providing the additional information:

- 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 sampling events completed in March, June, October, and December 2019 are provided.
- Attachment 2 Statistical Analyses: Includes a discussion of the statistical analyses utilized along with a table summarizing the statistical outputs (e.g., frequency of detection, maximum detection, variance, standard deviation, coefficient of variance, outlier tests, trends, upper and lower confidence limits, and comparison against Groundwater Protection Standards), and supporting backup for statistical analyses completed in 2019. Statistical analyses completed in 2019 included:
  - January 2019 statistical analyses for data obtained in the September 2018 sampling event; and
  - July 2019 statistical analyses for data obtained in the March 2019 sampling event.
- Attachment 3 Revised 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 March, June, October, and December 2019 are provided.



# ATTACHMENT 1

Laboratory Analytical Reports

**ATTACHMENT 1-1** 

March 2019 Sampling Event Laboratory Analytical Report



Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

April 01, 2019

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

RE: Project: TEC SI CCR Pace Project No.: 60297581

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on March 21, 2019. 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,

Autor m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: HEATH HORYNA, WESTAR ENERGY Andrew Hare, Westar Energy Adam Kneeling, Haley & Aldrich, Inc. JARED MORRISON, WESTAR ENERGY Melissa Michels, Westar Energy



## **REPORT OF LABORATORY ANALYSIS**



#### CERTIFICATIONS

Project: TEC SI CCR Pace Project No.: 60297581

#### **Kansas Certification IDs**

9608 Loiret Boulevard, Lenexa, KS 66219 Missouri Certification Number: 10090 Arkansas Drinking Water WY STR Certification #: 2456.01 Arkansas Certification #: 18-016-0 Arkansas Drinking Water Illinois Certification #: 004455 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10116 / E10426 Louisiana Certification #: 03055 Nevada Certification #: KS000212018-1 Oklahoma Certification #: 9205/9935 Texas Certification #: T104704407-18-11 Utah Certification #: KS000212018-8 Kansas Field Laboratory Accreditation: # E-92587 Missouri Certification: 10070 Missouri Certification Number: 10090

### **REPORT OF LABORATORY ANALYSIS**


# SAMPLE SUMMARY

Project: TEC SI CCR Pace Project No.: 60297581

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60297581001	MW-7-032019	Water	03/20/19 15:37	03/21/19 17:00
60297581002	MW-10-032119	Water	03/21/19 08:34	03/21/19 17:00
60297581003	MW-9-032119	Water	03/21/19 11:00	03/21/19 17:00
60297581004	MW-8-032119	Water	03/21/19 12:28	03/21/19 17:00



# SAMPLE ANALYTE COUNT

Project: TEC SI CCR Pace Project No.: 60297581

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60297581001	MW-7-032019	EPA 200.7	JDE	7	PASI-K
		EPA 200.8	CTR	7	PASI-K
		EPA 245.1	LRS	1	PASI-K
		SM 2540C	ZMH	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
60297581002	MW-10-032119	EPA 200.7	JDE	7	PASI-K
		EPA 200.8	CTR	7	PASI-K
		EPA 245.1	LRS	1	PASI-K
		SM 2540C	ZMH	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
60297581003	MW-9-032119	EPA 200.7	JDE	7	PASI-K
		EPA 200.8	CTR	7	PASI-K
		EPA 245.1	LRS	1	PASI-K
		SM 2540C	ZMH	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
60297581004	MW-8-032119	EPA 200.7	EMR	7	PASI-K
		EPA 200.8	CTR	7	PASI-K
		EPA 245.1	LRS	1	PASI-K
		SM 2540C	ZMH	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	WNM	3	PASI-K



Project: TEC SI CCR Pace Project No.: 60297581

Method:EPA 200.7Description:200.7 Metals, TotalClient:WESTAR ENERGYDate:April 01, 2019

# 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.

# QC Batch: 575351

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60297581003

- M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
  - MS (Lab ID: 2360338)
    - Calcium
  - MSD (Lab ID: 2360339)
    - Calcium

#### Additional Comments:



Project: TEC SI CCR Pace Project No.: 60297581

# Method:EPA 200.8Description:200.8 MET ICPMSClient:WESTAR ENERGYDate:April 01, 2019

# 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.

#### Additional Comments:

Analyte Comments:

# QC Batch: 575368

- D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
  - MW-8-032119 (Lab ID: 60297581004)
    - Selenium, Total Recoverable



Project: TEC SI CCR Pace Project No.: 60297581

Method: EPA 245.1 Description: 245.1 Mercury Client: WESTAR ENERGY

Client:WESTAR ENERGDate:April 01, 2019

# 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.

# Additional Comments:



Project: TEC SI CCR Pace Project No.: 60297581

# Method: SM 2540C

Description:2540C Total Dissolved SolidsClient:WESTAR ENERGYDate:April 01, 2019

# **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.

#### **Additional Comments:**



Project: TEC SI CCR Pace Project No.: 60297581

Tace 1 Toject No.: 00297381

Method:	SM 4500-H+B
Description:	4500H+ pH, Electrometric
Client:	WESTAR ENERGY
Date:	April 01, 2019

# **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.

- MW-10-032119 (Lab ID: 60297581002)
- MW-7-032019 (Lab ID: 60297581001)
- MW-8-032119 (Lab ID: 60297581004)
- MW-9-032119 (Lab ID: 60297581003)

# 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: TEC SI CCR Pace Project No.: 60297581

Method:EPA 300.0Description:300.0 IC Anions 28 DaysClient:WESTAR ENERGYDate:April 01, 2019

# 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.

# QC Batch: 576049

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60296837001,60297442001

- M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MSD (Lab ID: 2363302)
  - Chloride

# Additional Comments:

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



Project: TEC SI CCR

Pace Project No.: 60297581

Sample: MW-7-032019	Lab ID: 602	297581001	Collected: 03/20/1	9 15:3	7 Received: 03	8/21/19 17:00 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: E	PA 200.7			
Barium, Total Recoverable	0.078	mg/L	0.0050	1	03/25/19 11:27	03/26/19 13:08	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 11:27	03/26/19 13:08	7440-41-7	
Boron, Total Recoverable	0.73	mg/L	0.10	1	03/25/19 11:27	03/26/19 13:08	7440-42-8	
Calcium, Total Recoverable	188	mg/L	0.20	1	03/25/19 11:27	03/26/19 13:08	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	03/25/19 11:27	03/26/19 13:08	7440-47-3	
Lead, Total Recoverable	<0.010	mg/L	0.010	1	03/25/19 11:27	03/26/19 13:08	7439-92-1	
Lithium	0.028	mg/L	0.010	1	03/25/19 11:27	03/26/19 13:08	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: E	PA 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:34	7440-36-0	
Arsenic, Total Recoverable	0.0016	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:34	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	03/25/19 15:00	03/28/19 13:34	7440-43-9	
Cobalt, Total Recoverable	0.0016	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:34	7440-48-4	
Molybdenum, Total Recoverable	0.0050	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:34	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:34	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:34	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	5.1 Preparation Met	hod: E	PA 245.1			
Mercury	<0.00020	mg/L	0.00020	1	03/26/19 11:57	03/28/19 11:08	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	0C					
Total Dissolved Solids	1340	mg/L	5.0	1		03/22/19 15:40		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
pH at 25 Degrees C	6.9	Std. Units	0.10	1		03/25/19 11:21		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	).0					
Chloride	268	mg/L	20.0	20		03/28/19 19:58	16887-00-6	
Fluoride	0.26	mg/L	0.20	1		03/28/19 19:46	16984-48-8	
Sulfate	617	mg/L	50.0	50		03/29/19 16:19	14808-79-8	



Project: TEC SI CCR

Pace Project No.: 60297581

Sample: MW-10-032119	Lab ID: 602	297581002	Collected: 03/21/1	9 08:34	4 Received: 03	8/21/19 17:00 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: El	PA 200.7			
Barium, Total Recoverable	0.36	mg/L	0.0050	1	03/25/19 11:27	03/26/19 13:10	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 11:27	03/26/19 13:10	7440-41-7	
Boron, Total Recoverable	0.23	mg/L	0.10	1	03/25/19 11:27	03/26/19 13:10	7440-42-8	
Calcium, Total Recoverable	174	mg/L	0.20	1	03/25/19 11:27	03/26/19 13:10	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	03/25/19 11:27	03/26/19 13:10	7440-47-3	
Lead, Total Recoverable	<0.010	mg/L	0.010	1	03/25/19 11:27	03/26/19 13:10	7439-92-1	
Lithium	<0.010	mg/L	0.010	1	03/25/19 11:27	03/26/19 13:10	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: El	PA 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:03	7440-36-0	
Arsenic, Total Recoverable	0.028	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:03	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	03/25/19 15:00	03/28/19 13:03	7440-43-9	
Cobalt, Total Recoverable	0.0014	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:03	7440-48-4	
Molybdenum, Total Recoverable	0.0029	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:03	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:03	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:03	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 24	5.1 Preparation Met	hod: El	PA 245.1			
Mercury	<0.00020	mg/L	0.00020	1	03/26/19 11:57	03/28/19 11:10	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	0C					
Total Dissolved Solids	1190	mg/L	5.0	1		03/22/19 15:41		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
pH at 25 Degrees C	6.8	Std. Units	0.10	1		03/25/19 11:23		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	252	mg/L	20.0	20		03/28/19 20:37	16887-00-6	
Fluoride	0.50	mg/L	0.20	1		03/28/19 20:24	16984-48-8	
Sulfate	86.7	mg/L	20.0	20		03/28/19 20:37	14808-79-8	



Project: TEC SI CCR

Pace Project No.: 60297581

Sample: MW-9-032119	Lab ID: 602	297581003	Collected: 03/21/1	9 11:00	Received: 03	8/21/19 17:00 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: EF	PA 200.7			
Barium, Total Recoverable	0.54	mg/L	0.0050	1	03/25/19 11:27	03/26/19 13:12	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 11:27	03/26/19 13:12	7440-41-7	
Boron, Total Recoverable	0.48	mg/L	0.10	1	03/25/19 11:27	03/26/19 13:12	7440-42-8	
Calcium, Total Recoverable	206	mg/L	0.20	1	03/25/19 11:27	03/26/19 13:12	7440-70-2	M1
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	03/25/19 11:27	03/26/19 13:12	7440-47-3	
Lead, Total Recoverable	<0.010	mg/L	0.010	1	03/25/19 11:27	03/26/19 13:12	7439-92-1	
Lithium	0.021	mg/L	0.010	1	03/25/19 11:27	03/26/19 13:12	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	03/25/19 15:00	03/28/19 13:37	7440-36-0	
Arsenic, Total Recoverable	0.040	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:37	7440-38-2	
Cadmium, Total Recoverable	0.0013	mg/L	0.00050	1	03/25/19 15:00	03/28/19 13:37	7440-43-9	
Cobalt, Total Recoverable	0.048	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:37	7440-48-4	
Molybdenum, Total Recoverable	0.0062	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:37	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:37	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:37	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	03/26/19 11:57	03/28/19 11:13	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	C					
Total Dissolved Solids	1440	mg/L	5.0	1		03/22/19 15:41		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	)-H+B					
pH at 25 Degrees C	6.7	Std. Units	0.10	1		03/25/19 11:26		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	261	mg/L	20.0	20		03/28/19 21:16	16887-00-6	
Fluoride	0.38	mg/L	0.20	1		03/28/19 21:03	16984-48-8	
Sulfate	443	mg/L	100	100		03/28/19 21:28	14808-79-8	



Project: TEC SI CCR

Pace Project No.: 60297581

Sample: MW-8-032119	Lab ID: 602	297581004	Collected: 03/21/1	9 12:28	B Received: 03	8/21/19 17:00 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: Ef	PA 200.7			
Barium, Total Recoverable	0.054	mg/L	0.0050	1	03/25/19 11:27	03/27/19 10:15	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 11:27	03/27/19 10:15	7440-41-7	
Boron, Total Recoverable	1.4	mg/L	0.10	1	03/25/19 11:27	03/27/19 10:15	7440-42-8	
Calcium, Total Recoverable	223	mg/L	0.20	1	03/25/19 11:27	03/27/19 10:15	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	03/25/19 11:27	03/27/19 10:15	7440-47-3	
Lead, Total Recoverable	<0.010	mg/L	0.010	1	03/25/19 11:27	03/27/19 10:15	7439-92-1	
Lithium	0.017	mg/L	0.010	1	03/25/19 11:27	03/27/19 10:15	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	03/25/19 15:00	03/28/19 13:40	7440-36-0	
Arsenic, Total Recoverable	0.0023	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:40	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	03/25/19 15:00	03/28/19 13:40	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:40	7440-48-4	
Molybdenum, Total Recoverable	0.031	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:40	7439-98-7	
Selenium, Total Recoverable	<0.0050	mg/L	0.0050	5	03/25/19 15:00	03/29/19 10:33	7782-49-2	D3
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	03/25/19 15:00	03/28/19 13:40	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 24	5.1 Preparation Met	hod: EF	PA 245.1			
Mercury	<0.00020	mg/L	0.00020	1	03/26/19 11:57	03/28/19 11:17	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	0C					
Total Dissolved Solids	1440	mg/L	5.0	1		03/22/19 15:41		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
pH at 25 Degrees C	6.7	Std. Units	0.10	1		03/25/19 11:27		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	271	mg/L	20.0	20		03/28/19 22:20	16887-00-6	
Fluoride	0.23	mg/L	0.20	1		03/28/19 21:41	16984-48-8	
Sulfate	733	mg/L	100	100		03/28/19 22:33	14808-79-8	



Project:	TEC SI CCR											
Pace Project No.:	60297581											
QC Batch:	575586		Analysi	is Method	l: E	PA 245.1						
QC Batch Method:	EPA 245.1		Analysi	is Descrip	otion: 2	45.1 Mercur	у					
Associated Lab Sar	nples: 602975	81001, 60297581002	2, 602975810	003, 6029	7581004							
METHOD BLANK:	2361248		Μ	latrix: Wa	ater							
Associated Lab Sar	nples: 602975	81001, 60297581002	2, 602975810	003, 6029	7581004							
			Blank	F	Reporting							
Parar	neter	Units	Result	t	Limit	Analyz	ed	Qualifiers				
Mercury		mg/L	<0.00	0020	0.00020	03/28/19	10:59					
LABORATORY CO		: 2361249										
Parar	neter	Units	Spike Conc.	LCS Resi	S ult	LCS % Rec	% Red Limits	c Qi	ualifiers			
Mercury		mg/L	0.005	(	0.0045	90	85	5-115		-		
MATRIX SPIKE SA	MPLE:	2361250										
Parar	neter	Units	6029758 Resu	31003 ult	Spike Conc.	MS Result	N % I	IS Rec	% Rec Limits		Qualif	iers
Mercury		mg/L	<(	0.00020	0.005	0.004	46	92	70-	130		
MATRIX SPIKE & M			51		2361252							
			MS	MSD	2001202							
		60297657001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Paramete	er L	Jnits Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Mercury	n	ng/L ND	0.005	0.005	0.0050	0.0050	101	99	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.



EPA 200.7

200.7 Metals, Total

Project: TEC SI CCR

Pace Project No.: 60297581

QC Batch:	575351	Analysis Method:
QC Batch Method:	EPA 200.7	Analysis Description:

Associated Lab Samples: 60297581001, 60297581002, 60297581003, 60297581004

# METHOD BLANK: 2360336

METHOD BLANK: 23	360336	Matrix: Water
Associated Lab Sample	es: 60297581001, 60297581002	, 60297581003, 60297581004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	03/26/19 13:05	
Beryllium	mg/L	<0.0010	0.0010	03/26/19 13:05	
Boron	mg/L	<0.10	0.10	03/26/19 13:05	
Calcium	mg/L	<0.20	0.20	03/26/19 13:05	
Chromium	mg/L	<0.0050	0.0050	03/26/19 13:05	
Lead	mg/L	<0.010	0.010	03/26/19 13:05	
Lithium	mg/L	<0.010	0.010	03/26/19 13:05	

#### LABORATORY CONTROL SAMPLE: 2360337

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Barium	mg/L	1	0.98	98	85-115	
Beryllium	mg/L	1	0.98	98	85-115	
Boron	mg/L	1	0.96	96	85-115	
Calcium	mg/L	10	10	100	85-115	
Chromium	mg/L	1	0.97	97	85-115	
Lead	mg/L	1	0.99	99	85-115	
Lithium	mg/L	1	0.99	99	85-115	

ATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2360338 2360339													
			MS	MSD									
		60297581003	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max		
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual	
Barium	mg/L	0.54	1	1	1.6	1.5	101	100	70-130	0	20		
Beryllium	mg/L	<0.0010	1	1	0.99	1.0	99	100	70-130	0	20		
Boron	mg/L	0.48	1	1	1.5	1.5	101	103	70-130	1	20		
Calcium	mg/L	206	10	10	221	219	154	134	70-130	1	20	M1	
Chromium	mg/L	<0.0050	1	1	0.96	0.97	96	97	70-130	1	20		
Lead	mg/L	<0.010	1	1	0.96	0.97	96	97	70-130	0	20		
Lithium	mg/L	0.021	1	1	1.0	1.0	102	102	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.

# **REPORT OF LABORATORY ANALYSIS**

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Pace Project No.: 60297581

QC Batch:	575368		Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200	).8	Analysis Description:	200.8 MET
Associated Lab Sam	ples: 6	0297581001, 60297581002, 60	297581003, 60297581004	l de la constante de

Matrix: Water

#### METHOD BLANK: 2360396

Associated Lab Samples:	60297581001.	60297581002.	60297581003.	60297581004
	00201001001,	00201001002,	002010010000,	00201001001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	03/28/19 13:00	
Arsenic	mg/L	<0.0010	0.0010	03/28/19 13:00	
Cadmium	mg/L	<0.00050	0.00050	03/28/19 13:00	
Cobalt	mg/L	<0.0010	0.0010	03/28/19 13:00	
Molybdenum	mg/L	<0.0010	0.0010	03/28/19 13:00	
Selenium	mg/L	<0.0010	0.0010	03/28/19 13:00	
Thallium	mg/L	<0.0010	0.0010	03/28/19 13:00	

#### LABORATORY CONTROL SAMPLE: 2360397

<b>-</b> .		Spike	LCS	LCS	% Rec	o ""
Parameter	Units	Conc	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	0.04	0.038	95	85-115	
Arsenic	mg/L	0.04	0.039	97	85-115	
Cadmium	mg/L	0.04	0.039	96	85-115	
Cobalt	mg/L	0.04	0.039	97	85-115	
Molybdenum	mg/L	0.04	0.035	88	85-115	
Selenium	mg/L	0.04	0.039	99	85-115	
Thallium	mg/L	0.04	0.036	91	85-115	

MATRIX SPIKE & MATRIX SPIKE	DUPLI	CATE: 236039		2360399								
			MS	MSD								
		60297581002	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	0.04	0.04	0.037	0.038	93	94	70-130	1	20	
Arsenic	mg/L	0.028	0.04	0.04	0.066	0.066	95	95	70-130	0	20	
Cadmium	mg/L	<0.00050	0.04	0.04	0.035	0.035	88	89	70-130	0	20	
Cobalt	mg/L	0.0014	0.04	0.04	0.040	0.040	96	96	70-130	0	20	
Molybdenum	mg/L	0.0029	0.04	0.04	0.040	0.040	92	92	70-130	0	20	
Selenium	mg/L	<0.0010	0.04	0.04	0.033	0.033	81	81	70-130	0	20	
Thallium	mg/L	<0.0010	0.04	0.04	0.038	0.038	94	95	70-130	1	20	

MATRIX SPIKE SAMPLE:	2360400						
		60297582005	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	0.04	0.037	92	70-130	
Arsenic	mg/L	<0.0010	0.04	0.039	96	70-130	
Cadmium	mg/L	<0.00050	0.04	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.

# **REPORT OF LABORATORY ANALYSIS**

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



Project: TEC SI CCR Pace Project No.: 60297581

MATRIX SPIKE SAMPLE:	2360400	60297582005	Snike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Cobalt	mg/L	0.0021	0.04	0.042	99	70-130	
Molybdenum	mg/L	<0.0010	0.04	0.037	90	70-130	
Selenium	mg/L	<0.0050	0.04	0.037	93	70-130	
Thallium	mg/L	<0.0010	0.04	0.038	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.

# **REPORT OF LABORATORY ANALYSIS**

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Project: TE	C SI CCR									
Pace Project No.: 60	297581									
QC Batch: 5	75162		Analysis M	lethod:	SM 2540C					
QC Batch Method: S	SM 2540C		Analysis D	escription:	2540C Total D	issolved Solids				
Associated Lab Sample	es: 60297581	001								
METHOD BLANK: 23	59339		Matrix: Water							
Associated Lab Sample	es: 60297581	001								
Paramete	٥r	Linits	Blank Result	Reporting	Analyza	ed Quali	fiers			
								-		
Total Dissolved Solids		mg/L	<5.	0	5.0 03/22/19 1	15:39				
LABORATORY CONTR	OL SAMPLE:	2359340								
			Spike	LCS	LCS	% Rec				
Paramete	er	Units	Conc.	Result	% Rec	Limits	Qua	alifiers		
Total Dissolved Solids		mg/L	1000	992	99	80-120				
SAMPLE DUPLICATE:	2359341									
			60297248003	B Dup		Max				
Paramete	er	Units	Result	Result	RPD	RPD		Qualifiers		
Total Dissolved Solids		mg/L	668	0 66	630	1	10			
SAMPLE DUPLICATE:	2359342									
			60297249004	1 Dup		Max				
Paramete	er	Units	Result	Result	RPD	RPD		Qualifiers		
Total Dissolved Solids		mg/L	471	0 47	20	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:	TEC SI CCR						
Pace Project No.:	60297581						
QC Batch:	575163		Analysis M	ethod:	SM 2540C		
QC Batch Method:	SM 2540C		Analysis De	escription:	2540C Total Di	ssolved Solids	
Associated Lab Sam	ples: 60297581	002, 60297581003	, 60297581004				
METHOD BLANK:	2359343		Matrix	x: Water			
Associated Lab Sam	ples: 60297581	002, 60297581003	, 60297581004				
			Blank	Reporting			
Param	eter	Units	Result	Limit	Analyze	d Quali	fiers
Total Dissolved Solid	s	mg/L	<5.0	D 5	5.0 03/22/19 1	5:40	
LABORATORY CON	TROL SAMPLE:	2359344					
			Spike	LCS	LCS	% Rec	
Param	eter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Total Dissolved Solid	S	mg/L	1000	986	99	80-120	
SAMPLE DUPLICAT	E: 2359345						
			60297582001	Dup		Max	
Param	eter	Units	Result	Result	RPD	RPD	Qualifiers
Total Dissolved Solid	S	mg/L	976	6 9	41	4	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:	TEC SI CCR							
Pace Project No.:	60297581							
QC Batch: 575267			Analysis Meth	nod:	SM 4500-H+B			
QC Batch Method:	SM 4500-H+B		Analysis Desc	4500H+B pH				
Associated Lab Sar	nples: 60297581001,	6029758100	2, 60297581003, 60	29758100	4			
SAMPLE DUPLICA	TE: 2360124							
			60297253001	Dup		Max		
Parar	neter	Units	Result	Result	RPD	RPD	Qualifiers	

pH at 25 Degrees C	Std. Units	7.8	7.9	1	5 H	6

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**

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Project:	TEC SI CCR												
Pace Project No .:	60297581												
QC Batch:	576049			Analys	is Method:	E	PA 300.0						
QC Batch Method:	EPA 300.0			Analys	is Descript	tion: 3	00.0 IC Anio	ns					
Associated Lab Sa	mples: 60297	581001,	60297581002	, 60297581	003, 6029 <sup>-</sup>	7581004							
METHOD BLANK:	2363299			Ν	Aatrix: Wa	ter							
Associated Lab Sa	mples: 60297	581001,	60297581002	, 60297581	003, 6029 <sup>.</sup>	7581004							
				Blank	K R	eporting							
Para	meter		Units	Resul	t	Limit	Analyz	ed	Qualifiers				
Chloride			mg/L		<1.0	1.0	03/28/19	14:16					
Fluoride			mg/L		<0.20	0.20	03/28/19	14:16					
Sulfate			mg/L		<1.0	1.0	03/28/19	14:16					
LABORATORY CO	NTROL SAMPLE	E: 236	3300										
				Spike	LCS	5	LCS	% Re	C				
Para	meter		Units	Conc.	Resu	ılt	% Rec	Limits	s Q	ualifiers			
Chloride			mg/L	5		5.1	102	90	D-110		-		
Fluoride			mg/L	2.5		2.6	106	90	D-110				
Sulfate			mg/L	5		5.3	105	90	D-110				
MATRIX SPIKE & I	MATRIX SPIKE D	UPLICA	ATE: 236330	01		2363302							
				MS	MSD								
		6	0296837001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Paramet	er	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride		mg/L	199000	100000	100000	291000	286000	92	87	90-110	2	15	M1
Fluoride		mg/L	ND	50000	50000	51400	52500	100	103	90-110	2	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.

# **REPORT OF LABORATORY ANALYSIS**

Sulfate

mg/L

ND

100000

100000

107000

107000

102

102 90-110

0 15



Project:	TEC SI CCR							
Pace Project No.:	60297581							
QC Batch:	576262		Analysis	Method:	EPA 300.0			
QC Batch Method:	EPA 300.0		Analysis	Description:	300.0 IC Anions	6		
Associated Lab San	nples: 60297581	001						
METHOD BLANK:	2364278		Mat	trix: Water				
Associated Lab San	nples: 60297581	001						
			Blank	Reportin	g			
Paran	neter	Units	Result	Limit	Analyzed	d Quali	fiers	
Sulfate		mg/L	<1	1.0	1.0 03/29/19 12	2:14		
LABORATORY CON	NTROL SAMPLE:	2364279						
			Spike	LCS	LCS	% Rec		
Paran	neter	Units	Conc.	Result	% Rec	Limits	Qualifiers	
Sulfate		mg/L	5	5.3	106	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.



# QUALIFIERS

Project: TEC SI CCR Pace Project No.: 60297581

#### 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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.

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

#### ANALYTE QUALIFIERS

- 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:	TEC SI CCR
Pace Project No.:	60297581

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60297581001	MW-7-032019	EPA 200.7	575351	EPA 200.7	575421
60297581002	MW-10-032119	EPA 200.7	575351	EPA 200.7	575421
60297581003	MW-9-032119	EPA 200.7	575351	EPA 200.7	575421
60297581004	MW-8-032119	EPA 200.7	575351	EPA 200.7	575421
60297581001	MW-7-032019	EPA 200.8	575368	EPA 200.8	575517
60297581002	MW-10-032119	EPA 200.8	575368	EPA 200.8	575517
60297581003	MW-9-032119	EPA 200.8	575368	EPA 200.8	575517
60297581004	MW-8-032119	EPA 200.8	575368	EPA 200.8	575517
60297581001	MW-7-032019	EPA 245.1	575586	EPA 245.1	575627
60297581002	MW-10-032119	EPA 245.1	575586	EPA 245.1	575627
60297581003	MW-9-032119	EPA 245.1	575586	EPA 245.1	575627
60297581004	MW-8-032119	EPA 245.1	575586	EPA 245.1	575627
60297581001	MW-7-032019	SM 2540C	575162		
60297581002	MW-10-032119	SM 2540C	575163		
60297581003	MW-9-032119	SM 2540C	575163		
60297581004	MW-8-032119	SM 2540C	575163		
60297581001	MW-7-032019	SM 4500-H+B	575267		
60297581002	MW-10-032119	SM 4500-H+B	575267		
60297581003	MW-9-032119	SM 4500-H+B	575267		
60297581004	MW-8-032119	SM 4500-H+B	575267		
60297581001	MW-7-032019	EPA 300.0	576049		
60297581001	MW-7-032019	EPA 300.0	576262		
60297581002	MW-10-032119	EPA 300.0	576049		
60297581003	MW-9-032119	EPA 300.0	576049		
60297581004	MW-8-032119	EPA 300.0	576049		



Sample Condition Upon Receipt

Client Name: LIPS For Energy				
		Pace Xroads	Client Cother C	
		2 Yes □ No		
	Ce Shipping Laber Used		~	
		Nana	Other []	÷.
Packing Material: Bubble Wrap Bubble Bags				
Thermometer Used: 1-246 Type	brice: wer blue wor		Date and initials of persor	
Cooler Temperature (°C): As-read <u>C</u> Corr. Fac	ctor -1.0 Correcte	ed	examining contents:	
Temperature should be above freezing to 6°C			p 5/21119	
Chain of Custody present:	Yes INO NA			
Chain of Custody relinquished:				
Samples arrived within holding time:	ZYes □No □N/A	-		
Short Hold Time analyses (<72hr)				
Rush Turn Around Time requested:				
Sufficient volume:				
Correct containers used.	Yes No N/A			
Pace containers used:				
Containers intact:	Yes No N/A			
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:				
Containers requiring pH preservation in compliance?	Yes No N/A	List sample IDs, v	volumes, lot #'s of preservative a	and the
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide)	/	date/time added.		12
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)		-		03
Cyanide water sample checks:	Yes No	1		
Potassium iodide test strip turns blue/purple? (Preserve)				
Trip Blank present:				
Headspace in VOA vials ( >6mm):			1	
Samples from USDA Regulated Area: State:	DYes DNO DNIA			
Additional labels attached to 5035A / TX1005 vials in the fi	eld? 🗆 Yes 🗆 No 🖉 N/A		40	
Client Notification/ Resolution: Copy CC	OC to Client? Y 1 N	Field Data Re	quired? Y / N	
Person Contacted: Da	te/Time:			
Comments/ Resolution:				
				2
Project Manager Review:	Da	te:		

WO#:60297581

60297581

Pace Analytical

# CHAIN-OF-CUSTODY / Analytical Request Document

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

Section	A	Section B Beautrad Drainet Information:	Section C Invoice Information:	Page		1
Company.	WESTAR ENERGY	Report To: Brandon Griffin	Attention: Jared Morrison			
Address.	818 Kansas Ave	Copy To: Jared Morrison, Heath Hornya	Company Name: WESTAR ENERGY	REGULATORY AGENCY		
	Topeka, KS 66612		Address: SEE SECTION A	VINDES L CROUND WA	TER L DRIN	JKING WATER
Email To:	brandon.I. griffin@westarenergy.com	Purchase Order No.: 10TEC-0000007956	Pace Ouote Reference:	L UST L RCRA	HTO L	ER
Phone:	(785) 575-8135 Fax	Project Name: TEC SI CCR	Pace Project Heather Wilson, 913-563-140 Manager	Site Location		
Requeste	td Due Date/TAT: 7 DAY	Project Number:	Pace Profile #: 9656, 1	STATE:		
			Re	uested Analysis Filtered (Y/N)		
	Section D Valid Matrix C.	odes € D cone 2 D cone 2 D cone 2 D	Preservatives			
	Required Client Intormation PRINKING WATER WATER PRODUCT SoluSould	D Mut With M	S COLLECTION		(N/1) Əl	
# W3.	SAMPLE ID WIFE (A-Z, 0-9/) OTHER Sample IDs MUST BE UNIQUE TISSUE	(응 순 은 는 는 8) 3 전 ODE (6 ) 3 CODE (6 ) 3 CODE (6 ) 5 CODE (6 )	й SAMPLE TEMP AT C SAMPLE TEMP AT C SAMPLE TEMP AT C HOC3 HUO3 NacOH Nachanol Other	245.1 Total Met 245.1 Total Met 300: CI, F SO4 4500 H+B 2540C TDS		253/ ject No./ Lab I.D.
ш	21-60 -		37 2 (		ROIM BPI	N OOI
-	1-10-CO-1-1-WW	wr 6 3/21 083	34 2 1 1		-	200
0 0	mu-a-032119	VT6 3/21 (10	00 2 1 1			500
9 4	MW-K-032119	r6 \$121	28 2 1		> ~	hoo
5						
9						
7						
60						
ŋ €						
÷						
12				LATION DATE TIME	SAMPLE	CONDITIONS
200.7 16	ADDITIONAL COMMENTS vial Metals*: B. Ca.Ba. Be. Cr. Pb. Li	NELNQUARED BITAL HAVING	11/19 1400 Manante	3/21/19/1200 1-0	X	X X
200.8 To	otal Metals**: Sb, As, Cd, Co, Mo, Se, Tl	and and and the	and and and when			
Juge	2200	SAMPLER NAME AND SI	SIGNATURE	0.1	(N uo p	(N/Y) Intacl
210	27 -	PRINT Name of S	SAMPLER: Brandon Griffin	a ni qme	ceive (Y) eol	(X/N mbjes pojet (
,1 20	of 28	SIGNATURE of S	SAMPLER: MYYY (M	те signed M/DD/YY): 03/21/19   +	ਸ 1 ਸ	PS PC Sn2

F-ALL-Q-020rev.08, 12-Oct-2007

"important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days. 0

# Pace Container Order #468046

Order	By :		Ship T	о:				Returi	n To:	
Company	WESTAR EN	ERGY	Company	WESTA	R ENERGY			Company	Pace A	Analytical Kansas
Contact	Griffin, Brand	on	Contact	Griffin, E	Brandon			Contact	Wilson	, Heather
Email	brandon.l.grif	fin@westarenergy.	Email	brandon	.l.griffin@w	estarener	gy.	Email	heathe	r.wilson@pacelabs.com
Address	818 S. Kansa	s Ave	Address	818 S. K	ansas Ave			Address	9608 L	.oiret Blvd.
Address 2			Address 2					Address 2		
City	Topeka		City	Topeka				City	Lenex	a
State	KS Z	ip 66612	State	KS	Zip 666	12		State	KS	Zip 66219
Phone	785-575-813	5	Phone	785-575	-8135			Phone	1(913)	563-1407
Inf	fo									
Project	Name TEC S	SI CCR- App III & IV	Due Date	02/27/2	019	Profil	e 9657,	ă		Quote
Ρ	Project Wilson	n, Heather	Return			Carrie	Most	Economical	L	ocatio KS
— Гпр Ві	nclude Trip Bla	anks			Blank Pre-Printed Pre-Printed	No Samp With Sam	le IDs nple IDs		Boxe Indiv Grou	ed Cases idually Wrapped ped By Sample
- Retur	rn Shipping			– Mis	c					
	No Shipper With Shipper Options – Number of Blan Pre-Printed	ıks			Sampling In Custody Se Temp. Blan Coolers Syringes	structions al ks	3			Extra Bubble Wrap Short Hold/Rush DI Liter(s) USDA Regulated Soils
# of Sample	es Matrix	Test	Containe	er		Total	# of	Lot #		Notes
						1	1.			
4	WT	Metals	1-1L plasti	cw/HNO3	_	4	0	010719-2AJN		

# Hazard Shipping Placard In Place : NO

\*Sample receiving hours are Mon-Fri 7:00am-6:00pm and Sat 8:00am-2:00pm unless special arrangements are made with your project manager.

\*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

\*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage and disposal.

\*Payment term are net 30 days. \*Please include the proposal number on the chain of custody to insure proper billing.

Sample	Ship Date :	02/27/2019
PP COC (1), PP labels w/o sample IDs Lenexa return	Prepared	Ben
Scott to take on 2/28/19	Verified By:	Page 28 of 28
		<u>,</u>



Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

April 03, 2019

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

RE: Project: TEC SI CCR Pace Project No.: 60297615

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on March 22, 2019. 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,

Autor m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: HEATH HORYNA, WESTAR ENERGY Andrew Hare, Westar Energy Adam Kneeling, Haley & Aldrich, Inc. JARED MORRISON, WESTAR ENERGY Melissa Michels, Westar Energy





Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

# CERTIFICATIONS

Project: TEC SI CCR Pace Project No.: 60297615

#### Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad 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 #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L



# SAMPLE SUMMARY

Project: TEC SI CCR Pace Project No.: 60297615

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60297615001	MW-7-032019	Water	03/20/19 15:37	03/22/19 09:30
60297615002	MW-10-032119	Water	03/21/19 08:34	03/22/19 09:30
60297615003	MW-9-032119	Water	03/21/19 11:00	03/22/19 09:30
60297615004	MW-8-032119	Water	03/21/19 12:28	03/22/19 09:30



# SAMPLE ANALYTE COUNT

Project: TEC SI CCR Pace Project No.: 60297615

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60297615001	MW-7-032019	EPA 903.1		1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60297615002	MW-10-032119	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60297615003	MW-9-032119	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60297615004	MW-8-032119	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA



Project: TEC SI CCR Pace Project No.: 60297615

Method:EPA 903.1Description:903.1 Radium 226Client:WESTAR ENERGYDate:April 03, 2019

# **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.

Additional Comments:



Project: TEC SI CCR Pace Project No.: 60297615

Method:EPA 904.0Description:904.0 Radium 228Client:WESTAR ENERGYDate:April 03, 2019

# **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.

Additional Comments:



Project: TEC SI CCR Pace Project No.: 60297615

Method: Total Radium Calculation Description: Total Radium 228+226

Client:WESTAR ENERGYDate:April 03, 2019

# **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.

# Additional Comments:

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



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: TEC SI CCR

Pace Project No.: 60297615

Sample: MW-7-032019	Lab ID: 602976	<b>I5001</b> Collected: 03/20/19 15:37	Received:	03/22/19 09:30	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.043 ± 0.377 (0.820) C:NA T:87%	pCi/L	04/02/19 11:44	13982-63-3	
Radium-228	EPA 904.0	0.0990 ± 0.341 (0.767) C:76% T:87%	pCi/L	04/02/19 14:40	15262-20-1	
Total Radium	Total Radium Calculation	0.0990 ± 0.718 (1.59)	pCi/L	04/03/19 16:02	2 7440-14-4	



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: TEC SI CCR

Pace Project No.: 60297615

Sample: MW-10-032119	Lab ID: 60297	<b>615002</b> Collected: 03/21/19 08:34	Received:	03/22/19 09:30	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0679 ± 0.502 (0.958) C:NA T:91%	pCi/L	04/02/19 11:44	13982-63-3	
Radium-228	EPA 904.0	1.50 ± 0.534 (0.776) C:76% T:84%	pCi/L	04/02/19 14:40	) 15262-20-1	
Total Radium	Total Radium Calculation	1.57 ± 1.04 (1.73)	pCi/L	04/03/19 16:02	2 7440-14-4	



# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: TEC SI CCR

Pace Project No.: 60297615

Sample: MW-9-032119	Lab ID: 6029761	5003 Collected: 03/21/19 11:00	Received:	03/22/19 09:30 N	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.170 ± 0.541 (0.995) C:NA T:92%	pCi/L	04/02/19 11:44	13982-63-3	
Radium-228	EPA 904.0	0.493 ± 0.366 (0.709) C:73% T:82%	pCi/L	04/02/19 14:40	15262-20-1	
Total Radium	Total Radium Calculation	0.663 ± 0.907 (1.70)	pCi/L	04/03/19 16:02	7440-14-4	


# **ANALYTICAL RESULTS - RADIOCHEMISTRY**

Project: TEC SI CCR

Pace Project No.: 60297615

Sample: MW-8-032119	Lab ID: 602976	<b>15004</b> Collected: 03/21/19 12:28	Received:	03/22/19 09:30	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0789 ± 0.583 (1.11) C:NA T:81%	pCi/L	04/02/19 11:44	13982-63-3	
Radium-228	EPA 904.0	0.386 ± 0.379 (0.779) C:74% T:80%	pCi/L	04/02/19 14:40	15262-20-1	
Total Radium	Total Radium Calculation	0.465 ± 0.962 (1.89)	pCi/L	04/03/19 16:02	2 7440-14-4	



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project:	TEC SI CCR					
Pace Project No.:	60297615					
QC Batch:	335730	Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radiun	n 228		
Associated Lab Sar	nples: 602976150	001, 60297615002, 60297615003, 602976150	04			
METHOD BLANK:	1633600	Matrix: Water				
Associated Lab Sar	nples: 602976150	001, 60297615002, 60297615003, 602976150	04			
Parar	neter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.151 ± 0.414 (0.925) C:76% T:69%	pCi/L	04/02/19 11:21		

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.



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project:	TEC SI CCR					
Pace Project No.:	60297615					
QC Batch:	335729	Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium	-226		
Associated Lab San	nples: 60297615	001, 60297615002, 60297615003, 6029761500	94			
METHOD BLANK:	1633599	Matrix: Water				
Associated Lab San	nples: 60297615	001, 60297615002, 60297615003, 6029761500	4			
Paran	neter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.506 ± 0.472 (0.661) C:NA T:98%	pCi/L	04/02/19 10:37		

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: TEC SI CCR Pace Project No.: 60297615

### 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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-PA Pace Analytical Services - Greensburg



# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:	TEC SI CCR
Pace Project No.:	60297615

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60297615001	MW-7-032019	EPA 903.1	335729		
60297615002	MW-10-032119	EPA 903.1	335729		
60297615003	MW-9-032119	EPA 903.1	335729		
60297615004	MW-8-032119	EPA 903.1	335729		
60297615001	MW-7-032019	EPA 904.0	335730		
60297615002	MW-10-032119	EPA 904.0	335730		
60297615003	MW-9-032119	EPA 904.0	335730		
60297615004	MW-8-032119	EPA 904.0	335730		
60297615001	MW-7-032019	Total Radium Calculation	336842		
60297615002	MW-10-032119	Total Radium Calculation	336842		
60297615003	MW-9-032119	Total Radium Calculation	336842		
60297615004	MW-8-032119	Total Radium Calculation	336842		

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×	Samples were s	ent directly to th	he Subcontractin	g Laboratory.		ភប	tate Of Oric ert. Needec	ini SX⊡	Yes	×		www.pacelabs.com
Workon	der: 60297615	Workorder N	lame: TEC SI Co	CR		Ó	wner Recei	ved Da	te: 3	122/2019	Results Requested	<b>J By:</b> 4/5/2019
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2 MW <sup>L</sup> :	10-032119	PS	3/21/2019 08:34	60297615002	Water	1		X X				NN 1
3 MW-	9-032119	PS	3/21/2019 11:00	60297615003	Water	1		XX				<i>ž</i> ů3
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ace Analytical

# 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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Pace Analytical Client Name:	W	2571	<u>C1</u>	Energy P	roject #
Courier: Fed Ex UPS USPS Client Tracking #: MMU 8742 5723		ommer	cial	Pace Other	Label ET
Custody Seal on Cooler/Box Present:	[] no	D	Seals	intact: 🛛 yes 🗌 no	0
Thermometer Used	Туре о	of Ice:	Wet	) Blue None	
Cooler Temperature Observed Temp )	.1	°C	Corre	ection Factor: $O_1O_1$	°C Final Temp: ], ] °C
Temp should be above freezing to 6°C					
			_	pH paper Lot#	Date and Initials of person examining contents: <u> ドナ 3-スン-19</u>
Comments:	Yes	No	N/A	10D3281	
Chain of Custody Present:				1.	
Chain of Custody Filled Out:				2.	
Chain of Custody Relinquished:				3.	
Sampler Name & Signature on COC:				4.	
Sample Labels match COC:				5.	
-Includes date/time/ID Matrix:	WT		<del>.</del>		
Samples Arrived within Hold Time:				6.	
Short Hold Time Analysis (<72hr remaining):				7	
Rush Turn Around Time Requested:		[		8.	
Sufficient Volume:				9.	
Correct Containers Used:				10.	
-Pace Containers Used:		•			
Containers Intact:		Ĺ		11.	
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Hex Cr Aqueous Compliance/NPDES sample field filtered				13.	-
Organic Samples checked for dechlorination:				14.	
Filtered volume received for Dissolved tests			$\leq$	15.	
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All containers needing preservation are found to be in compliance with EPA recommendation.				p n	
exceptions' VOA coliform TOC O&G Phenolics				Initial when ET	Date/time of
				Lot # of added preservative	
Headspace in VOA Vials ( >6mm):				17.	
Trip Blank Present:				18.	
Trip Blank Custody Seals Present					
Rad Samples Screened < 0.5 mrem/hr				completed: ET	Date: 3-22-19
Client Notification/ Resolution:	<u> </u>		•		
Person Contacted:			Date/	Fime:	Contacted By:
Comments/ Resolution:					a an
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Avancement A					

# $\Box$ 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.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-8 5March2019)

ATTACHMENT 1-2

June 2019 Sampling Event Laboratory Analytical Report



Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

July 09, 2019

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

RE: Project: TEC SI CCR Pace Project No.: 60307292

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on June 27, 2019. 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,

Autor m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: HEATH HORYNA, WESTAR ENERGY Andrew Hare, Westar Energy Jake Humphrey, KCP&L & Westar, Evergy Companies Adam Kneeling, Haley & Aldrich, Inc. JARED MORRISON, WESTAR ENERGY Melissa Michels, Westar Energy





### CERTIFICATIONS

Project: TEC SI CCR Pace Project No.: 60307292

### **Kansas Certification IDs**

9608 Loiret Boulevard, Lenexa, KS 66219 Missouri Inorganic Drinking Water Certification #: 10090 Arkansas Drinking Water Arkansas Certification #: 19-016-0 Arkansas Drinking Water Illinois Certification #: 004455 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055 Nevada Certification #: KS000212018-1 Oklahoma Certification #: 9205/9935 Missouri SEKS Micro Certification: 10070 Florida: Cert E871149 SEKS WET Texas Certification #: T104704407-18-11 Utah Certification #: KS000212018-8 Illinois Certification #: 004592 Kansas Field Laboratory Accreditation: # E-92587



# SAMPLE SUMMARY

Project: TEC SI CCR Pace Project No.: 60307292

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60307292001	MW-8-062519	Water	06/25/19 09:50	06/27/19 08:35
60307292002	MW-9-062519	Water	06/25/19 12:00	06/27/19 08:35
60307292003	MW-10-062519	Water	06/25/19 14:10	06/27/19 08:35
60307292004	MW-7-062519	Water	06/25/19 16:20	06/27/19 08:35



# SAMPLE ANALYTE COUNT

Project: TEC SI CCR Pace Project No.: 60307292

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60307292001	MW-8-062519	EPA 200.7	LRS	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	TDS	1	PASI-K
		EPA 300.0	JDS	1	PASI-K
60307292002	MW-9-062519	EPA 200.7	LRS	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	TDS	1	PASI-K
		EPA 300.0	JDS	1	PASI-K
60307292003	MW-10-062519	EPA 200.7	LRS	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	TDS	1	PASI-K
		EPA 300.0	JDS	1	PASI-K
60307292004	MW-7-062519	EPA 200.7	LRS	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	TDS	1	PASI-K
		EPA 300.0	JDS	1	PASI-K



Project: TEC SI CCR

Pace Project No.: 60307292

Method:	EPA 200.7
Description:	200.7 Metals, Total
Client:	WESTAR ENERGY
Date:	July 09, 2019

### **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.

### Additional Comments:



Project: TEC SI CCR Pace Project No.: 60307292

Method:EPA 200.8Description:200.8 MET ICPMSClient:WESTAR ENERGYDate:July 09, 2019

### 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.

### Additional Comments:



Project: TEC SI CCR

Pace Project No.: 60307292

 Method:
 EPA 245.1

 Description:
 245.1 Mercury

 Client:
 WESTAR ENERGY

 Date:
 July 09, 2019

### 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.

### Additional Comments:



Project: TEC SI CCR Pace Project No.: 60307292

Method:EPA 300.0Description:300.0 IC Anions 28 DaysClient:WESTAR ENERGYDate:July 09, 2019

### **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.



Project: TEC SI CCR

Pace Project No.: 60307292

Sample: MW-8-062519	Lab ID: 603	07292001	Collected: 06/25/1	9 09:50	0 Received: 06	/27/19 08:35 N	latrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual		
200.7 Metals, Total	Analytical Meth	nod: EPA 20	00.7 Preparation Met	hod: El	PA 200.7					
Barium, Total Recoverable	0.055	mg/L	0.0050	1	07/05/19 16:17	07/08/19 17:21	7440-39-3			
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 17:21	7440-41-7			
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	07/05/19 16:17	07/08/19 17:21	7440-47-3			
Lead, Total Recoverable	<0.010	mg/L	0.010	1	07/05/19 16:17	07/08/19 17:21	7439-92-1			
Lithium	0.019	mg/L	0.010	1	07/05/19 16:17	07/08/19 17:21	7439-93-2			
200.8 MET ICPMS	Analytical Meth	nod: EPA 20	00.8 Preparation Met	hod: El	PA 200.8					
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 14:52	7440-36-0			
Arsenic, Total Recoverable	0.0029	mg/L	0.0010	1	07/05/19 16:17	07/08/19 14:52	7440-38-2			
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	07/05/19 16:17	07/08/19 14:52	7440-43-9			
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 14:52	7440-48-4			
Molybdenum, Total Recoverable	0.025	mg/L	0.0010	1	07/05/19 16:17	07/08/19 14:52	7439-98-7			
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 14:52	7782-49-2			
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/09/19 10:41	7440-28-0			
245.1 Mercury	Analytical Meth	nod: EPA 24	45.1 Preparation Met	hod: El	PA 245.1					
Mercury	<0.20	ug/L	0.20	1	07/02/19 10:30	07/05/19 15:56	7439-97-6			
300.0 IC Anions 28 Days	Analytical Meth	nod: EPA 30	0.0							
Fluoride	<0.20	mg/L	0.20	1		07/09/19 03:53	16984-48-8			



Project: TEC SI CCR

Pace Project No.: 60307292

Sample: MW-9-062519	Lab ID: 603	07292002	Collected: 06/25/1	9 12:00	Received: 06	/27/19 08:35 N	latrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual		
200.7 Metals, Total	Analytical Meth	nod: EPA 20	0.7 Preparation Met	hod: EF	PA 200.7					
Barium, Total Recoverable	0.36	mg/L	0.0050	1	07/05/19 16:17	07/08/19 17:24	7440-39-3			
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 17:24	7440-41-7			
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	07/05/19 16:17	07/08/19 17:24	7440-47-3			
Lead, Total Recoverable	<0.010	mg/L	0.010	1	07/05/19 16:17	07/08/19 17:24	7439-92-1			
Lithium	0.020	mg/L	0.010	1	07/05/19 16:17	07/08/19 17:24	7439-93-2			
200.8 MET ICPMS	Analytical Meth	nod: EPA 20	0.8 Preparation Met	hod: EF	PA 200.8					
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 14:56	7440-36-0			
Arsenic, Total Recoverable	0.093	mg/L	0.0010	1	07/05/19 16:17	07/09/19 10:47	7440-38-2			
Cadmium, Total Recoverable	0.00053	mg/L	0.00050	1	07/05/19 16:17	07/08/19 14:56	7440-43-9			
Cobalt, Total Recoverable	0.032	mg/L	0.0010	1	07/05/19 16:17	07/08/19 14:56	7440-48-4			
Molybdenum, Total Recoverable	0.0024	mg/L	0.0010	1	07/05/19 16:17	07/08/19 14:56	7439-98-7			
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/09/19 10:47	7782-49-2			
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/09/19 10:47	7440-28-0			
245.1 Mercury	Analytical Meth	nod: EPA 24	15.1 Preparation Met	hod: EF	PA 245.1					
Mercury	<0.20	ug/L	0.20	1	07/02/19 10:30	07/05/19 15:58	7439-97-6			
300.0 IC Anions 28 Days	Analytical Meth	nod: EPA 30	0.0							
Fluoride	<0.20	mg/L	0.20	1		07/09/19 04:07	16984-48-8			



Project: TEC SI CCR

Pace Project No.: 60307292

Sample: MW-10-062519	Lab ID: 603	07292003	Collected: 06/25/1	9 14:10	0 Received: 06	/27/19 08:35 N	latrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual		
200.7 Metals, Total	Analytical Meth	nod: EPA 20	0.7 Preparation Met	hod: EF	PA 200.7					
Barium, Total Recoverable	0.27	mg/L	0.0050	1	07/05/19 16:17	07/08/19 17:26	7440-39-3			
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 17:26	7440-41-7			
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	07/05/19 16:17	07/08/19 17:26	7440-47-3			
Lead, Total Recoverable	<0.010	mg/L	0.010	1	07/05/19 16:17	07/08/19 17:26	7439-92-1			
Lithium	<0.010	mg/L	0.010	1	07/05/19 16:17	07/08/19 17:26	7439-93-2			
200.8 MET ICPMS	Analytical Meth	nod: EPA 20	0.8 Preparation Met	hod: EF	PA 200.8					
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:03	7440-36-0			
Arsenic, Total Recoverable	0.029	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:03	7440-38-2			
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	07/05/19 16:17	07/08/19 15:03	7440-43-9			
Cobalt, Total Recoverable	0.0091	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:03	7440-48-4			
Molybdenum, Total Recoverable	0.0053	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:03	7439-98-7			
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:03	7782-49-2			
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/09/19 10:52	7440-28-0			
245.1 Mercury	Analytical Meth	nod: EPA 24	5.1 Preparation Met	hod: EF	PA 245.1					
Mercury	<0.20	ug/L	0.20	1	07/02/19 10:30	07/05/19 16:00	7439-97-6			
300.0 IC Anions 28 Days	Analytical Meth	nod: EPA 30	0.0							
Fluoride	<0.20	mg/L	0.20	1		07/09/19 04:22	16984-48-8			



Project: TEC SI CCR

Pace Project No.: 60307292

Sample: MW-7-062519	Lab ID: 603	07292004	Collected: 06/25/1	9 16:20	Received: 06	/27/19 08:35 N	latrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual		
200.7 Metals, Total	Analytical Meth	nod: EPA 20	0.7 Preparation Met	hod: EF	PA 200.7					
Barium, Total Recoverable	0.063	mg/L	0.0050	1	07/05/19 16:17	07/08/19 17:36	7440-39-3			
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 17:36	7440-41-7			
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	07/05/19 16:17	07/08/19 17:36	7440-47-3			
Lead, Total Recoverable	<0.010	mg/L	0.010	1	07/05/19 16:17	07/08/19 17:36	7439-92-1			
Lithium	0.027	mg/L	0.010	1	07/05/19 16:17	07/08/19 17:36	7439-93-2			
200.8 MET ICPMS	Analytical Mether	nod: EPA 20	0.8 Preparation Met	hod: EF	PA 200.8					
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:07	7440-36-0			
Arsenic, Total Recoverable	0.0016	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:07	7440-38-2			
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	07/05/19 16:17	07/08/19 15:07	7440-43-9			
Cobalt, Total Recoverable	0.0016	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:07	7440-48-4			
Molybdenum, Total Recoverable	0.0072	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:07	7439-98-7			
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/08/19 15:07	7782-49-2			
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	07/05/19 16:17	07/09/19 10:54	7440-28-0			
245.1 Mercury	Analytical Meth	nod: EPA 24	5.1 Preparation Met	hod: EF	PA 245.1					
Mercury	<0.20	ug/L	0.20	1	07/02/19 10:30	07/05/19 16:02	7439-97-6			
300.0 IC Anions 28 Days	Analytical Meth	nod: EPA 30	0.0							
Fluoride	0.32	mg/L	0.20	1		07/09/19 04:37	16984-48-8			



Mercury		ug/L		<0.20	5		4.5	90	70	-130		
Parameter		Units	60306 Re	868002 esult	Spike Conc.	MS Result	9	MS 6 Rec	% Rec Limits	:	Qualif	iers
MATRIX SPIKE SAMPLI	≣:	2435096										
Mercury	ug/L	<0.20	5	5	4.6	4.5	92	90	70-130	3	20	
Parameter	Units	60306868001 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			MS	MSD								
MATRIX SPIKE & MATR	IX SPIKE DUP	LICATE: 2435	094		2435095							
Mercury		ug/L		5	4.7	93	3	85-115				
Parameter		Units	Conc.	Res	sult	% Rec	% R Lim	its (	Qualifiers			
LABORATORY CONTRO	OL SAMPLE:	2435093	Collec		0		0/ D					
Mercury		ug/L		<0.20	0.20	0 07/05/19	9 15:14					
Parameter		Units	Res	ult	Limit	Analy	/zed	Qualifiers	6			
	000072020		Blar	nk I	Reporting							
Associated Lab Samples	60307292	001.6030729200	2.6030729	2003, 603	07292004							
METHOD BLANK 243	5092			Matrix: W	ater							
Associated Lab Samples	603072920	001, 6030729200	2, 6030729	92003, 6030	07292004							
QC Batch Method: El	PA 245.1		Analy	ysis Descrip	otion: 2	245.1 Mercu	ıry					
QC Batch: 59	94115		Analy	ysis Method	d: E	EPA 245.1						
Pace Project No.: 603	07292											
Project: TEC	C SI CCR											

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:	TEC SI CCR

Pace Project No.: 60307292

QC Batch:	594823	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total

Associated Lab Samples: 60307292001, 60307292002, 60307292003, 60307292004

METHOD BLANK: 2	437479
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# 9 Matrix: Water

Associated Lab Samples: 60307292001, 60307292002, 60307292003, 60307292004									
		Blank	Reporting						
Parameter	Units	Result	Limit	Analyzed	Qualifiers				
Barium	mg/L	<0.0050	0.0050	07/08/19 12:32					
Beryllium	mg/L	<0.0010	0.0010	07/08/19 12:32					
Chromium	mg/L	<0.0050	0.0050	07/08/19 12:32					
Lead	mg/L	<0.010	0.010	07/08/19 12:32					
Lithium	mg/L	<0.010	0.010	07/08/19 12:32					

### LABORATORY CONTROL SAMPLE: 2437480

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	1	0.98	98	85-115	
Beryllium	mg/L	1	0.99	99	85-115	
Chromium	mg/L	1	0.98	98	85-115	
Lead	mg/L	1	1.0	102	85-115	
Lithium	mg/L	1	0.97	97	85-115	

MATRIX SPIKE & MATRIX SPI	ATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2437481 2437482											
Parameter	Units	60307292003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.27	1	1	1.2	1.3	96	98	70-130	2	20	
Beryllium	mg/L	<0.0010	1	1	0.97	1.0	97	100	70-130	2	20	
Chromium	mg/L	<0.0050	1	1	0.92	0.95	92	95	70-130	3	20	
Lead	mg/L	<0.010	1	1	0.95	0.97	95	97	70-130	2	20	
Lithium	mg/L	<0.010	1	1	1.0	1.1	104	106	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.



Pace Project No.: 60307292

QC Batch:	594825	Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET
Associated Lab Samp	oles: 60307292001, 60307292002, 60	307292003, 60307292004	

### METHOD BLANK: 2437487

METHOD BLANK: 24374	.87	Matrix: Water
Associated Lab Samples:	60307292001, 60307292002,	60307292003, 60307292004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	07/08/19 14:17	
Arsenic	mg/L	<0.0010	0.0010	07/08/19 14:17	
Cadmium	mg/L	<0.00050	0.00050	07/08/19 14:17	
Cobalt	mg/L	<0.0010	0.0010	07/08/19 14:17	
Molybdenum	mg/L	<0.0010	0.0010	07/08/19 14:17	
Selenium	mg/L	<0.0010	0.0010	07/08/19 14:17	
Thallium	mg/L	<0.0010	0.0010	07/08/19 14:17	

### LABORATORY CONTROL SAMPLE: 2437488

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	0.04	0.041	103	85-115	
Arsenic	mg/L	0.04	0.041	103	85-115	
Cadmium	mg/L	0.04	0.042	105	85-115	
Cobalt	mg/L	0.04	0.042	104	85-115	
Molybdenum	mg/L	0.04	0.039	97	85-115	
Selenium	mg/L	0.04	0.041	104	85-115	
Thallium	mg/L	0.04	0.039	98	85-115	
Thailian	iiig/E	0.04	0.000	00	00 110	

MATRIX SPIKE & MATRIX SPIK	E DUPI	LICATE: 24374	489		2437490							
			MS	MSD								
		60307291002	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	0.04	0.04	0.040	0.039	101	98	70-130	3	20	
Arsenic	mg/L	<0.0010	0.04	0.04	0.043	0.042	106	104	70-130	2	20	
Cadmium	mg/L	<0.00050	0.04	0.04	0.039	0.037	96	93	70-130	3	20	
Cobalt	mg/L	0.0026	0.04	0.04	0.047	0.045	110	107	70-130	3	20	
Molybdenum	mg/L	<0.0010	0.04	0.04	0.042	0.041	104	101	70-130	3	20	
Selenium	mg/L	<0.0010	0.04	0.04	0.039	0.038	97	95	70-130	2	20	
Thallium	mg/L	<0.0010	0.04	0.04	0.042	0.041	106	103	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.

# **REPORT OF LABORATORY ANALYSIS**

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Project:	TEC SI CCR											
Pace Project No.:	60307292											
QC Batch:	595185		Anal	ysis Method	d: E	EPA 300.0						
QC Batch Method:	EPA 300.0		Anal	ysis Descrij	ption: 3	300.0 IC Ani	ions					
Associated Lab Sar	mples: 60307292	001, 6030729200	2, 6030729	92003, 6030	07292004							
METHOD BLANK:	2438440			Matrix: W	ater							
Associated Lab Sar	nples: 60307292	001, 6030729200	2, 6030729	92003, 6030	07292004							
			Bla	nk l	Reporting							
Parar	neter	Units	Res	ult	Limit	Analy	/zed	Qualifier	S			
Fluoride		mg/L		<0.20	0.20	07/08/19	9 18:58					
LABORATORY CO	NTROL SAMPLE:	2438441										
Parar	neter	Units	Spike Conc.	LC Res	:S sult	LCS % Rec	% R Limi	ec ts (	Qualifiers			
Fluoride		mg/L	2	.5	2.4	96	6	90-110		_		
MATRIX SPIKE & N	ATRIX SPIKE DUF	PLICATE: 2438	442		2438443							
			MS	MSD								
		60307333007	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Paramete	r Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Fluoride	mg/L	0.40	2.5	2.5	2.9	2.9	99	99	80-120	0	15	
MATRIX SPIKE SA	MPLE:	2438444										
			60307	291005	Spike	MS		MS	% Rec	;		
Parar	neter	Units	Re	esult	Conc.	Result	%	Rec	Limits		Qualif	iers
Fluoride		mg/L		0.24	2.5		2.8	102	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.



# QUALIFIERS

Project: TEC SI CCR Pace Project No.: 60307292

### 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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.

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



# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:	TEC SI CCR
Pace Project No.:	60307292

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60307292001	MW-8-062519	EPA 200.7	594823	EPA 200.7	594952
60307292002	MW-9-062519	EPA 200.7	594823	EPA 200.7	594952
60307292003	MW-10-062519	EPA 200.7	594823	EPA 200.7	594952
60307292004	MW-7-062519	EPA 200.7	594823	EPA 200.7	594952
60307292001	MW-8-062519	EPA 200.8	594825	EPA 200.8	594953
60307292002	MW-9-062519	EPA 200.8	594825	EPA 200.8	594953
60307292003	MW-10-062519	EPA 200.8	594825	EPA 200.8	594953
60307292004	MW-7-062519	EPA 200.8	594825	EPA 200.8	594953
60307292001	MW-8-062519	EPA 245.1	594115	EPA 245.1	594129
60307292002	MW-9-062519	EPA 245.1	594115	EPA 245.1	594129
60307292003	MW-10-062519	EPA 245.1	594115	EPA 245.1	594129
60307292004	MW-7-062519	EPA 245.1	594115	EPA 245.1	594129
60307292001	MW-8-062519	EPA 300.0	595185		
60307292002	MW-9-062519	EPA 300.0	595185		
60307292003	MW-10-062519	EPA 300.0	595185		
60307292004	MW-7-062519	EPA 300.0	595185		

Pace Analytical Sample Condition U	pon Receipt	WO#:60307292
Client Name: Westar Energy		
Sourier: FedEx 🗆 UPS 🗆 VIA 🕅 Clay 🗆 F		Pace 🗆 Xroads 🗆 Client 🗆 Other 🗆
Fracking #: Pac	e Shipping Label Usec	i? Yes □ No □
Custody Seal on Cooler/Box Present: 🔫 🖉 🛛 🕅	Seals intact. Yes	- Notes
Packing Material: Bubble Wrap  Bubble Bags	] Foam 🗆	
Thermometer Used: <b>T-246</b> Type of	Ice: Aver Blue Nor	Date and initials of person
Cooler Temperature (°C): As-read <u>2</u> Corr. Fact	or <u>-1.0</u> Correct	ted <u>15</u> examining contents:
emperature should be above freezing to 6°C	1	poplettig
Chain of Custody present:	Yes No N/A	
Chain of Custody relinguished	Yes DNO DN/A	
Samples arrived within holding time:	Yes No N/A	
Short Hold Time analyses (<72hr):	OYes INO ON/A	
Rush Turn Around Time requested:		
Sufficient volume:	Yes No N/A	
Correct containers used:		
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: $\mathcal{WT}$	TYes No DN/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 N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Lead acetate strip turns dark? (Record only)	□Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	
Trip Blank present:	IYes INO MIA	
Headspace in VOA vials ( >6mm):	TYes No NIA	
Samples from USDA Regulated Area: State:		
Additional labels attached to 5035A / TX1005 vials in the field	d? OYes ONO DINA	
Client Notification/ Resolution: Copy COC	to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/ Comments/ Resolution: Analyses on COC are inaccu HMW 7/1/19	Time: rate due to an IT glitc	h in our bottle order system. Please see attached COC

Project Manager Review:

Date:

Pace Analytical 8

# CHAIN-OF-CUSTODY / Analytical Request Document

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

Sectio		Section B Required Project Information:	Section C Invoice Information:	Page: of	
Compa		Report To: Drandon Griffin-	Attention: Jared Morrison		
Addres	<ul> <li>818 Kansas Ave</li> </ul>	Copy To: Jared Morrison, Heath Hornya	Company Name: WESTAR ENERGY	REGULATORY AGENCY	
	Topeka, KS 66612		Address: SEE SECTION A	I NPDES ☐ GROUND WATER ☐ DRINKING V	WATER
Email	2: thrandom:ligitfin@westarenergy.com	Purchase Order No.: 10TEC-0000007956	Pace Quote Reference:	L UST L RCRA	
Phone:	(785) 575-8135 Fax:	Project Name: TEC SI CCR	Pace Project Heather Wilson, 913-563-1407	Site Location KC	
Reque	ted Due Date/TAT: 7 DAY	Project Number:	Pace Profile # 9656, 1	STATE:	
			Requested	Analysis Filtered (YIN)	
	Section D Valld Matrix Cc	odes 🖻 🖗 COLLECTED	Preservatives		
	DRINKING WATER WATER WATER PRODUC	DW WT WWT COMPOSITE ENDIGRAB	cnuλ 3 8 <sub>**</sub> 3 8 <sub>*</sub> 3 8 <sub>*</sub> 4  5 5 10 5 10 5 10 5 10 5 10 5 10 5 10 5	(N/X) Ə	
# W	SAMPLE ID WE (A-Z, 0-9 / -) OTHER Sample IDS MUST BE UNIQUE TISSUE	성 홍 준 요 지RIX CODE (se	меце теме ет с ог соителиенся б6, 1 с 500 2504 2504 64hanol 64hanol 2503 652,0 2504 64hanol 64hanol 64hanol 70, 7 Total Meta 70, 7 Total Meta	Sesidual Chlorin	260
311		S & DATE TIME DATE TIME A h A A A			1 001 LAU 1.D.
- 0	1112-8-0028-0	NT C 06/25 120			002
N	Milly 10 - 01 7510	116 12/25 1410	XXX		003
4	MJ-7-062519	W 6 05/25 1620			100
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9					
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σ					
10					
12					
	ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION DAT	TE TIME ACCEPTED BY / AFFILIATION	DATE TIME SAMPLE CONDITIO	lons
200.7	Total Metals*: B, Ca,Ba, Be, Cr, Pb, Li	El: Freds: Cksan Ob	27 835 Vartionin Manifip	a Ce 10/27/19 835 1,3 V N	>-<
200.8	Total Metals**: Sb, As, Cd, Co, Mo, Se, Tl				-
	P				
	ane	SAMPLER NAME AND SIG	NATURE	sealedd Sealedd N/) S'e C N/Y/N	) Intact
	20 of	PRINT Name of SAM	APLER: E.I. Freder CKS dr	Temp Ir Ice (Y)	səlqmeğ
	21	SIGNATURE of SAN	APLER: Y/ Ove   (MM/DD/YY)	0000011111000	s

F-ALL-Q-020rev 08, 12-Oct-2007

"Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.



# 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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Sectio Require	n A ad Client Information:	Section B Required Pr	roject	t Inforr	mation:					Sect	tion C	; ormati	ion <sup>.</sup>															Page:		of		
Compar	IV: WESTAR ENERGY	Report To:	Brar	ndon	Griffin					Atten	tion:	J	Jared	Mor	rriso	n					٦						-					
Address	818 Kansas Ave	Copy To:	Jare	d Mc	orrison, H	eath Horr	nya			Com	bany N	lame	: WI	EST	AR	R ENERGY REGULATORY AGENC						Y										
	Topeka, KS 66612									Addr	ess:		SE	ΕS	ECT	TION	A					<b>V</b> N	PDES	3 Г		ROL	JND	WAT	ER 🗆		WATER	_
Email T	o: brandon.l.griffin@westarenergy.com	Purchase O	order N	No.:	10TEC-C	0000079	56			Pace	Quote											Πι	IST	Г	F	RCRA	4			OTHER		
Phone:	(785) 575-8135 Fax:	Project Nam	ne:	TEC	SI CCR					Pace	ence: Project	F	leath	er V	Vilso	on, 9′	13-56	63-1	407			Site	Locat	ion	-				777	777		
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	Section D Valid Matrix C	odes	(t)						1								<b>₽</b> z	1	T						Ì	Í	Τ	$\mathbb{V}$				
	Required Client Information <u>MATRIX</u> DRINKING WATER	CODE DW	s to let	OMP	<b> -</b>	COLL	ECTED		_			P	Preser	vati	ves		*		_							_		4				$\square$
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		OL WP	(see v	=GR/					COLL	SS							t (	als*	als*	Cury								le (Y	I			
	(A-Z, 0-9 / ,-) OTHER	AR OT	Щ	0					o AT	INEF	5						Tes	Met	Met	Mer	Ð							lorir	I			
	Sample IDs MUST BE UNIQUE	TS	COL	ТҮРЕ					TEMF	NTA	erve				3	0	sis	otal	otal	otal	loric							al Cr	I			
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ITE			MA <sup>-</sup>	SAM	DATE	TIME	DATE	TIME	SAN	0#	Ung	H <sub>2</sub> S	Т Н П	Na(	$Na_2$	Oth Oth	TA	200	200	245	300							Res	Pace	Project N	lo./ Lab I.	D.
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	ADDITIONAL COMMENTS		REL	INQUI	ISHED BY /	AFFILIATIO	ON	DATE	:	-	ГІМЕ				ACC	ЕРТЕ	DBY	( / AF	FILIA	TION			DATE		TI	ME			SAMP		ONS	
200.7 T	otal Metals*: Ba, Be, Cr, Pb, Li																															
200.8 T	otal Metals**: Sb, As, Cd, Co, Mo, Se, Tl																															
L		I				SAMPLE	R NAME A	ND SIGNA	TURI	E																		ပ္	u (	N)	ntact	
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ATTACHMENT 1-3

October 2019 Sampling Event Laboratory Analytical Report



Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

October 22, 2019

Adam Kneeling Haley & Aldrich, Inc. 400 E. Van Buren St Suite 545 Phoenix, AZ 85004

RE: Project: TEC BASA CCR Pace Project No.: 60317942

Dear Adam Kneeling:

Enclosed are the analytical results for sample(s) received by the laboratory on October 11, 2019. 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,

Astantos m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: Bob Beck, Kansas City Power & Light Company HEATH HORYNA, WESTAR ENERGY Andrew Hare, KCP&L and Westar, Evergy Companies Jake Humphrey, KCP&L and Westar, Evergy Companies JARED MORRISON, KCP&L and Westar, Evergy Companies Melissa Michels, KCP&L and Westar, Evergy Companies Danielle Zinmaster, Haley & Aldrich





# CERTIFICATIONS

Project: TEC BASA CCR

Pace Project No.: 60317942

### Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219 Missouri Inorganic Drinking Water Certification #: 10090 Arkansas Drinking Water Arkansas Certification #: 19-016-0 Arkansas Drinking Water Illinois Certification #: 004455 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055 Nevada Certification #: KS000212020-2 Oklahoma Certification #: 9205/9935 Florida: Cert E871149 SEKS WET Texas Certification #: T104704407-19-12 Utah Certification #: KS000212018-8 Illinois Certification #: 004592 Kansas Field Laboratory Accreditation: # E-92587 Missouri SEKS Micro Certification: 10070



# SAMPLE SUMMARY

Project: TEC BASA CCR

Pace Project No.: 60317942

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60317942001	MW-10	Water	10/09/19 14:51	10/11/19 15:41
60317942002	MW-9	Water	10/10/19 08:45	10/11/19 15:41
60317942003	MW-8	Water	10/10/19 11:44	10/11/19 15:41
60317942004	MW-7	Water	10/10/19 14:23	10/11/19 15:41



# SAMPLE ANALYTE COUNT

Project: TEC BASA CCR Pace Project No.: 60317942

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60317942001	MW-10	EPA 200.7	LRS	4	PASI-K
		EPA 200.8	EMR	4	PASI-K
		SM 2540C	LDB	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60317942002	MW-9	EPA 200.7	LRS	4	PASI-K
		EPA 200.8	EMR	4	PASI-K
		SM 2540C	LDB	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60317942003	MW-8	EPA 200.7	LRS	4	PASI-K
		EPA 200.8	EMR	4	PASI-K
		SM 2540C	LDB	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60317942004	MW-7	EPA 200.7	LRS	4	PASI-K
		EPA 200.8	EMR	4	PASI-K
		SM 2540C	LDB	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	MGS	3	PASI-K



Project: TEC BASA CCR

Pace Project No.: 60317942

### Method: EPA 200.7

Description:200.7 Metals, TotalClient:Evergy Kansas Central, Inc.Date:October 22, 2019

### 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.

### QC Batch: 615723

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60317942001

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

- MS (Lab ID: 2513544)
  - Calcium
- MSD (Lab ID: 2513545)
  - Calcium

### Additional Comments:


Project: TEC BASA CCR

Pace Project No.: 60317942

#### Method: EPA 200.8

Description:200.8 MET ICPMSClient:Evergy Kansas Central, Inc.Date:October 22, 2019

#### 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.

#### Additional Comments:



Project: TEC BASA CCR

Pace Project No.: 60317942

#### Method: SM 2540C

Description:2540C Total Dissolved SolidsClient:Evergy Kansas Central, Inc.Date:October 22, 2019

## **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.

#### QC Batch: 616608

D6: The precision between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 2516900)
  - Total Dissolved Solids

## Additional Comments:



Project: TEC BASA CCR

Pace Project No.: 60317942

#### Method: SM 4500-H+B

Description:4500H+ pH, ElectrometricClient:Evergy Kansas Central, Inc.Date:October 22, 2019

#### **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.

- MW-10 (Lab ID: 60317942001)
- MW-7 (Lab ID: 60317942004)
- MW-8 (Lab ID: 60317942003)
- MW-9 (Lab ID: 60317942002)

## 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: TEC BASA CCR

Pace Project No.: 60317942

## Method: EPA 300.0

Description:300.0 IC Anions 28 DaysClient:Evergy Kansas Central, Inc.Date:October 22, 2019

## **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.



# Project: TEC BASA CCR

Pace Project No.: 60317942

Sample: MW-10	Lab ID: 60317942001		Collected: 10/09/	Collected: 10/09/19 14:51		/11/19 15:41 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 20	0.7 Preparation Me	thod: EF	PA 200.7			
Barium, Total Recoverable	0.36	mg/L	0.0050	1	10/15/19 09:00	10/17/19 16:19	7440-39-3	
Boron, Total Recoverable	0.22	mg/L	0.10	1	10/15/19 09:00	10/17/19 16:19	7440-42-8	
Calcium, Total Recoverable	182	mg/L	0.20	1	10/15/19 09:00	10/17/19 16:19	7440-70-2	M1
Lithium	<0.010	mg/L	0.010	1	10/15/19 09:00	10/18/19 13:53	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 20	0.8 Preparation Me	thod: EF	PA 200.8			
Arsenic, Total Recoverable	0.021	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:12	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	10/15/19 09:00	10/16/19 10:12	7440-43-9	
Cobalt, Total Recoverable	0.0020	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:12	7440-48-4	
Molybdenum, Total Recoverable	0.0041	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:12	7439-98-7	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	0C					
Total Dissolved Solids	1260	mg/L	13.3	1		10/16/19 10:14		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
pH at 25 Degrees C	6.9	Std. Units	0.10	1		10/17/19 11:47		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 30	0.0					
Chloride	222	mg/L	20.0	20		10/21/19 22:18	16887-00-6	
Fluoride	0.41	mg/L	0.20	1		10/21/19 21:46	16984-48-8	
Sulfate	98.6	mg/L	10.0	10		10/21/19 22:02	14808-79-8	



# Project: TEC BASA CCR

Pace Project No.: 60317942

Sample: MW-9	Lab ID: 60317942002		Collected: 10/10/1	9 08:4	5 Received: 10	/11/19 15:41 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 20	0.7 Preparation Met	hod: El	PA 200.7			
Barium, Total Recoverable	0.85	mg/L	0.0050	1	10/15/19 09:00	10/17/19 16:26	7440-39-3	
Boron, Total Recoverable	0.11	mg/L	0.10	1	10/15/19 09:00	10/17/19 16:26	7440-42-8	
Calcium, Total Recoverable	203	mg/L	0.20	1	10/15/19 09:00	10/17/19 16:26	7440-70-2	
Lithium	<0.010	mg/L	0.010	1	10/15/19 09:00	10/18/19 14:04	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 20	0.8 Preparation Met	hod: El	PA 200.8			
Arsenic, Total Recoverable	0.051	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:17	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	10/15/19 09:00	10/16/19 10:17	7440-43-9	
Cobalt, Total Recoverable	0.016	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:17	7440-48-4	
Molybdenum, Total Recoverable	0.0085	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:17	7439-98-7	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	IOC					
Total Dissolved Solids	1110	mg/L	13.3	1		10/17/19 16:59		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	)0-H+B					
pH at 25 Degrees C	7.8	Std. Units	0.10	1		10/17/19 11:48		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 30	0.0					
Chloride	206	mg/L	50.0	50		10/17/19 01:22	16887-00-6	
Fluoride	0.32	mg/L	0.20	1		10/17/19 01:05	16984-48-8	
Sulfate	19.3	mg/L	1.0	1		10/17/19 01:05	14808-79-8	



# Project: TEC BASA CCR

Pace Project No.: 60317942

Sample: MW-8	Lab ID: 60317942003		Collected: 10/10/1	9 11:44	Received: 10	/11/19 15:41 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 20	0.7 Preparation Met	hod: EF	PA 200.7			
Barium, Total Recoverable	0.064	mg/L	0.0050	1	10/15/19 09:00	10/17/19 16:29	7440-39-3	
Boron, Total Recoverable	1.3	mg/L	0.10	1	10/15/19 09:00	10/17/19 16:29	7440-42-8	
Calcium, Total Recoverable	205	mg/L	0.20	1	10/15/19 09:00	10/17/19 16:29	7440-70-2	
Lithium	0.017	mg/L	0.010	1	10/15/19 09:00	10/18/19 14:06	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 20	0.8 Preparation Met	hod: Ef	PA 200.8			
Arsenic, Total Recoverable	0.0024	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:18	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	10/15/19 09:00	10/16/19 10:18	7440-43-9	
Cobalt, Total Recoverable	0.0014	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:18	7440-48-4	
Molybdenum, Total Recoverable	0.039	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:18	7439-98-7	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	ł0C					
Total Dissolved Solids	1380	mg/L	13.3	1		10/17/19 16:59		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	)0-H+B					
pH at 25 Degrees C	7.2	Std. Units	0.10	1		10/17/19 11:50		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 30	0.0					
Chloride	216	mg/L	50.0	50		10/17/19 01:55	16887-00-6	
Fluoride	0.25	mg/L	0.20	1		10/17/19 01:38	16984-48-8	
Sulfate	648	mg/L	50.0	50		10/17/19 01:55	14808-79-8	



# Project: TEC BASA CCR

Pace Project No.: 60317942

Sample: MW-7	Lab ID: 60317942004		Collected: 10/10/1	9 14:23	3 Received: 10	/11/19 15:41 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: El	PA 200.7			
Barium, Total Recoverable	0.053	mg/L	0.0050	1	10/15/19 09:00	10/17/19 16:31	7440-39-3	
Boron, Total Recoverable	0.66	mg/L	0.10	1	10/15/19 09:00	10/17/19 16:31	7440-42-8	
Calcium, Total Recoverable	129	mg/L	0.20	1	10/15/19 09:00	10/17/19 16:31	7440-70-2	
Lithium	0.017	mg/L	0.010	1	10/15/19 09:00	10/18/19 14:09	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: El	PA 200.8			
Arsenic, Total Recoverable	0.0016	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:20	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	10/15/19 09:00	10/16/19 10:20	7440-43-9	
Cobalt, Total Recoverable	<0.0010	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:20	7440-48-4	
Molybdenum, Total Recoverable	0.011	mg/L	0.0010	1	10/15/19 09:00	10/16/19 10:20	7439-98-7	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	0C					
Total Dissolved Solids	1000	mg/L	13.3	1		10/17/19 16:59		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
pH at 25 Degrees C	7.2	Std. Units	0.10	1		10/17/19 11:52		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	172	mg/L	50.0	50		10/17/19 02:29	16887-00-6	
Fluoride	0.34	mg/L	0.20	1		10/17/19 02:12	16984-48-8	
Sulfate	375	mg/L	50.0	50		10/17/19 02:29	14808-79-8	



EPA 200.7

Project: TEC BASA CCR

Pace Project No.: 60317942

QC Batch:	615723	Analysis Method:
QC Batch Method:	EPA 200.7	Analysis Descript

EPA 200.7 Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60317942001, 60317942002, 60317942003, 60317942004

METHOD BLANK: 2513542 Matrix: Water Associated Lab Samples: 60317942001, 60317942002, 60317942003, 60317942004

Parameter	Units	Blank	Reporting	Analyzed	Qualifiers
	01110				
Barium	mg/L	<0.0050	0.0050	10/17/19 16:14	
Bololi	mg/L	<0.10	0.10	10/17/19 10:14	
Litteium	mg/L	<0.20	0.20	10/17/19 10:14	
Lithium	mg/L	<0.010	0.010	10/18/19 13:47	

#### LABORATORY CONTROL SAMPLE: 2513543

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	1	1.0	100	85-115	
Boron	mg/L	1	0.94	94	85-115	
Calcium	mg/L	10	9.9	99	85-115	
Lithium	mg/L	1	0.94	94	85-115	

MATRIX SPIKE & MATRIX SPI	KE DUPI	_ICATE: 2513	2513545									
		60317942001	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Barium	mg/L	0.36	1	1	1.4	1.3	100	97	70-130	2	20	
Boron	mg/L	0.22	1	1	1.2	1.2	98	96	70-130	2	20	
Calcium	mg/L	182	10	10	187	186	53	44	70-130	0	20	M1
Lithium	mg/L	<0.010	1	1	0.96	0.94	95	93	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.

# **REPORT OF LABORATORY ANALYSIS**

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Project: TEC BASA CCR

Pace Project No.: 60317942

QC Batch:	615717	Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET
Associated Lab Sam	ples: 60317942001, 6	0317942002, 60317942003, 60317942004	4

 METHOD BLANK:
 2513526
 Matrix:
 Water

 Associated Lab Samples:
 60317942001, 60317942002, 60317942003, 60317942004
 60317942004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	<0.0010	0.0010	10/16/19 10:09	
Cadmium	mg/L	<0.00050	0.00050	10/16/19 10:09	
Cobalt	mg/L	<0.0010	0.0010	10/16/19 10:09	
Molybdenum	mg/L	<0.0010	0.0010	10/16/19 10:09	

#### LABORATORY CONTROL SAMPLE: 2513527

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	0.04	0.039	98	85-115	
Cadmium	mg/L	0.04	0.040	100	85-115	
Cobalt	mg/L	0.04	0.041	102	85-115	
Molybdenum	mg/L	0.04	0.040	100	85-115	

MATRIX SPIKE & MATRIX SPI		2513529										
		60317942001	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Arsenic	mg/L	0.021	0.04	0.04	0.059	0.059	95	95	70-130	0	20	
Cadmium	mg/L	<0.00050	0.04	0.04	0.037	0.037	93	94	70-130	1	20	
Cobalt	mg/L	0.0020	0.04	0.04	0.041	0.041	97	98	70-130	2	20	
Molybdenum	mg/L	0.0041	0.04	0.04	0.046	0.046	104	104	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: TEC BASA CCR						
Pace Project No.: 60317942						
QC Batch: 616101		Analysis Me	ethod: S	SM 2540C		
QC Batch Method: SM 2540C		Analysis Description:		2540C Total Dis		
Associated Lab Samples: 60317942	2001					
METHOD BLANK: 2514937		Matrix	: Water			
Associated Lab Samples: 60317942	2001					
Parameter	Units	Blank Result	Reporting Limit	Analyze	d Quali	fiers
Total Dissolved Solids	mg/L	<5.0	5.0	0 10/16/19 10	):12	
LABORATORY CONTROL SAMPLE:	2514938					
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1070	107	80-120	
SAMPLE DUPLICATE: 2514939						
		60317792003	Dup		Max	
Parameter	Units	Result	Result		RPD	Qualifiers
Total Dissolved Solids	mg/L	93.5	93.0	)	1	10
SAMPLE DUPLICATE: 2514940						
-		60317867005	Dup		Max	0 11/1
Parameter	Units	Result	Result			Qualifiers
Total Dissolved Solids	mg/L	1740	1760	0	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:	TEC BASA CCR							
Pace Project No.:	60317942							
QC Batch:	616608		Analysis M	ethod:	SM 2540C			
QC Batch Method:	SM 2540C		Analysis De	escription:	2540C Total Di	ssolved Solids		
Associated Lab San	nples: 60317942	2002, 6031794200	3, 60317942004					
METHOD BLANK:	2516897		Matrix	: Water				
Associated Lab San	nples: 60317942	002, 6031794200	3, 60317942004					
			Blank	Reporting				
Paran	neter	Units	Result	Limit	Analyze	ed Quali	fiers	
Total Dissolved Soli	ds	mg/L	<5.0	) 5.	0 10/17/19 1	6:58		
LABORATORY CON	NTROL SAMPLE:	2516898						
Paran	neter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers	
Total Dissolved Soli	ds	mg/L	1000	993	99	80-120		
SAMPLE DUPLICA	TE: 2516899							
			60317759001	Dup		Max		
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers	
Total Dissolved Soli	ds	mg/L	53.5	5 53.	5	0	10	
SAMPLE DUPLICA	TE: 2516900							
			60318009001	Dup		Max		
Paran	neter	Units	Result	Result	RPD	RPD	Qualifiers	
Total Dissolved Soli	ds	mg/L	1590	) 122	0	26	10 D6	

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:	TEC BASA CCR							
Pace Project No.:	60317942							
QC Batch:	616086		Analysis Meth	od:	SM 4500-H+B			
QC Batch Method:	SM 4500-H+B		Analysis Desc	ription:	4500H+B pH			
Associated Lab Samples: 60317942001, 60317942002, 60317942003, 60317942004								
SAMPLE DUPLICA	TE: 2514885							
Para	neter	Units	60317530002 Result	Dup Result	RPD	Max RPD	Qualifiers	

pH at 25 Degrees C	Std. Units	7.3	7.3	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:	TEC BASA CCR								
Pace Project No.:	60317942								
QC Batch:	615749		Analysis	Method:	EF	PA 300.0			
QC Batch Method:	EPA 300.0		Analysis	Description:	30	0.0 IC Anion	S		
Associated Lab Sar	nples: 60317942	002, 6031794200	3, 6031794200	4					
METHOD BLANK:	2513647		Mat	trix: Water					
Associated Lab Sar	mples: 60317942	001, 6031794200	2, 6031794200	3, 603179420	004				
			Blank	Report	ing				
Parar	neter	Units	Result	Limi	t	Analyze	d Qua	alifiers	
Chloride		mg/L	<1	1.0	1.0	10/16/19 1	5:48		
Fluoride		mg/L	<0.	20	0.20	10/16/19 1	5:48		
Sulfate		mg/L	<1	1.0	1.0	10/16/19 1	5:48		
LABORATORY CO	NTROL SAMPLE:	2513648							
			Spike	LCS		LCS	% Rec		
Parar	neter	Units	Conc.	Result	0	% Rec	Limits	Qualifiers	
Chloride		mg/L	5	4.6	5 	92	90-11	0	-
Fluoride		mg/L	2.5	2.4	ļ	95	90-11	D	
Sulfate		mg/L	5	4.8	3	96	90-11	0	
MATRIX SPIKE & N	ATRIX SPIKE DUP	LICATE: 25136	649 MS M	251 SD	3650				

Parameter	Units	60317619001 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	220	100	100	325	324	105	104	80-120	0	15	
Fluoride	mg/L	ND	12.5	12.5	11.1	11.3	86	87	80-120	2	15	
Sulfate	mg/L	67.6	25	25	90.6	90.8	92	93	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.



Project:	TEC BASA CCR											
Pace Project No.:	60317942											
QC Batch:	617263		Anal	ysis Metho	d: E	PA 300.0						
QC Batch Method	: EPA 300.0		Anal	ysis Descri	ption: 3	800.0 IC Ani	ons					
Associated Lab Sa	amples: 60317942	001										
METHOD BLANK	: 2519017			Matrix: W	ater							
Associated Lab Sa	amples: 60317942	001										
			Bla	nk	Reporting							
Para	ameter	Units	Res	ult	Limit	Analy	zed	Qualifier	S			
Chloride		mg/L		<1.0	1.(	0 10/21/19	9 10:52					
Fluoride		mg/L		<0.20	0.20	0 10/21/19	9 10:52					
Sulfate		mg/L		<1.0	1.(	0 10/21/19	9 10:52					
LABORATORY CO	ONTROL SAMPLE:	2519018										
			Spike	LC	S	LCS	% Re	ec				
Para	ameter	Units	Conc.	Res	sult	% Rec	Limi	ts (	Qualifiers			
Chloride		mg/L		5	4.6	92	2 9	90-110		_		
Fluoride		mg/L	2	.5	2.3	94	1 9	90-110				
Sulfate		mg/L		5	4.8	95	5 9	90-110				
MATRIX SPIKE &	MATRIX SPIKE DUF	LICATE: 2519	019		2519020							
			MS	MSD								
Paramet	ter Units	60317142007 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride		831	100	100	97.5	97.8	89	90	80-120	0	15	
Fluoride	mg/L	. ND	50	50	49.5	49.8	99	100	80-120	0	15	
Sulfate	mg/L	. 113	100	100	212	208	99	95	80-120	2	15	
MATRIX SPIKE S	AMPI F:	2519021										
			60318	3577004	Spike	MS		MS	% Rec			
Para	ameter	Units	Re	esult	Conc.	Result	%	Rec	Limits		Qualif	iers
Chloride		mg/L		641	250		926	114	80	-120		
Fluoride		mg/L		23.0	125		154	105	80	-120		
Sulfate		mg/L		59.4	250		308	99	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.

# **REPORT OF LABORATORY ANALYSIS**

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# QUALIFIERS

Project: TEC BASA CCR

Pace Project No.: 60317942

## 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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.

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

#### ANALYTE QUALIFIERS

- 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:	TEC BASA CCR
Pace Project No.:	60317942

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60317942001	MW-10	EPA 200.7	615723	EPA 200.7	615961
60317942002	MW-9	EPA 200.7	615723	EPA 200.7	615961
60317942003	MW-8	EPA 200.7	615723	EPA 200.7	615961
60317942004	MW-7	EPA 200.7	615723	EPA 200.7	615961
60317942001	MW-10	EPA 200.8	615717	EPA 200.8	615958
60317942002	MW-9	EPA 200.8	615717	EPA 200.8	615958
60317942003	MW-8	EPA 200.8	615717	EPA 200.8	615958
60317942004	MW-7	EPA 200.8	615717	EPA 200.8	615958
60317942001	MW-10	SM 2540C	616101		
60317942002	MW-9	SM 2540C	616608		
60317942003	MW-8	SM 2540C	616608		
60317942004	MW-7	SM 2540C	616608		
60317942001	MW-10	SM 4500-H+B	616086		
60317942002	MW-9	SM 4500-H+B	616086		
60317942003	MW-8	SM 4500-H+B	616086		
60317942004	MW-7	SM 4500-H+B	616086		
60317942001	MW-10	EPA 300.0	617263		
60317942002	MW-9	EPA 300.0	615749		
60317942003	MW-8	EPA 300.0	615749		
60317942004	MW-7	EPA 300.0	615749		

Pace Analytical <sup>®</sup> Sample Condition L	Jpon Receipt	WO#:60317942
Client Name: Verser		1
Courier: FedEx 🗆 UPS 🗆 VIA 🖾 Clay 🗆	PEX 🗆 ECI 🗆	Pace 🖉 Xroads 🗆 Client 🗆 Other 🗔
Tracking #: Pac	ce Shipping Label Used	1? Yes □ No Ø
Custody Seal on Cooler/Box Present: Yes 🖉 No 🗆	Seals intact: Yes	No 🗆
Packing Material:     Bubble Wrap □     Bubble Bags       Thermometer Used:	I Foam □ fice: Wret Blue No	None  Other
Cooler Temperature (°C): As-read 3, 7 Corr. Fact	tor <u>0,</u> Correct	Date and initials of person examining contents: $16/11/19$
Chain of Custody present:	Yes 🗆 No 🗇 N/A	
Chain of Custody relinquished:		
Samples arrived within holding time:		
Short Hold Time analyses (<72hr):	Yes No ON/A	
Rush Turn Around Time requested:	□Yes ØNo □N/A	
Sufficient volume:		
Correct containers used:		
Pace containers used:	Yes No N/A	
Containers intact:	Yes No N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	Yes No DN/A	
Filtered volume received for dissolved tests?	Yes No PN/A	
Sample labels match COC: Date / time / ID / analyses	Yes No N/A	
Samples contain multiple phases? Matrix:		
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 N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
l ead acetate strip turns dark? (Record 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):		
Samples from USDA Regulated Area: State:	DYes DNO DINIA	
Additional labels attached to 5035A / TX1005 vials in the field	? DYes DNo DN/A	
Client Notification/ Resolution: Copy COC to	o Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/	ſime:	
Comments/ Resolution:		
Project Manager Review:	Date	2:

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# CHAIN-OF-CUSTODY / Analytical Request Document

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

Sectio: Require	n A d Client Information:	Section B Required Project Information:	Section C Invoice Information:	Page: / of
Compan	W: WESTAR ENERGY	Report To: Brandon Griffin	Attention: Jared Morrison	
Address	818 Kansas Ave	Copy To: Jared Morrison, Heath Hornya	Company Name: WESTAR ENERGY	REGULATORY AGENCY
	Topeka, KS 66612		Address: SEE SECTION A	P NPDES C GROUND WATER C DRINKING WATER
Email Tc	brandon.I.griffin@westarenergy.com	Purchase Order No.: 10TEC-0000007956	Pace Quote Reference:	L UST L RCRA C OTHER
Phone:	(785) 575-8135 Fax	Project Name: TEC BASA CCR	Pace Project Heather Wilson, 913-563-1407 Manager:	Site Location
Reques	ted Due Date/TAT: 7 DAY	Project Number:	Pace Profile #: 9656, 1	STATE: KS
			Requested	Analysis Filtered (YIN)
	Section D Required Client Information MATRIX	odes of COLLECTED	Preservatives	
	DRINKING WATER WATER WASTE WATER PRODUCT SOLLSOLD OIL	DW WT WT P W COMPOSITE COM	312 **	(N/A) e
# W3	SAMPLE ID WIFE (A-Z, 0-9 / _) OTHER Sample IDs MUST BE UNIQUE TISSUE	중 준 단 전 e) = GODE (e imple type (G=	0: CI' E 2O4 40C LD2 0: S Lotsi Mets 0: S Lotsi Mets 6(µsuo) 3:2 <sup>S</sup> C <sup>3</sup> 90H 10 <sup>3</sup> 20 10 10 10 10 10 10 10 10 10 10 10 10 10	000 H+B
u -	Min-IN	≥ Ø DATE TIME DATE TIME	8/         H         H         X         30           Y         0         H         H         X         X	Image: Constraint of the second sec
- 2	MU1-9	NA A 10/10/10/10/0845		
m	RIN-8	WT (S)   W/1/1/19/11/44	32 II XXXX	X 003
4	MW-7	WT 65 16/10/19/19/23	32 II XXXX	A A A A A A A A A A A A A A A A A A A
c)				
9				
2				
~ ~				
- -				
7				
12	ADDITIONAL COMMENTS			DATE TIME SAMPLE CONDITIONS
200.7 76	tal Metals*: B, Ca,Ba, Li	W Willer / War / 174 D	MAN A AL TRO	V V X 10.2 1171 201.12
200.8 Tc	otal Metals**: As, Cd, Co, Mo		and the same	
Pa		SAMPLER NAME AND SIGNA	URE	
ge 24		PRINT Name of SAMPL	ER: Micha Miller Kilmore	(MYY)
↓ of 24		SIGNATURE of SAMPL	ER: WW C MMM/DD/Y);	(0/(0/(9 Custo Coo

F-ALL-Q-020rev\_08, 12-Oct-2007

"Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any involces not paid within 30 days.



Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

November 08, 2019

Adam Kneeling Haley & Aldrich, Inc. 400 E. Van Buren St Suite 545 Phoenix, AZ 85004

RE: Project: TEC BASA CCR Pace Project No.: 60317943

Dear Adam Kneeling:

Enclosed are the analytical results for sample(s) received by the laboratory on October 11, 2019. 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,

Astantos m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: Bob Beck, Kansas City Power & Light Company HEATH HORYNA, WESTAR ENERGY Andrew Hare, KCP&L and Westar, Evergy Companies Laura Hines, KCP&L & Westar, Evergy Companies Jake Humphrey, KCP&L and Westar, Evergy Companies JARED MORRISON, KCP&L and Westar, Evergy Companies Melissa Michels, KCP&L & Westar, Evergy Companies Danielle Zinmaster, Haley & Aldrich



# **REPORT OF LABORATORY ANALYSIS**

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Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

## CERTIFICATIONS

Project: TEC BASA CCR Pace Project No.: 60317943

#### **Pennsylvania Certification IDs**

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L



# SAMPLE SUMMARY

Project: TEC BASA CCR

Pace Project No.: 60317943

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60317943001	MW-10	Water	10/09/19 14:51	10/11/19 15:41
60317943002	MW-9	Water	10/10/19 08:45	10/11/19 15:41
60317943003	MW-8	Water	10/10/19 11:44	10/11/19 15:41
60317943004	MW-7	Water	10/10/19 14:23	10/11/19 15:41



# SAMPLE ANALYTE COUNT

Project: TEC BASA CCR Pace Project No.: 60317943

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60317943001		EPA 903.1		1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60317943002	MW-9	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60317943003	MW-8	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60317943004	MW-7	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA



Project: TEC BASA CCR

Pace Project No.: 60317943

#### Method: EPA 903.1

Description:903.1 Radium 226Client:Evergy Kansas Central, Inc.Date:November 08, 2019

#### **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.

Additional Comments:



Project: TEC BASA CCR

Pace Project No.: 60317943

#### Method: EPA 904.0

Description:904.0 Radium 228Client:Evergy Kansas Central, Inc.Date:November 08, 2019

#### **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.

Additional Comments:



Project: TEC BASA CCR

Pace Project No.: 60317943

#### Method: Total Radium Calculation

Description:Total Radium 228+226Client:Evergy Kansas Central, Inc.Date:November 08, 2019

#### **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.

#### Additional Comments:

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



Project: TEC BASA CCR

Pace Project No.: 60317943

Sample: MW-10 PWS:	Lab ID: 6031794 Site ID:	<b>3001</b> Collected: 10/09/19 14:51 Sample Type:	Received:	10/11/19 15:41 I	Matrix: Water	
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.794 ± 0.502 (0.567) C:NA T:87%	pCi/L	11/04/19 13:49	13982-63-3	
Radium-228	EPA 904.0	1.85 ± 0.643 (0.935) C:68% T:79%	pCi/L	11/01/19 12:34	15262-20-1	
Total Radium	Total Radium Calculation	2.64 ± 1.15 (1.50)	pCi/L	11/05/19 14:23	7440-14-4	



Project: TEC BASA CCR

Pace Project No.: 60317943

Sample: MW-9	Lab ID: 603179	<b>43002</b> Collected: 10/10/19 08:45	Received:	10/11/19 15:41 I	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.696 ± 0.489 (0.236) C:NA T:98%	pCi/L	11/04/19 13:49	13982-63-3	
Radium-228	EPA 904.0	0.972 ± 0.523 (0.929) C:69% T:84%	pCi/L	11/01/19 12:34	15262-20-1	
Total Radium	Total Radium Calculation	1.67 ± 1.01 (1.17)	pCi/L	11/05/19 14:23	7440-14-4	



Project: TEC BASA CCR

Pace Project No.: 60317943

Sample: MW-8	Lab ID: 603179	43003 Collected: 10/10/19 11:44	Received:	10/11/19 15:41 I	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.114 ± 0.386 (0.745) C:NA T:94%	pCi/L	11/04/19 13:49	13982-63-3	
Radium-228	EPA 904.0	0.607 ± 0.456 (0.888) C:66% T:74%	pCi/L	11/01/19 12:34	15262-20-1	
Total Radium	Total Radium Calculation	0.721 ± 0.842 (1.63)	pCi/L	11/05/19 14:23	7440-14-4	



Project: TEC BASA CCR

Pace Project No.: 60317943

Sample: MW-7	Lab ID: 603179	<b>43004</b> Collected: 10/10/19 14:23	Received:	10/11/19 15:41	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0567 ± 0.294 (0.610) C:NA T:86%	pCi/L	11/04/19 13:49	13982-63-3	
Radium-228	EPA 904.0	0.346 ± 0.317 (0.641) C:71% T:90%	pCi/L	11/01/19 12:35	15262-20-1	
Total Radium	Total Radium Calculation	0.403 ± 0.611 (1.25)	pCi/L	11/05/19 14:23	7440-14-4	



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project:	TEC BASA CCR						
Pace Project No.:	60317943						
QC Batch:	366697		Analysis Method:	EPA 903.1			
QC Batch Method:	EPA 903.1		Analysis Description:	903.1 Radium-226			
Associated Lab Sar	nples: 60317943	001, 603179430	02, 60317943003, 6031794300	)4			
METHOD BLANK:	1778706		Matrix: Water				
Associated Lab Sar	nples: 60317943	001, 603179430	02, 60317943003, 6031794300	)4			
Parar	neter	Act ±	Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-226		0.0850 ± 0.264	(0.510) C:NA T:94%	pCi/L	11/04/19 13:35		

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:	TEC BASA CCR					
Pace Project No.:	60317943					
QC Batch:	366700	Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228			
Associated Lab Sar	nples: 60317943	001, 60317943002, 60317943003, 603179430	004			
METHOD BLANK:	1778711	Matrix: Water				
Associated Lab Sar	nples: 60317943	001, 60317943002, 60317943003, 603179430	004			
Parar	neter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.283 ± 0.317 (0.662) C:74% T:86%	pCi/L	11/01/19 12:34		

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: TEC BASA CCR

Pace Project No.: 60317943

## 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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-PA Pace Analytical Services - Greensburg



# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:	TEC BASA CCR
Pace Project No.:	60317943

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60317943001	MW-10	EPA 903.1	366697		
60317943002	MW-9	EPA 903.1	366697		
60317943003	MW-8	EPA 903.1	366697		
60317943004	MW-7	EPA 903.1	366697		
60317943001	MW-10	EPA 904.0	366700		
60317943002	MW-9	EPA 904.0	366700		
60317943003	MW-8	EPA 904.0	366700		
60317943004	MW-7	EPA 904.0	366700		
60317943001	MW-10	Total Radium Calculation	369490		
60317943002	MW-9	Total Radium Calculation	369490		
60317943003	MW-8	Total Radium Calculation	369490		
60317943004	MW-7	Total Radium Calculation	369490		

Pace Analytical <sup>®</sup> Sample Condition	Upon Receipt	WO#:60317943
Client Name:       Courier:       FedEx       UPS       VIA       Clay         Tracking #:       Pa         Custody Seal on Cooler/Box Present:       Yes       No       Pa         Packing Material:       Bubble Wrap       Bubble Bags       Thermometer Used:       Yes       Type of	PEX  ECI Ace Shipping Label Used? Seals intact: Yes Foam Foam of Ice: Wet Blue None	Pace Xroads Client Other Yes No No None Other Date and initials of person
Cooler Temperature (°C): As-read 3. Corr. Fac Temperature should be above freezing to 6°C	ctor <u>0,4</u> Correcte	examining contents: 167/11/74
Chain of Custody present:		
Chain of Custody relinquished:	Yes No N/A	
Samples arrived within holding time:	Yes No N/A	
Short Hold Time analyses (<72hr):		
Rush Turn Around Time requested:	□Yes ØNo □N/A	
Sufficient volume:		
Correct containers used:		
Pace containers used:		
Containers intact:		
Uppresented 5025A / TV1005/1006 soils frazen in 49brs?		
Filtered volume received for dissolved tests?		
Sample labels match COC: Date / time / ID / analyses		
Samples contain multiple phases? Matrix: )-( ) 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:	Yes No N/A	ist sample IDs, volumes, lot #'s of preservative and the late/time added.
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):		
Samples from USDA Regulated Area: State:		
Additional labels attached to 5035A / TX1005 vials in the fiel	d? DYes DNo DN/A	
Client Notification/ Resolution: Copy COC	to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date	/Time:	
Comments/ Resolution:		
Project Manager Review:	Date:	· · · · · · · · · · · · · · · · · · ·

F-KS-C-003-Rev.11, February 28, 2018 Page 16 of 21



# CHAIN-OF-CUSTODY / Analytical Request Document

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

	Required	d Client Information:	Required Project Infi	ormation:			Invoice Info	rmation:						Page:	_	of	
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Index         Totals, 15 (B012)         Total, 15 (B012)	Address:	818 Kansas Ave	Copy To: Jared N	Aorrison, Heath H	omya		Company N	lame: WES	STAR ENEF	ζGY		REGULATO	RY AGENC	X		1	
		Topeka, KS 66612					Address:	SEE	SECTION /	-		VPDES	L GROU	IND WATER		RINKING W	ATER
Market Name         Teles         Constrained         State of the constrained         State of t	Email To:	brandon.I.griffin@westarenergy.com	Purchase Order No :	10TEC-000000	7956		Pace Quote Reference:					∏ UST	L RCRA		o L	THER	
Полновида         <	Phone:	(785) 575-8135 Fax	Project Name: TE	EC BASA CCR			Pace Project Manager.	Heather	Wilson, 91.	3-563-12	.07	Site Location	E	777			
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\*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.
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)	Samples were sent	t directly to th	he Subcontract	ting Laboratory.			Stat	e Of Ori	gin: -	ې د کې				Pa	Ce Analytic	۲ ۳
ž	orkorder: 60317943 V	Norkorder N	Vame: TEC BA	VSA CCR			Uwn Own	neede ter Rece	a:	Date:	10/11/	2019	Results R	equested	By: 11/6/201	~
Re	port To		Subcontra	actTo			STREET STREET				Req	uested A	nalysis			
P C O C C C C C C C C C C C C C C C C C	ather Wilson ce Analytical Kansas 38 Loiret Blvd. 1exa, KS 66219 one 1(913)563-1407		Pace 1636 Suite Gree Phon	e Analytical Pittsbi Roseytown Road is 2,3, & 4 insburg, PA 1560 ie (724)850-5600	urgh d				umpe							
					<u> </u>				-226 & Total R	822-muibeA						
		Samila				5 EOI			muibe A					8		
lter	n Sample (D	Type	Date/Time	LabID	Matrix	NH									LAB USE ON	۲.
<del>,</del>	MW-10	PS	10/9/2019 14:51	60317943001	Water	2			×	×			-		1321	
~	6-MW	PS	10/10/2019 08:4	5 60317943002	Water	マズ	Amy	1011SII01	(4) ×	×					(X)2	
m	MW-8	PS	10/10/2019 11:4	4 60317943003	Water	5			×	×					003	
4	MW-7	PS	10/10/2019 14:2	3 60317943004	Water	2			×	×					004	
2																
													Comm	ients 🔬 👸		
Tra	Insfers Released By		Date/Time	Received B	۲.			Date/Ti	me	*Pleas	e provid	e QC sh	ieets.			
-	Nitter	<del>B</del> 100	16 10115/19	1804 MM-	507			10-11	64.1.	2	B A	R				
2		•								<u>s</u>	51016-2	5				
m																
ပိ	oler Temperature on Rec	ceipt <i>Э</i> . ل	P°C Cu	istody Seal Y	or (N)		Rec	seived o	n Ice	R or	z		Samp	oles Intact	(Y) or N	
***	n order to maintain client c This chain of custody is co	confidentiality susidered con	'y, location/nam mplete as is sir	te of the samplii ace this informa	ng site, sa tion is ave	impler'. silable	s name in the o	and sigi wner lat	nature Noraton	may no 'Y.	t be pro	ovided (	on this CO	C documer	nt	
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WO#:30330215

Tuesday, October 15, 2019 11:38:12 AM

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Page 1 of 1

Pittsburgh Lab Sample Condition	on U	pon	Rec	eipt #_30330	215
Pace Analytical' Client Name:	<u> </u>	Pac	z k	25 Project #	
Courier: ZFed Ex DUPS DUSPS Client Tracking #: 121929907870	<b></b>	mmerc	ial	□Pace Other Label MM	
Custody Seal on Cooler/Box Present: Uyes	Inc	)	Seals i	ntact: 🧕 yes 🔄 no	
Thermometer Used	Туре с	of ice:	(Vet)	Blue None	
Cooler Temperature Observed Temp	$\psi$	°C	Corre	ction Factor: <u>+0.0</u> °C Final Temp: <u>5~0</u> C	
Temp should be above freezing to 6°C			T	nH paper Lot# Date and initials of person examining	
			NIA	10D2581 contents: <u>N1.) \$10-1679</u>	
Comments:	Yes	NO	IN/A		
Chain of Custody Present:				1.	
Chain of Custody Filled Out:				2	
Chain of Custody Relinquished:				3	
Sampler Name & Signature on COC:	Ķ			4	
Sample Labels match COC:	$\Box$	<u> </u>		5.	
-Includes date/time/ID Matrix:	<u> </u>	<u>۴</u>	<u></u>		
Samples Arrived within Hold Time:				6.	
Short Hold Time Analysis (<72hr remaining):		$\leq$		7	
Rush Turn Around Time Requested:				8.	Sample
Sufficient Volume:	1	/		9. MJS10-1679 Chy Reared IBPINTE	MW-9
Correct Containers Used:	$\angle$	1		10.	
-Pace Containers Used:	/				
Containers Intact:				11.	
Orthonhosphate field filtered			/	12.	
Hex Cr Aqueous sample field filtered			/	13.	
Organic Samples checked for dechlorination:			/	14.	
Eithered volume received for Dissolved tests			/	15.	
All containers have been checked for preservation.	$\overline{}$			16. 01/2	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Non-aqueous matrix	Radon	l,		ри	
All containers meet method preservation				Initial when AAS Date/time of preservation	
requirements.	L			Lot # of added	
	<del></del>			preservative	
Headspace in VOA Vials ( >6mm):	<u> </u>			17.	
Trip Blank Present:		<u> </u>	$\mid$	18.	,
Trip Blank Custody Seals Present	<u> </u>	ļ,			·
Rad Samples Screened < 0.5 mrem/hr	/	1		completed MJS Date: 10-1979	
Client Notification/ Resolution:			-Date	行me:	
Comments/ Resolution:			-		
N					
A check in this box indicates that add	litiona	l infor	matic	on 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.

PACE Analytical Services Ra-226 Analysis

Pace Analytical

# **Quality Control Sample Performance Assessment**

WWW SAPAGE COM	900 °L		<u>Analyst Must Manually Enter All Fields Highlighted in</u>	Yellow.	
	13-24D				
Analyst: Date:	MK1 10/24/2019		Sample Matrix Spike Control Assessment Sample Collection Date:	MS/MSD 1 10/8/2019	MS/MSD 2 10/14/2019
Batch ID:	50446		Samole I.D.	30330221001	50238593005
Matrix:	MO		Sample MS I.D.	30330221001MS	50238593010
Mathed Blank Accocmant			Sample MSD I.D.		50238593009
				770-61	770-61
	1/18/06		MS/MSD Decay Corrected Spike Concentration (pCi/mL):	32.118	32.117
MB concentration:	0.085		Spike Volume Used in MS (mL):	0.10	0.20
WE COUNTING UNCERTAINTY: MB MDC:	0.263		Spike Volume Used in MSD (mL):	0.234	0.20
MB Numerical Performance indicator	0.63		VIC Tarrat Conc (Cright SW	1.40.0	00000
MB Status vs Numerical Indicator;	N/A		MSD Aliquot (L, g, F):	300.0	0.650
MB Status vs. MDC:	Pass		MSD Target Conc. (pCi/L, g, F):		9.875
			MS Spike Uncertainty (calculated):	0.470	0.461
	LCSD (Y or N)?	N	MSD Spike Uncertainty (calculated):		0.464
	LCS50446	LCSD50446	Sample Result:	1.147	-0.061
Count Date:	11/8/2019		Sample Result Counting Uncertainty (pCl/L, g, F):	0.601	0.316
	770-61			877.71	8.359
	32.110		Matrix Spike Result Counting Uncertainty (pCi/L, g, F):	2.291	1.169
Volume Used (mL):	0.10		Sample Matrix Spike Duplicate Result:		10.739
Aliquot Volume (L, g, F):	0.648		Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		1.390
Target Conc. (pCi/L, g, F):	4.955		MS Numerical Performance Indicator:	0.884	-2.029
Uncertainty (Calculated):	0.233		MSD Numerical Performance Indicator:		1.209
Result (pCi/L, g, F):	4.783		MS Percent Recovery:	110.90%	86.32%
LCS/LCSD Counting Uncertainty (pC//L, g, F):	0.973		MSD Percent Recovery:		109.36%
Numerical Performance Indicator:	-0.34		MS Status vs Numerical Indicator:	N/A	N/A
Percent Recovery:	96.53%		MSD Status vs Numerical Indicator:		N/A
Status vs Numerical Indicator:	N/A		MS Status vs Recovery:	Pass	Pass
Status vs Recovery:	Pass		MSD Status vs Recovery:		Pass
Upper % Recovery Limits:	135%		MS/MSD Upper % Recovery Limits:	136%	136%
	9/01			1 92.17	1170
Duplicate Sample Assessment			Matrix Spike/Matrix Spike Duplicate Sample Assessment		
			Sample I.D.		20238293005
		sample lus II	Sample MS I.D.		50238593010
Sampe Rout (port, g, r):			Sample MSD I.D.		50238593009 3 235
Sample Result Counting Uncertainty (pCi/L, g, F):			Sample Matrix Spike Result:		8.399
Sample Uuplicate Boards Continue (poulte, g, F):		the space below.	Matrix Spike Result Counting Uncertainty (pCI/L, g, F):		1.169
Semple cupricate result Counting Ortoertainty (port, g, F). Are sample and/or duplicate results helow RI 2	See Relow ##		Sample Matrix Spike Dunlicate Result Counting Processing (ACi/I o E)		10./39
Duplicate Numerical Performance Indicator:			Duolicate Numerical Performance Indicator:		-2.525
Duplicate RPD:			(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		23.56%
Duplicate Status vs Numerical Indicator:			MS/ MSD Duplicate Status vs Numerical Indicator:		N/A
Duplicate Status vs RPD:			MS/ MSD Duplicate Status vs RPD:		Pass
% RPD Limit:			% RPD Limit:		32%

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the Rt..

Comments:

Cumilis/10)

MU 1-9-19

1 of 1

Ra-226 NELAC QC Printed: 11/8/2019 2:02 PM

PACE Analytical Services Ra-228 Analysis

Andress     Tests     Activity Lines     A	ć	Quality C	control S	ample Pe	rformance Assessment		
Address         Address <t< th=""><th>Face Analyti</th><th>ical" ***** Test</th><th>Ra-228</th><th></th><th>Analyst Must Manually Enter All Fields Highlighted in</th><th>Yellow.</th><th></th></t<>	Face Analyti	ical" ***** Test	Ra-228		Analyst Must Manually Enter All Fields Highlighted in	Yellow.	
Windless     Opticity     Optic		Analyst: Date:	VAL 10/28/2019		Sample Matrix Spike Control Assessment Sample Collection Date:	MS/MSD 1 10/14/2019	MS/MSD 2 10/8/2019
Image: Second		Worklist: Matrix:	50449 WT		Sample I.D. Sample MS I.D.	50238593002 50238593010	30330220001 30330220001N
Method Burk Assessment         Oil: Spannet (C): Comparison         Spannet (C					Sample MSD I.D.	50238593009	
Image: Second contract of the second contract	Method Blank Assessme	ent			Spike I.D.:	19-026 55 525	19-026
Image: Control		MB Sample ID	1778711		MS/MSU Decay Corrected Spike Concentration (pC/mL):	35.0/5 00 0	0.0.0
Image: Control for the state of Manufact Pressure (Card Card Card Card Card Card Card Card		MIB CONCENTIATION:	0.283		Spike Volume Used in MSD (mu.).	0.20	N7.V
Image: control of the contro			0.662		MS Aliquot (L, g, F):	0.808	0.653
Mill Status of Minische Tabes     Mill Status of Mill Mill Status of Mill Mill Mill Mill Mill Mill Mill Mil		MB Numerical Performance Indicator:	1.75		MS Target Conc.(pCi/l., g, F):	8.687	10.750
Image: stand bit in the stand of the stand bit in the sta		MB Status vs Numerical Indicator	Pass		MSD Aliquot (L, g, F):	0.801	
Image: control former formed Sample Assessment         Control former formed Sample Reading (Cut, a) FL (C		MIB STATUS VS. MILC.	1955	-	Mour target value, (pour, g, r). MS Snike I Incertainty (calculated):	0.426	0.527
Image: Space of the stand o	Laboratory Control Sam	ine Assessment	LCSD (Y or N)?	N	MSD Spike Uncertainty (calculated):	0.429	1977
Count Date     Count Date     1/1/2018     Sample Activity     2/2016     5/17     2/2014     7/2014			LCS50449	LCSD50449	Sample Result:	-0.005	2.483
Devry Connected Splac Encrementary System     3456     Amery Scyne Connected Splac Encrementary Splace Out (Dird), a Print     7730     2.253       Devry Connected Splac Encrementary (Schwark Jack)     3516     0.00     Mater Schwark Jack (Dird), a Print     2.00       Target Connormal Jack (Dird), a Print     0.01     Mater Schwark Jack (Dird), a Print     2.03     0.06       Target Connormal Jack (Dird), a Print     0.03     Mater Schwark Jack (Dird), a Print     2.03     0.06       Connormal Jack (Dird), a Print     0.03     Mater Schwark Jack (Dird), a Print     0.06     0.06       Connormal Jack (Dird), a Print     0.03     Mater Schwark Jack (Dird), a Print     0.06     0.06       Connormal Performance Indicated     0.03     Mater Schwark Jack (Dird), a Print     0.06     0.06       Connormal Performance Indicated     0.03     Mater Schwark Jack (Dird), a Print     0.06     0.06       Connormal Performance Indicated     0.03     Mater Schwark Jack (Dird), a Print     0.06     0.06       Connormal Performance Indicated     0.03     Mater Schwark Jack (Dird), a Print     0.06     0.06       Connormal Performance Indicated     0.04     Mater Schwark Jack (Dird), a Print     0.06     0.06       Connormal Performance Indicated     0.04     Mater Schwark Jack (Dird), a Print     0.06     0.06       Connormal Per		Count Date:	11/1/2019		Sample Result 2 Sigma CSU (pCi/L, g, F):	0.284	0.725
Member Solution     0.001     0.001     0.001     0.001     0.001       Traper Conference Real     0.001     0.001     0.001     0.001     0.001       Transference Real     0.001     0.001     0.001     0.001     0.001       Sample Real     0.0011<		Spike LU.: Comodod Solito Concentration (201/m) V	19-026 34 866		Metrix Sorive Desuit 9 Simma CSU (nCi/) o EV	712	2 463
Approving Lington Concert (Concentration Concentration	Deca)	y contected opixe contectuation (powrite).	0.10		Sample Matrix Soike Dunlicate Result:	8.070	1
MELL     Unmersing (Galo, ap P) (Galo, ap P) (Cast.CSD 2 galom CSU (Galo, ap P) (Cast.CSD 2 m) (Cast.CSD 2 m) (Cast	-	Aliquot Volume (L, g, F):	0.801		Matrix Spike Duplicate Result 2 Sigma CSU (pCi/l, g, F):	1.762	
MELO EVENT     Unserting Vertication Proceedings (Casta policy, n. p. 1, 0.4)     MELO Month Recomption (Casta policy) (Casta policy policy), n. p. 1, 0.4)     91,00%     91,00%       Present Recomption Present Recomption P		Target Conc. (pCl/L, g, F):	4.351		MS Numerical Performance Indicator:	-0.858	-0.667
Instant     LCSALCSD 2 Signar Food (DOLL, 0, F) Transford Principation Pressing (EAC)     4.54 (DOLL)		Uncertainty (Calculated):	0.213		MSD Numerical Performance Indicator:	-0.726	1007 1007
The control of the production of the control of t		Result (pCi/L, g, F):	4.027		MS Percent Recovery:	91.UU%	%1/1A
The mean decoder and status of Feronder Bases of the control of the Base		LCS/LCSD 2 Signa CSO (DU/L, 9, F).	0.65		MS Status vs Numerical Indicator:	Pass	Pass
Network     Status verscovery (and status verscovery) (upper status verscover) (upper sta		Percent Recovery:	92.54%		MSD Status vs Numerical Indicator.	Pass	
The second of a field of the second units     Task is an end of a field a		Status vs Numerical Indicator:	N/A		MS Status vs Recovery:	Pass	Pass
Upder % Recovery Limits     User % Recov		Status vs Recovery:	Pass		MSD Status vs Recovery:	Pass	103 4 4
Duplicate Sample Assessment     Banch Spike/Matrix Spike Duplicate Sample LD:       Duplicate Sample LD:     Duplicate Sample LD:       Duplicate Sample LD:     Duplicate Sample LD:       Sample LD:     Sample LD:       Sample Result CoCh. 4 FD:     Sample Matrix Spike Duplicate Result       Sample Duplicate Result CoCh. 4 FD:     Sample Matrix Spike Duplicate Result       Sample Duplicate Result CoCh. 4 FD:     Sample Matrix Spike Duplicate Result       Sample Duplicate Result CoCh. 4 FD:     Total Sample Matrix Spike Duplicate Result       Duplicate Result CoCh. 4 FD:     Total Result CoCh. 4 FD:       Duplicate Result CoCh. 4 FD:     Total Result CoCH. 4 FD:       Duplicate Result CoCH. 4 FD:     Total Result Result CoCH. 4 FD:       Duplicate Status vs RPD:     Duplicate Result Resu		Upper % Recovery Limits: Lower % Recovery Limits:	135% 60%		MS/MSD Upper % Recovery Limits: MS/MSD Lower % Recovery Limits:	80% 60%	60%
Duplicate Sample Assessment     Duplicate Sample Assessment       Duplicate Sample Assessment     Sample Network       Sample Result (pCML, g. F): Sample Result (pCML, g. F): Sample Result (pCML, g. F): Sample Duplicate Result (pCML, g. F): Sample Result (pCML, g. F): Sample Duplicate Result (pCML, g. F): Sample Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Sample Duplicate Result (pCML, g. F): Sample Duplicate Result (pCML, g. F): Sample Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Matrix Splike Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Sample Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Duplicate Status ver RPD: Duplicate Status ver RPD: Matrix Splike Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Duplicate Status ver RPD: Matrix Splike Duplicate RPD: Duplicate Status ver RPD: Matrix Splike Duplicate RPD: Duplicate RPD: Duplicate Result (pCML, g. F): Duplicate Result (pCML, g. F): Duplicate RPD: Duplicate RPD							
Method     Sample ID: Sample Result (pGL, g, F) sample Result (pGL, g, F) sample Result (pGL, g, F) sample Result (pGL, g, F) sample Result 25(gm of 29) sample Result 25(gm of 20) publicate Result 25(gm of 20) publicate Result 25(gm of 20) sample Result 25(gm of 20) publicate Res	Duplicate Sample Asses	ssment			Matrix Spike/Matrix Spike Duplicate Sample Assessment		
NELAC DVX     Matrix Spike Dipicate Result (SOLL, 9, F): Sample Dipicate Result (SOLL, 9, F): Sample Matrix Spike Dipicate Result Dipicate Result (SOLL, 9, F): Rest Result (SOLL, 9, F): Are sample and/or dupicate Result (SOLL, 9, F): Are sample and/or dupicate Result (SOLL, 9, F): Are sample and/or dupicate Result (SOLL, 9, F): Dupicate Result Spike Spike Result (SOLL, 9, F): Are sample and/or dupicate Result (SOLL, 9, F): Dupicate Result (SOLL, 9, F): Are sample and/or dupicate Result (SOLL, 9, F): Dupicate Result (SOLL, 9, F): Are sample and/or dupicate Result (SOLL, 9, F): Dupicate Result (SOLL, 9, F): Are sample and/or dupicate Result (SOLL, 9, F): Dupicate Resul		Sample I.D.:		Enter Duplicate	Sample I.D.	50238593002	
Rample Result (2) (1, g, F) Sample Result (2) (1, g, F) Sample Noullicate Result (2) (1, g, F) Sample Duplicate Result (2) (1, g, F) Sample Duplicate Result (2) (1, g, F) Are sample and result (2) (1, g, F) Are sample and result (2) (1, g, F) Duplicate Result (2) (1, g, F) Are sample and result (2) (1, g, F) Duplicate Resu		Duplicate Sample I.D.		sample IDs if	Sample MS I.D.	50238593010	
Sample Duplicate Result 2 signa CSU (pC/L, g. F);     To Concreating and the space below.     To Concreating and the space below.       Sample Duplicate Result 2 signa CSU (pC/L, g. F);     The space below.     Matrix Spike Duplicate Result 2 signa CSU (pC/L, g. F);       Sample Duplicate Result 2 signa CSU (pC/L, g. F);     The space below.     Matrix Spike Duplicate Result 2 signa CSU (pC/L, g. F);       Duplicate Result 2 signa CSU (pC/L, g. F);     The space below.     Matrix Spike Duplicate Result 2 signa CSU (pC/L, g. F);       Result 2 signa CSU (pC/L, g. F);     The space below.     Matrix Spike Duplicate Result 2 signa CSU (pC/L, g. F);       Duplicate Numerical Indicator:     Duplicate Numerical Indicator:     Duplicate Result 2 signa CSU (pC/L, g. F);       Duplicate Result 2 signa SSU (pC/L, g. F);     The space below.     Matrix Spike Duplicate Result 2 signa SSU (pC/L, g. F);       Result 2 signa SSU (pC/L, g. F);     The space below.     Matrix Spike Duplicate Result     1, 172       Duplicate Numerical Indicator:     Duplicate Status vs RPD;     1, 35%       Duplicate Result of cupricate Result of cupricate Status vs RPD;     1, 35%       Matrix Spike Duplicate Result of cupricate results are below the MD;     Result Results are status vs RPD;       Matrix Spike Duplicate Result of cupricate results are below the MD;     Setted matrix Results are status vs RPD;       Matrix Spike Duplicate Result of cupricate results are below the MD;     Setted matrix status vs RPD;       Matrix Spike Duplicate		Sample Result (pCi/L, g, F):		other than	Sample MSU I.U.	5U2383930U9 7 000	
Rample Duplicate Neural Solution     Sample Duplicate Neural Solution     Sample Matrix Splite Duplicate Result     8.00       Rample Duplicate Neural Solution     Duplicate Neural Solution     Sample Matrix Splite Duplicate Result     8.00       Rample Duplicate Neural Solution     Duplicate Neural Solution     Duplicate Result     9.135       Duplicate Numerical Performance Indicator:     Duplicate RPD:     0.136     0.136       Duplicate Numerical Solution     Duplicate RPD:     0.136     0.136       Ratix Splite Duplicate RPD:     Duplicate RPD:     0.136     0.136       Duplicate RPD:     Duplicate RPD:     0.136     0.136       Ratix Splite Duplicate RPD:     Duplicate RPD:     0.136       Ratix Splite Duplicate RPD:     0.101     0.136       Ratix Splite Duplicate RPD:     0.136     0.136       Ratix Splite Duplicate RPD:     0.136     0.136       Ratix Splite Duplicate RPD:     0.101     0.136       Ratix Splite Duplicate RPD:     0.101     0.136       Ratix Splite Duplicate RPD:     0.101     0.136       Ratix Splite Duplicate Result     0.101     0.136		Sample Result 2 Sigma CSU (pCi/L, g, F):		the space helow	Matrix Snike Result 2 Simma CSU InCi/I of EV	1 712	
Image sample and/or duplicate results below #1.7       See Below #1.7       See Below #1.7       The suprement of the Cupicate results are below #1.7       The cupicate results are below #1.7       The cupicate results are below #1.7       The cupicate status were Provement of the cupicate results are below #1.7       The cupicate status were Provement of the cupicate results are below the MDC.       The cupicate status were Provement of the cupicate results are below the MDC.       The cupicate status were Provement of the cupicate results are below the MDC.       The cupicate status were Provement of the cupicate results are below the MDC.       The cupicate status were Provement of the cupicate results are below the MDC.       The cupicate status were Provement of the cupicate results are below the MDC.       The cupicate status were Provement of the cupicate status were Provement of the cupicate results are below the MDC		oatliple Dupicate Result (POPL 9, F).		nic share nerow.	Sample Matrix Shike Diministe Result	8.070	
Dupticate Numerical Performance Indicator:     Dupticate Numerical Performance Indicator:     -0.136       Dupticate Numerical Performance Indicator:     Dupticate RPD:     -0.136       Based on the Percent Recording Status vs RPD:     Based on the Percent Recording Status vs RPD:     53%       WS MSD Dupticate Status vs RPD:     Status vs RPD:     36%       Recision is not applicable if either the sample or dupticate results are below the MDC.     MS/MSD Dupticate Status vs RPD:     73%       MSLAC DWZ     MSLAC DWZ     6 of 10     6 of 10     Re228	Ares	sample and/or duplicate results below RL?	See Below ##		Matrix Spike Duplicate Result 2 Sigma CSU (pCift, g, F):	1.762	
Duplicate RPD:     Duplicate RPD:     135%       Puplicate Status vs Numerical Indicator:     Duplicate Status vs Numerical Indicator:     135%       ## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.     (Based on the Percent Recovertes) MS/ MSD Duplicate RStatus vs RPD:     36%       ## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.     NS/ MSD Duplicate RStatus vs RPD:     36%       INELAC DW2     MS/ MSD Duplicate Status vs RPD:     36%     36%	ā	uplicate Numerical Performance Indicator.			Duplicate Numerical Performance Indicator:	-0.136	
Duplicate Status vs Numerical Indicator:     MS/ MSD Duplicate Status vs Numerical Indicator:     Pass Pass       ## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.     MS/ MSD Duplicate Status vs RPD:     Pass % RPD Limit:       ** Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.     MS/ MSD Duplicate precision is not applicable if either the sample or duplicate results are below the MDC.       ** NELAD W2     MS/ MSD Duplicate precision is not applicable if either the sample or duplicate results are below the MDC.		Duplicate RPD:			(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:	1.35%	
## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.     Max mod Unplote and the sample or duplicate results are below the MDC.       ** FEUL     Comments:     % RPD Limit:       ** Inter the sample or duplicate results are below the MDC.     Set in the sample or duplicate results are below the MDC.       ** NELAD W2     ** TUAT       ** TUAT     ** TUAT		Duplicate Status vs Numerical Indicator:			MS/ MSD Duplicate Status vs Numerical Indicator:	Pass	
## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.         Comments:         Comments:         INELAC DW2         MMM         INELAC DW2         B of 10		Duplicate Status VS RPD: RPD Limit:			MOV MOD DUDINGRE STATUS	36%	
Comments: Comments: INHIM I	## Evaluation of duplic:	ate precision is not applicable if either the se	ample or duplicate	results are below th	e MDC.		
Comments: MILADWZ NELADWZ FL47 6 of 10 6 of 10 8-228							
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Ra-228\_50449\_DW\_W 28 (R086-8 04Sep2019).xls **ATTACHMENT 1-4** 

December 2019 Sampling Event Laboratory Analytical Report



December 18, 2019

Adam Kneeling Haley & Aldrich, Inc. 400 E. Van Buren St Suite 545 Phoenix, AZ 85004

RE: Project: TEC CCR Pace Project No.: 60323643

Dear Adam Kneeling:

Enclosed are the analytical results for sample(s) received by the laboratory on December 09, 2019. 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,

Astantos m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures

cc: Bob Beck, Kansas City Power & Light Company HEATH HORYNA, WESTAR ENERGY Andrew Hare, KCP&L and Westar, Evergy Companies Laura Hines, KCP&L & Westar, Evergy Companies Jake Humphrey, KCP&L and Westar, Evergy Companies Samantha Kaney, Haley & Aldrich JARED MORRISON, KCP&L and Westar, Evergy Companies Melissa Michels, KCP&L & Westar, Evergy Companies Danielle Zinmaster, Haley & Aldrich



## **REPORT OF LABORATORY ANALYSIS**

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## CERTIFICATIONS

Project: TEC CCR Pace Project No.: 60323643

## **Pace Analytical Services Kansas**

9608 Loiret Boulevard, Lenexa, KS 66219 Missouri Inorganic Drinking Water Certification #: 10090 Arkansas Drinking Water Arkansas Certification #: 19-016-0 Arkansas Drinking Water Illinois Certification #: 004455 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055 Nevada Certification #: KS000212020-2 Oklahoma Certification #: 9205/9935 Florida: Cert E871149 SEKS WET Texas Certification #: T104704407-19-12 Utah Certification #: KS000212018-8 Illinois Certification #: 004592 Kansas Field Laboratory Accreditation: # E-92587 Missouri SEKS Micro Certification: 10070



## SAMPLE SUMMARY

Project: TEC CCR Pace Project No.: 60323643

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60323643001	MW-08-120519	Water	12/05/19 09:15	12/09/19 16:10
60323643002	MW-10-120519	Water	12/05/19 11:10	12/09/19 16:10
60323643003	MW-07-120519	Water	12/05/19 13:40	12/09/19 16:10
60323643004	DUP-120519	Water	12/05/19 13:45	12/09/19 16:10



## SAMPLE ANALYTE COUNT

Project: TEC CCR Pace Project No.: 60323643

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60323643001	MW-08-120519	EPA 200.7	НКС	7	PASI-K
		EPA 200.8	LRS	7	PASI-K
		EPA 245.1	JLH	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	AJS2	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60323643002	MW-10-120519	EPA 200.7	HKC	7	PASI-K
		EPA 200.8	LRS	7	PASI-K
		EPA 245.1	JLH	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	AJS2	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60323643003	MW-07-120519	EPA 200.7	HKC	7	PASI-K
		EPA 200.8	LRS	7	PASI-K
		EPA 245.1	JLH	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	AJS2	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60323643004	DUP-120519	EPA 200.7	НКС	7	PASI-K
		EPA 200.8	LRS	7	PASI-K
		EPA 245.1	JLH	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	AJS2	1	PASI-K
		EPA 300.0	MJK	3	PASI-K



Project: TEC CCR Pace Project No.: 60323643

## Method: EPA 200.7

Description:200.7 Metals, TotalClient:Evergy Kansas Central, Inc.Date:December 18, 2019

## 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.

## QC Batch: 627594

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60323009001,60323643001

- M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
  - MS (Lab ID: 2558038)
    - Calcium
  - MS (Lab ID: 2558039)
    - Calcium

## Additional Comments:



Project: TEC CCR Pace Project No.: 60323643

## Method: EPA 200.8

Description:200.8 MET ICPMSClient:Evergy Kansas Central, Inc.Date:December 18, 2019

## 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.

## Additional Comments:



Project: TEC CCR Pace Project No.: 60323643

## Method: EPA 245.1

Description:245.1 MercuryClient:Evergy Kansas Central, Inc.Date:December 18, 2019

## 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.

## QC Batch: 627969

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60323643002,60323644007

- M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
  - MS (Lab ID: 2559570)
    - Mercury
  - MSD (Lab ID: 2559571)
    - Mercury

## Additional Comments:



Project: TEC CCR Pace Project No.: 60323643

## Method: SM 2540C

Description:2540C Total Dissolved SolidsClient:Evergy Kansas Central, Inc.Date:December 18, 2019

## **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.

## **Additional Comments:**



Project: TEC CCR Pace Project No.: 60323643

## Method: SM 4500-H+B

Description:4500H+ pH, ElectrometricClient:Evergy Kansas Central, Inc.Date:December 18, 2019

## **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.

- DUP-120519 (Lab ID: 60323643004)
- MW-07-120519 (Lab ID: 60323643003)
- MW-08-120519 (Lab ID: 60323643001)
- MW-10-120519 (Lab ID: 60323643002)

## 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: TEC CCR Pace Project No.: 60323643

## Method:EPA 300.0Description:300.0 IC Anions 28 DaysClient:Evergy Kansas Central, Inc.Date:December 18, 2019

## **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.



## Project: TEC CCR

Pace Project No.: 60323643

Sample: MW-08-120519	Lab ID: 603	323643001	Collected: 12/05/1	9 09:1	5 Received: 12	2/09/19 16:10 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Met	thod: EPA 200	0.7 Preparation Met	hod: E	PA 200.7			
Barium, Total Recoverable	0.077	mg/L	0.0050	1	12/11/19 14:00	12/13/19 16:27	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 14:00	12/13/19 16:27	7440-41-7	
Boron, Total Recoverable	1.3	mg/L	0.10	1	12/11/19 14:00	12/13/19 16:27	7440-42-8	
Calcium, Total Recoverable	199	mg/L	0.20	1	12/11/19 14:00	12/13/19 16:27	7440-70-2	M1
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/11/19 14:00	12/13/19 16:27	7440-47-3	
Lead, Total Recoverable	<0.010	mg/L	0.010	1	12/11/19 14:00	12/13/19 16:27	7439-92-1	
Lithium	0.024	mg/L	0.010	1	12/11/19 14:00	12/13/19 16:27	7439-93-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 200	0.8 Preparation Met	hod: E	PA 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:39	7440-36-0	
Arsenic, Total Recoverable	0.0039	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:39	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/11/19 16:10	12/18/19 12:39	7440-43-9	
Cobalt, Total Recoverable	0.0025	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:39	7440-48-4	
Molybdenum, Total Recoverable	0.046	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:39	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:39	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:39	7440-28-0	
245.1 Mercury	Analytical Met	thod: EPA 245	5.1 Preparation Met	hod: E	PA 245.1			
Mercury	<0.20	ug/L	0.20	1	12/12/19 15:00	12/16/19 11:55	7439-97-6	
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	C					
Total Dissolved Solids	1330	mg/L	13.3	1		12/12/19 06:24		
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500	)-H+B					
pH at 25 Degrees C	7.0	Std. Units	0.10	1		12/10/19 09:17		H6
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	0.0					
Chloride	220	mg/L	50.0	50		12/12/19 16:06	16887-00-6	
Fluoride	<0.20	mg/L	0.20	1		12/12/19 18:13	16984-48-8	
Sulfate	654	mg/L	50.0	50		12/12/19 16:06	14808-79-8	



## Project: TEC CCR

Pace Project No.: 60323643

Sample: MW-10-120519	Lab ID: 603	323643002	Collected: 12/05/1	9 11:1	0 Received: 12	2/09/19 16:10 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Met	thod: EPA 200	0.7 Preparation Met	hod: E	PA 200.7			
Barium, Total Recoverable	0.30	mg/L	0.0050	1	12/11/19 14:00	12/13/19 16:31	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 14:00	12/13/19 16:31	7440-41-7	
Boron, Total Recoverable	0.22	mg/L	0.10	1	12/11/19 14:00	12/13/19 16:31	7440-42-8	
Calcium, Total Recoverable	162	mg/L	0.20	1	12/11/19 14:00	12/13/19 16:31	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/11/19 14:00	12/13/19 16:31	7440-47-3	
Lead, Total Recoverable	<0.010	mg/L	0.010	1	12/11/19 14:00	12/13/19 16:31	7439-92-1	
Lithium	<0.010	mg/L	0.010	1	12/11/19 14:00	12/13/19 16:31	7439-93-2	
200.8 MET ICPMS	Analytical Met	thod: EPA 200	0.8 Preparation Met	hod: E	PA 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:41	7440-36-0	
Arsenic, Total Recoverable	0.026	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:41	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/11/19 16:10	12/18/19 12:41	7440-43-9	
Cobalt, Total Recoverable	0.0028	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:41	7440-48-4	
Molybdenum, Total Recoverable	0.0043	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:41	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:41	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:41	7440-28-0	
245.1 Mercury	Analytical Met	thod: EPA 245	5.1 Preparation Met	hod: E	PA 245.1			
Mercury	<0.20	ug/L	0.20	1	12/12/19 15:00	12/16/19 11:57	7439-97-6	M1
2540C Total Dissolved Solids	Analytical Met	thod: SM 2540	C					
Total Dissolved Solids	1250	mg/L	13.3	1		12/12/19 06:24		
4500H+ pH, Electrometric	Analytical Met	thod: SM 4500	D-H+B					
pH at 25 Degrees C	6.8	Std. Units	0.10	1		12/10/19 09:18		H6
300.0 IC Anions 28 Days	Analytical Met	thod: EPA 300	).0					
Chloride	228	mg/L	50.0	50		12/12/19 19:16	16887-00-6	
Fluoride	0.35	mg/L	0.20	1		12/12/19 19:01	16984-48-8	
Sulfate	175	mg/L	50.0	50		12/12/19 19:16	14808-79-8	



## Project: TEC CCR

Pace Project No.: 60323643

Sample: MW-07-120519	Lab ID: 603	323643003	Collected: 12/05/1	9 13:4	0 Received: 12	2/09/19 16:10 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Met	hod: E	PA 200.7			
Barium, Total Recoverable	0.053	mg/L	0.0050	1	12/11/19 14:00	12/13/19 16:33	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 14:00	12/13/19 16:33	7440-41-7	
Boron, Total Recoverable	0.66	mg/L	0.10	1	12/11/19 14:00	12/13/19 16:33	7440-42-8	
Calcium, Total Recoverable	126	mg/L	0.20	1	12/11/19 14:00	12/13/19 16:33	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/11/19 14:00	12/13/19 16:33	7440-47-3	
Lead, Total Recoverable	<0.010	mg/L	0.010	1	12/11/19 14:00	12/13/19 16:33	7439-92-1	
Lithium	0.024	mg/L	0.010	1	12/11/19 14:00	12/13/19 16:33	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Met	hod: E	PA 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:48	7440-36-0	
Arsenic, Total Recoverable	0.0016	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:48	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/11/19 16:10	12/18/19 12:48	7440-43-9	
Cobalt, Total Recoverable	0.0018	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:48	7440-48-4	
Molybdenum, Total Recoverable	0.010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:48	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:48	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:48	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 245	.1 Preparation Met	hod: E	PA 245.1			
Mercury	<0.20	ug/L	0.20	1	12/12/19 15:00	12/16/19 12:04	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 2540	C					
Total Dissolved Solids	1080	mg/L	13.3	1		12/12/19 06:25		
4500H+ pH, Electrometric	Analytical Me	thod: SM 4500	)-H+B					
pH at 25 Degrees C	6.9	Std. Units	0.10	1		12/10/19 09:20		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	197	mg/L	10.0	10		12/12/19 20:36	16887-00-6	
Fluoride	0.22	mg/L	0.20	1		12/12/19 20:20	16984-48-8	
Sulfate	418	mg/L	50.0	50		12/13/19 14:08	14808-79-8	



## Project: TEC CCR

Pace Project No.: 60323643

Sample: DUP-120519	Lab ID: 60	323643004	Collected: 12/05/	19 13:4	5 Received: 12	2/09/19 16:10 N	Aatrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Me	thod: EPA 200	0.7 Preparation Me	thod: E	PA 200.7			
Barium, Total Recoverable	0.053	mg/L	0.0050	1	12/11/19 14:00	12/13/19 16:35	7440-39-3	
Beryllium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 14:00	12/13/19 16:35	7440-41-7	
Boron, Total Recoverable	0.65	mg/L	0.10	1	12/11/19 14:00	12/13/19 16:35	7440-42-8	
Calcium, Total Recoverable	128	mg/L	0.20	1	12/11/19 14:00	12/13/19 16:35	7440-70-2	
Chromium, Total Recoverable	<0.0050	mg/L	0.0050	1	12/11/19 14:00	12/13/19 16:35	7440-47-3	
Lead, Total Recoverable	<0.010	mg/L	0.010	1	12/11/19 14:00	12/13/19 16:35	7439-92-1	
Lithium	0.024	mg/L	0.010	1	12/11/19 14:00	12/13/19 16:35	7439-93-2	
200.8 MET ICPMS	Analytical Me	thod: EPA 200	0.8 Preparation Me	thod: E	PA 200.8			
Antimony, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:50	7440-36-0	
Arsenic, Total Recoverable	0.0015	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:50	7440-38-2	
Cadmium, Total Recoverable	<0.00050	mg/L	0.00050	1	12/11/19 16:10	12/18/19 12:50	7440-43-9	
Cobalt, Total Recoverable	0.0016	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:50	7440-48-4	
Molybdenum, Total Recoverable	0.011	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:50	7439-98-7	
Selenium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:50	7782-49-2	
Thallium, Total Recoverable	<0.0010	mg/L	0.0010	1	12/11/19 16:10	12/18/19 12:50	7440-28-0	
245.1 Mercury	Analytical Me	thod: EPA 24	5.1 Preparation Me	thod: E	PA 245.1			
Mercury	<0.20	ug/L	0.20	1	12/12/19 15:00	12/16/19 12:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Me	thod: SM 254	0C					
Total Dissolved Solids	1100	mg/L	13.3	1		12/12/19 06:25		
4500H+ pH, Electrometric	Analytical Me	thod: SM 450	0-H+B					
pH at 25 Degrees C	6.9	Std. Units	0.10	1		12/10/19 09:23		H6
300.0 IC Anions 28 Days	Analytical Me	thod: EPA 300	0.0					
Chloride	199	mg/L	10.0	10		12/12/19 21:23	16887-00-6	
Fluoride	0.21	mg/L	0.20	1		12/12/19 21:07	16984-48-8	
Sulfate	417	mg/L	50.0	50		12/13/19 14:24	14808-79-8	



Project:	TEC CCR											
Pace Project No.:	60323643											
QC Batch:	627969		Anal	ysis Method	d: E	EPA 245.1						
QC Batch Method:	EPA 245.1		Anal	ysis Descrij	otion: 2	245.1 Mercu	ıry					
Associated Lab San	nples: 60323643	001, 6032364300	2, 6032364	43003, 603	23643004							
METHOD BLANK:	2559568			Matrix: W	ater							
Associated Lab San	nples: 60323643	001, 6032364300	2, 6032364	43003, 6032	23643004							
			Bla	nk l	Reporting							
Paran	neter	Units	Res	ult	Limit	Analy	/zed	Qualifier	S			
Mercury		ug/L		<0.20	0.2	0 12/16/19	9 11:50					
LABORATORY COM	NTROL SAMPLE:	2559569										
			Spike	LC	S	LCS	% F	Rec				
Paran	neter	Units	Conc.	Res	sult	% Rec	Lim	nits	Qualifiers			
Mercury		ug/L		5	4.7	98	5	85-115				
MATRIX SPIKE & M	IATRIX SPIKE DUF	·LICATE: 2559	570		2559571							
			MS	MSD								
<b>D</b> (		60323643002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	0
Parameter		Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Quai
Mercury	ug/L	<0.20	5	5	2.5	2.5	51	49	70-130	2	20	M1
MATRIX SPIKE SAM	MPLE:	2559572										
			60323	3644007	Spike	MS		MS	% Rec	;		
Paran	neter	Units	Re	esult	Conc.	Result	0	% Rec	Limits		Quali	fiers
Mercurv		ua/L		<0.20	5		4.8	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: TEC CCR

Pace Project No.: 60323643

QC Batch:	627594	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total

Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

METHOD BLANK: 2558035

Associated Lab Samples:

5 Matrix: Water 60323643001, 60323643002, 60323643003, 60323643004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	12/13/19 16:11	
Beryllium	mg/L	<0.0010	0.0010	12/13/19 16:11	
Boron	mg/L	<0.10	0.10	12/13/19 16:11	
Calcium	mg/L	<0.20	0.20	12/13/19 16:11	
Chromium	mg/L	<0.0050	0.0050	12/13/19 16:11	
Lead	mg/L	<0.010	0.010	12/13/19 16:11	
Lithium	mg/L	<0.010	0.010	12/13/19 16:11	

## LABORATORY CONTROL SAMPLE: 2558037

Parameter	Units	Spike Conc	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
						Qualifiero
Barium	mg/L	1	1.0	101	85-115	
Beryllium	mg/L	1	0.97	97	85-115	
Boron	mg/L	1	0.94	94	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	102	85-115	
Lithium	mg/L	1	0.98	98	85-115	

MATRIX SPIKE SAMPLE:

2558038

Devenueter	l leite	60323643001	Spike	MS	MS	% Rec	Qualifiana
Parameter	Units	Result	Conc.	Result	% Rec		Quaimers
Barium	mg/L	0.077	1	1.1	103	70-130	
Beryllium	mg/L	<0.0010	1	0.99	99	70-130	
Boron	mg/L	1.3	1	2.3	103	70-130	
Calcium	mg/L	199	10	214	155	70-130 M	1
Chromium	mg/L	<0.0050	1	1.0	101	70-130	
Lead	mg/L	<0.010	1	0.98	98	70-130	
Lithium	mg/L	0.024	1	1.0	101	70-130	

MATRIX SPIKE & MATRIX SP		2558040										
Parameter	6 Units	0323009001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	340 ug/L	1	1	1.4	1.3	103	97	70-130	4	20	
Beryllium	mg/L	ND	1	1	0.97	0.93	97	93	70-130	4	20	
Boron	mg/L	533 ug/L	1	1	1.5	1.5	97	93	70-130	3	20	

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## **REPORT OF LABORATORY ANALYSIS**

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Project: TEC CCR Pace Project No.: 60323643

MATRIX SPIKE & MATRIX SPI	KE DUPI	LICATE: 2558	039		2558040							
		60323009001	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Calcium	mg/L		10	10	466	448	290	105	70-130	4	20	M1
Chromium	mg/L	5.6 ug/L	1	1	0.98	0.94	97	93	70-130	4	20	
Lead	mg/L	ND	1	1	0.95	0.91	95	91	70-130	4	20	
Lithium	mg/L	192 ug/L	1	1	1.2	1.2	102	97	70-130	4	20	

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Project: TEC CCR

Pace Project No.: 60323643

QC Batch:	627660	Analysis Method:	EPA 200.8	
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET	
Associated Lab Sam	oles: 60323643001, 60323643	3002, 60323643003, 60323643004	4	

METHOD BLANK: 2558261

## 1 Matrix: Water 60323643001, 60323643002, 60323643003, 60323643004

Associated Lab Samples:					
		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	12/18/19 12:34	
Arsenic	mg/L	<0.0010	0.0010	12/18/19 12:34	
Cadmium	mg/L	<0.00050	0.00050	12/18/19 12:34	
Cobalt	mg/L	<0.0010	0.0010	12/18/19 12:34	
Molybdenum	mg/L	<0.0010	0.0010	12/18/19 12:34	
Selenium	mg/L	<0.0010	0.0010	12/18/19 12:34	
Thallium	mg/L	<0.0010	0.0010	12/18/19 12:34	

## LABORATORY CONTROL SAMPLE: 2558262

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	0.04	0.039	96	85-115	
Arsenic	mg/L	0.04	0.039	98	85-115	
Cadmium	mg/L	0.04	0.039	97	85-115	
Cobalt	mg/L	0.04	0.040	100	85-115	
Molybdenum	mg/L	0.04	0.040	99	85-115	
Selenium	mg/L	0.04	0.039	96	85-115	
Thallium	mg/L	0.04	0.037	93	85-115	

## MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2558264 2558263 MSD MS 60323643002 Spike MS MSD MSD Spike MS % Rec Max Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD RPD Qual 0.038 20 Antimony <0.0010 0.04 0.04 0.038 70-130 mg/L 96 96 0 0.066 Arsenic mg/L 0.026 0.04 0.04 0.066 101 101 70-130 0 20 Cadmium mg/L < 0.00050 0.04 0.04 0.036 0.035 89 88 70-130 0 20 Cobalt mg/L 0.0028 0.04 0.04 0.042 0.042 98 99 70-130 20 1 Molybdenum mg/L 0.0043 0.04 0.04 0.048 0.048 108 109 70-130 1 20 Selenium < 0.0010 0.04 0.04 0.038 0.039 94 95 70-130 20 mg/L 1 Thallium mg/L < 0.0010 0.04 0.04 0.036 0.036 90 90 70-130 0 20

MATRIX SPIKE SAMPLE:	2558265						
		60323644007	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	mg/L	<0.0010	0.04	0.038	94	70-130	
Arsenic	mg/L	0.015	0.04	0.058	109	70-130	
Cadmium	mg/L	<0.00050	0.04	0.034	85	70-130	

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Project: TEC CCR Pace Project No.: 60323643

MATRIX SPIKE SAMPLE:	2558265						
		60323644007	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Cobalt	mg/L	<0.0010	0.04	0.038	96	70-130	
Molybdenum	mg/L	0.11	0.04	0.16	119	70-130	
Selenium	mg/L	<0.0010	0.04	0.041	101	70-130	
Thallium	mg/L	<0.0010	0.04	0.037	92	70-130	

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## **REPORT OF LABORATORY ANALYSIS**

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Project:	TEC CCR							
Pace Project No.:	60323643							
QC Batch:	627752		Analysis Me	ethod:	SM 2540C			
QC Batch Method:	SM 2540C		Analysis De	escription:	2540C Total Di	ssolved Solids		
Associated Lab Sar	nples: 60323643	3001, 6032364300	02, 60323643003,	60323643004				
METHOD BLANK:	2558642		Matrix	: Water				
Associated Lab Sar	mples: 60323643	3001, 6032364300	02, 60323643003,	60323643004				
			Blank	Reporting				
Parar	neter	Units	Result	Limit	Analyze	d Quali	fiers	
Total Dissolved Soli	ds	mg/L	<5.0	5.	0 12/12/19 00	6:24		
LABORATORY CO	NTROL SAMPLE:	2558643	0	1.00	1.00	04 D		
Parar	neter	Units	Spike Conc.	Result	% Rec	% Rec Limits	Qualifiers	
Total Dissolved Soli	ds	mg/L	1000	1010	101	80-120		
SAMPLE DUPLICA	TE: 2558644							
			60323643001	Dup		Max		
Parar	neter	Units	Result	Result	RPD	RPD	Qualifiers	
Total Dissolved Soli	ds	mg/L	1330	133	0	1	10	
SAMPLE DUPLICA	TE: 2558645							
			60323673004	Dup		Max		
Parar	neter	Units	Result	Result	RPD	RPD	Qualifiers	
Total Dissolved Soli	ds	mg/L	1010	106	0	4	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:	TEC CCR							
Pace Project No.:	60323643							
QC Batch:	627173		Analysis Meth	od:	SM 4500-H+B			
QC Batch Method:	SM 4500-H+B		Analysis Desc	ription:	4500H+B pH			
Associated Lab Sar	mples: 6032364300	1, 603236430	02, 60323643003, 60	32364300	4			
SAMPLE DUPLICA	TE: 2556513							
Para	neter	Units	60322862003 Result	Dup Result	RPD	Max RPD	Qualifiers	

1 didinotor	eritte	rtoourt	rtooun	THE B	10 D	aannoro
pH at 25 Degrees C	Std. Units	7.8	7.8	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:	TEC CCR												
Pace Project No .:	60323643												
QC Batch:	627689		Analy	/sis Metho	d:	EF	PA 300.0						
QC Batch Method:	EPA 300.0		Analy	/sis Descri	ption:	30	0.0 IC An	ions					
Associated Lab Sar	nples: 60323643	001, 6032364300	2, 6032364	3003, 603	2364300	4							
METHOD BLANK:	2558364			Matrix: W	ater								
Associated Lab Sar	nples: 60323643	001, 6032364300	2, 6032364	3003, 603	2364300	4							
			Blar	nk	Reporting	g							
Parar	neter	Units	Res	ult	Limit		Analy	/zed	Qualifie	rs			
Chloride		mg/L		<1.0		1.0	12/12/1	9 13:46					
Fluoride		mg/L		<0.20	(	).20	12/12/1	9 13:46					
Sulfate		mg/L		<1.0		1.0	12/12/1	9 13:46					
METHOD BLANK:	2560357			Matrix: W	ater								
Associated Lab Sar	nples: 60323643	001, 6032364300	2, 6032364	3003.603	2364300	4							
			Blar	nk	Reportin	g							
Parar	neter	Units	Res	ult	Limit	•	Analy	/zed	Qualifie	rs			
Chloride		mg/L		<1.0		1.0	12/13/1	9 09:25					
Fluoride		mg/L		<0.20	C	).20	12/13/1	9 09:25					
Sulfate		mg/L		<1.0		1.0	12/13/1	9 09:25					
LABORATORY CO	NTROL SAMPLE:	2558365											
			Spike	LC	S		LCS	% F	Rec				
Parar	neter	Units	Conc.	Res	sult	Ċ	% Rec	Lim	iits	Qualifiers			
Chloride		mg/L		5	4.7		9:	3	90-110		_		
Fluoride		mg/L	2.	.5	2.4		9	7	90-110				
Sulfate		mg/L		5	4.7		9	5	90-110				
LABORATORY CO	NTROL SAMPLE:	2560358											
			Spike	LC	s		LCS	% F	Rec				
Parar	neter	Units	Conc.	Res	sult	ç	% Rec	Lim	its	Qualifiers			
Chloride		mg/L		5	4.7		9,	4	90-110		_		
Fluoride		mg/L	2.	.5	2.4		9	7	90-110				
Sulfate		mg/L		5	4.8		9	6	90-110				
MATRIX SPIKE & M		LICATE: 2558	366		25583	867							
			MS	MSD	_0000								
		60323643001	Spike	Spike	MS		MSD	MS	MSD	% Rec		Max	
Paramete	r Units	Result	Conc.	Conc.	Result	_	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chloride	mg/L	220	250	250	47	73	463	101	9	7 80-120	2	15	
Fluoride	mg/L	<0.20	2.5	2.5	2	.8	2.9	110	11:	2 80-120	2	15	
Sulfate	mg/L	654	250	250	92	22	900	107	9	8 80-120	2	15	

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## REPORT OF LABORATORY ANALYSIS

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Project: TEC CCR Pace Project No.: 60323643

MATRIX SPIKE SAMPLE:	2558368						
		60323644006	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Chloride	mg/L	263	1000	1200	94	80-120	
Fluoride	mg/L	2.9	2.5	5.9	119	80-120	
Sulfate	mg/L	1650	1000	2680	104	80-120	

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## **REPORT OF LABORATORY ANALYSIS**

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## QUALIFIERS

Project:	TEC CCR
Pace Project No.:	60323643

## 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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.

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

## ANALYTE QUALIFIERS

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:	TEC CCR
Pace Project No.:	60323643

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60323643001	MW-08-120519	EPA 200.7	627594	EPA 200.7	627722
60323643002	MW-10-120519	EPA 200.7	627594	EPA 200.7	627722
60323643003	MW-07-120519	EPA 200.7	627594	EPA 200.7	627722
60323643004	DUP-120519	EPA 200.7	627594	EPA 200.7	627722
60323643001	MW-08-120519	EPA 200.8	627660	EPA 200.8	627730
60323643002	MW-10-120519	EPA 200.8	627660	EPA 200.8	627730
60323643003	MW-07-120519	EPA 200.8	627660	EPA 200.8	627730
60323643004	DUP-120519	EPA 200.8	627660	EPA 200.8	627730
60323643001	MW-08-120519	EPA 245.1	627969	EPA 245.1	628012
60323643002	MW-10-120519	EPA 245.1	627969	EPA 245.1	628012
60323643003	MW-07-120519	EPA 245.1	627969	EPA 245.1	628012
60323643004	DUP-120519	EPA 245.1	627969	EPA 245.1	628012
60323643001	MW-08-120519	SM 2540C	627752		
60323643002	MW-10-120519	SM 2540C	627752		
60323643003	MW-07-120519	SM 2540C	627752		
60323643004	DUP-120519	SM 2540C	627752		
60323643001	MW-08-120519	SM 4500-H+B	627173		
60323643002	MW-10-120519	SM 4500-H+B	627173		
60323643003	MW-07-120519	SM 4500-H+B	627173		
60323643004	DUP-120519	SM 4500-H+B	627173		
60323643001	MW-08-120519	EPA 300.0	627689		
60323643002	MW-10-120519	EPA 300.0	627689		
60323643003	MW-07-120519	EPA 300.0	627689		
60323643004	DUP-120519	EPA 300.0	627689		



Sample Condition Upon Receipt

## WO#:60323643

Client Name: <u>Wester Energy</u>		
Courier: FedEx 🗆 UPS 🗆 VIA 🖾 Clay 🗆	PEX 🗆 🛛 ECI 🗆	Pace Z Xroads 🗆 Client 🗆 Other 🗆
Tracking #: Pac	ce Shipping Label Used	1? Yes 🗆 No 🖊
Custody Seal on Cooler/Box Present: Yes 🗆 🛛 🛛 🖉	Seals intact: Yes 🗆	No
Packing Material: Bubble Wrap  Bubble Bags	□ Foam □	None 🖸 Other 🗆
Thermometer Used: <u>7-298</u> Type o	fice: Vet Blue Nor	Date and initials of person
Cooler Temperature (°C): As-read 3.7 Corr. Fac	tor <u>0.0</u> Correct	ed 3.7 examining contents:
Temperature should be above freezing to 6°C		pv/2/9/19
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):	□Yes DNO □N/A	
Rush Turn Around Time requested:	TYes No N/A	
Sufficient volume:	Yes DNo DN/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 ZN/A	
Sample labels match COC: Date / time / ID / analyses		
Samples contain multiple phases? Matrix:		
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	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:	□Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	
Trin Blank present	⊡Yes ⊡No 🕬/A	
Headspace in VOA vials ( >6mm);	TYes No IN/A	
Samples from USDA Regulated Area: State:		
Additional labels attached to 5035A / TX1005 vials in the fiel		
Client Notification/ Resolution: Copy COC	to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date	/Time:	·
Comments/ Resolution:		
1		

Project Manager Review:

Date:

Pace Analytical 0

## CHAIN-OF-CUSTODY / Analytical Request Document

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

Section / Required (	A Client Information:	Section B Required Proje	ect Info	simation:					Se Invi	ction C pice Infor	mation:									Pa	je:	of			
Company:	WESTAR ENERGY	Report To: BR	andon	m-Griffi	1 76	Jam	R	neel	Alte	antion:	Jare	d Morri	ison				_			I					1 1
Address:	818 Kansas Ave	Copy To: Ja	red N	Aorriso	n, Hea	th Horn	ya		٥ )	npany Né	ame: V	VESTA	AR ENE	ERGY			REGU	LATOR	Y AGEN	łcY	101 102		1		_
	Topeka, KS 66612								Adi	Iress:	<sup>w</sup>	SEE SE	CTION	A N				PDES	L GR	W DNDC	ATER [	DRIN	ING WA	TER	-
Email To:	brandon Lgriffin@westaremergy.com	Purchase Orde	sr No	10TE	EC 00	000079	56		Pac	e Quote:							L	ST	L RCI	₹A		- OTHE	۱ «		_
Phone: (	785) 575-8135 Fax:	Project Name:							Pac	le Project	Неа	ther W	ilson, 5	13-56	3-1407		Site	ocation.		9					1111
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F-ALL-Q-020rev\_08, 12-Oct-2007

"Important Note: By signing this form you are accepting Pace's NET 30 day payment lerms and agreeing to late charges of 1,5% per month for any invoices not paid within 30 days.

## Pace Container Order #569725

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Order	By :		Ship T	Го :				Return	то:
Сотрапу	Evergy Kans	as Central, Inc.	Company	Haley & Aldrich				Company	Pace Analytical Kansas
Contact	Kneeling, Ad	lam	Contact	Misha Miller-Gi	more	_		Contact	Wilson, Heather
Email	akneeling@l	haleyaldrich.com	Email					Email	heather.wilson@pacelabs.com
Address	400 E. Van E	Buren St	Address	11020 King St				Address	9608 Loiret Blvd.
Address 2	Suite 545		Address 2	Suite 450				Address 2	
City	Phoenix		City	Overland Park				City	Lenexa
State	AZ Z	Zip 85004	State	KS Zip	66210			State	KS Zip 66219
Phone	(602)760-242	24	Phone	(913) 242-5491				Phone	1(913)563-1407
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5	WT	300.0 Anions/pH	1L plastic L	Inpreserved	5		0	102819-2AED	
<u> </u>		FEDEX Prenaid Return-Lenexa	L plasuc	unpreserved			0	102010-2ALD	

Hazard Shipping Placard In Place : NO *Sample receiving hours are Mon-Fri 7:00am-6:00pm and Sat 8:00am-2:00pm unless special arrangements are made with your project manager. *Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you. *Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample *Payment term are net 30 days. *Please include the proposal number on the chain of custody to insure proper billing.	LAB USE: Ship Date : Prepared By: Verified By:	12/02/2019 Skylar
Sample     CLIE       PP COC (1), PP labels w/o sample IDs     Lenexa return       Client needs to arrive on 12/3 in the morning at the latest     Client needs to arrive on 12/3 in the morning at the latest	ENT USE (Optional): Date Rec'd: Received By:	

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Received By: Verified By:

Page 28 of 28

None

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Page 1 of 1



January 02, 2020

Adam Kneeling Haley & Aldrich, Inc. 400 E. Van Buren St Suite 545 Phoenix, AZ 85004

RE: Project: TEC CCR GROUNDWATER Pace Project No.: 60323759

Dear Adam Kneeling:

Enclosed are the analytical results for sample(s) received by the laboratory on December 09, 2019. 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.

Revision 1 - This report replaces the December 27, 2019 report. This project was revised on January 2, 2020 to correct the Radium Sum Calculation as per client specifications and to correct the Project ID. (Greensburg, PA)

Revision 2 - This report replaces the January 2, 2020 report. This project was revised on January 2, 2020 to correct the Lab IDs for 002, 003 and 004. (Greensburg, PA)

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

Sincerely,

Antarton m. Wilson

Heather Wilson heather.wilson@pacelabs.com 1(913)563-1407 Project Manager

Enclosures





January 02, 2020 Page 2

cc: Bob Beck, Kansas City Power & Light Company HEATH HORYNA, WESTAR ENERGY Andrew Hare, KCP&L and Westar, Evergy Companies Laura Hines, KCP&L & Westar, Evergy Companies Jake Humphrey, KCP&L and Westar, Evergy Companies Samantha Kaney, Haley & Aldrich JARED MORRISON, KCP&L and Westar, Evergy Companies Melissa Michels, KCP&L & Westar, Evergy Companies Danielle Zinmaster, Haley & Aldrich





## CERTIFICATIONS

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

## Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601 ANAB DOD-ELAP Rad Accreditation #: L2417 Alabama Certification #: 41590 Arizona Certification #: AZ0734 Arkansas Certification California Certification #: 04222CA Colorado Certification #: PA01547 Connecticut Certification #: PH-0694 **Delaware Certification** EPA Region 4 DW Rad Florida/TNI Certification #: E87683 Georgia Certification #: C040 Florida: Cert E871149 SEKS WET **Guam Certification** Hawaii Certification Idaho Certification **Illinois Certification** Indiana Certification Iowa Certification #: 391 Kansas/TNI Certification #: E-10358 Kentucky Certification #: KY90133 KY WW Permit #: KY0098221 KY WW Permit #: KY0000221 Louisiana DHH/TNI Certification #: LA180012 Louisiana DEQ/TNI Certification #: 4086 Maine Certification #: 2017020 Maryland Certification #: 308 Massachusetts Certification #: M-PA1457 Michigan/PADEP Certification #: 9991

Missouri Certification #: 235 Montana Certification #: Cert0082 Nebraska Certification #: NE-OS-29-14 Nevada Certification #: PA014572018-1 New Hampshire/TNI Certification #: 297617 New Jersey/TNI Certification #: PA051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888 North Carolina Certification #: 42706 North Dakota Certification #: R-190 Ohio EPA Rad Approval: #41249 Oregon/TNI Certification #: PA200002-010 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457 Rhode Island Certification #: 65-00282 South Dakota Certification Tennessee Certification #: 02867 Texas/TNI Certification #: T104704188-17-3 Utah/TNI Certification #: PA014572017-9 USDA Soil Permit #: P330-17-00091 Vermont Dept. of Health: ID# VT-0282 Virgin Island/PADEP Certification Virginia/VELAP Certification #: 9526 Washington Certification #: C868 West Virginia DEP Certification #: 143 West Virginia DHHR Certification #: 9964C Wisconsin Approve List for Rad Wyoming Certification #: 8TMS-L


# SAMPLE SUMMARY

### Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60323759001	MW-08_120519	Water	12/05/19 09:15	12/09/19 09:30
60323759002	MW-10_120519	Water	12/05/19 11:10	12/09/19 09:30
60323759003	MW-07_120519	Water	12/05/19 13:40	12/09/19 09:30
60323759004	DUP_120519	Water	12/05/19 13:45	12/09/19 09:30



# SAMPLE ANALYTE COUNT

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60323759001		EPA 903.1		1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60323759002	MW-10_120519	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60323759003	MW-07_120519	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60323759004	DUP_120519	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA



# **PROJECT NARRATIVE**

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

### Method: EPA 903.1

Description:903.1 Radium 226Client:Evergy Kansas Central, Inc.Date:January 02, 2020

### **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.

Additional Comments:



## **PROJECT NARRATIVE**

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

### Method: EPA 904.0

Description:904.0 Radium 228Client:Evergy Kansas Central, Inc.Date:January 02, 2020

### **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.

Additional Comments:



# **PROJECT NARRATIVE**

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

### Method: Total Radium Calculation

Description:Total Radium 228+226Client:Evergy Kansas Central, Inc.Date:January 02, 2020

### **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.

### **Additional Comments:**

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



Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Sample: MW-08_120519	Lab ID: 6032375	<b>9001</b> Collected: 12/05/19 09:15	Received:	12/09/19 09:30 I	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.191 ± 0.485 (1.06) C:NA T:89%	pCi/L	12/24/19 11:52	13982-63-3	
Radium-228	EPA 904.0	0.569 ± 0.459 (0.926) C:72% T:85%	pCi/L	12/24/19 12:00	15262-20-1	
Total Radium	Total Radium Calculation	0.569 ± 0.668 (1.06)	pCi/L	01/02/20 11:31	7440-14-4	



Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Sample: MW-10_120519	Lab ID: 603237	<b>59002</b> Collected: 12/05/19 11:10	Received:	12/09/19 09:30	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.368 (0.779) C:NA T:95%	pCi/L	12/24/19 11:52	13982-63-3	
Radium-228	EPA 904.0	1.60 ± 0.656 (1.11) C:73% T:82%	pCi/L	12/24/19 12:01	15262-20-1	
Total Radium	Total Radium Calculation	1.60 ± 0.752 (1.11)	pCi/L	01/02/20 11:31	7440-14-4	



Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Sample: MW-07_120519	Lab ID: 603237	<b>59003</b> Collected: 12/05/19 13:40	Received:	12/09/19 09:30 I	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0619 ± 0.438 (0.873) C:NA T:92%	pCi/L	12/24/19 12:05	5 13982-63-3	
Radium-228	EPA 904.0	0.604 ± 0.370 (0.690) C:73% T:89%	pCi/L	12/24/19 11:57	15262-20-1	
Total Radium	Total Radium Calculation	0.666 ± 0.573 (0.873)	pCi/L	01/02/20 11:31	7440-14-4	



Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Sample: DUP_120519	Lab ID: 603237	<b>59004</b> Collected: 12/05/19 13:45	Received:	12/09/19 09:30	Matrix: Water	
PWS:	Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.280 ± 0.390 (0.988) C:NA T:82%	pCi/L	12/24/19 12:05	5 13982-63-3	
Radium-228	EPA 904.0	0.755 ± 0.430 (0.788) C:76% T:80%	pCi/L	12/24/19 12:01	15262-20-1	
Total Radium	Total Radium Calculation	0.755 ± 0.581 (0.988)	pCi/L	01/02/20 11:31	7440-14-4	



# **QUALITY CONTROL - RADIOCHEMISTRY**

Project:	TEC CCR GROUP	IDWATER			
Pace Project No.:	60323759				
QC Batch:	375682	Analysis Method:	EPA 903.1		
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226		
Associated Lab San	nples: 60323759	001, 60323759002, 60323759003, 60323759004	Ļ		
METHOD BLANK:	1822419	Matrix: Water			
Associated Lab San	nples: 60323759	001, 60323759002, 60323759003, 60323759004	Ļ		
Paran	neter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226		0.000 ± 0.244 (0.497) C:NA T:83%	pCi/L	12/24/19 11:32	

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:	TEC CCR GROUN	IDWATER				
Pace Project No.:	60323759					
QC Batch:	375683	Analysis Method:	EPA 904.0			
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228			
Associated Lab San	nples: 60323759	001, 60323759002, 60323759003, 60323759004	1			
METHOD BLANK:	1822420	Matrix: Water				
Associated Lab San	nples: 60323759	001, 60323759002, 60323759003, 60323759004	1			
Paran	neter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers	
Radium-228		0.727 ± 0.373 (0.642) C:79% T:78%	pCi/L	12/24/19 11:59		

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: TEC CCR GROUNDWATER

Pace Project No.: 60323759

### 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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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-PA Pace Analytical Services - Greensburg



# QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: TEC CCR GROUNDWATER

Pace Project No.:	60323759
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Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60323759001	MW-08_120519	EPA 903.1	375682		
60323759002	MW-10_120519	EPA 903.1	375682		
60323759003	MW-07_120519	EPA 903.1	375682		
60323759004	DUP_120519	EPA 903.1	375682		
60323759001	MW-08_120519	EPA 904.0	375683		
60323759002	MW-10_120519	EPA 904.0	375683		
60323759003	MW-07_120519	EPA 904.0	375683		
60323759004	DUP_120519	EPA 904.0	375683		
60323759001	MW-08_120519	Total Radium Calculation	377793		
60323759002	MW-10_120519	Total Radium Calculation	377793		
60323759003	MW-07_120519	Total Radium Calculation	377793		
60323759004	DUP_120519	Total Radium Calculation	377793		

Pace Analytical

# 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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Require	ed Client Information:	Required Project	l Informa	tion:				Invoi	ce Infor	mation:									Pac	e:		f		
Compan	W: WESTAR ENERGY	Report To: Esser	- upp	- Line Line Line	Ada	4 V	neel h	Ler Atter	ntion:	Jare	ad Mor	rison												
Address	t: 818 Kansas Ave	Copy To: Jare	nom bi	ison, Ht	eath Hoi	TIYA		Com Com	pany Na	ime:	WEST,	AR EN	ERGY			REGULA	TORY	AGEN	  }		·			
	Topeka, KS 66612							Addr	ess:		SEE SI	ECTIO	ΝA			D N D	ES	GRO	W GNU	ATER	L DRI	IKING W	ATER	
Email Tc	o: brandon l griffin@wastorenergy.cons-	Purchase Order 1	40.: 1	OTEC-0	00000	956		Pace	Quote ence:							L UST	Ľ	RCR	4		LT OTH	ž		
Phone:	(785) 575-8135 Fax	Project Name:						Pace Mana	Project ger:	Hea	ather <b>V</b>	Vilson,	913-5(	3-140	7	Site Loc	ation							
Reques	ted Due Date/TAT: 15 Day	Project Number		-				Pace	Profile #	: 965	6, 1					ST	A TE:	x.	2					
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2	MW-10-120519	5	_	5/2	11 (O			と		×			in far	X	XX		>	•	5	-	7	2	(	
6	MJ-07-120519	3		12/5	13-(1	6		7		×			10	×	X		1							
4	Dup- 120519	F	1	2/5	134			1		X			53) 	Y	X			/	1			١		
5								)		_			1											
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12	ADDITIONAL COMMENTS	KEL		HED BY /	AFFILIAT		DATE			1	-	ACCEP	TED BY								SAMPLE CO			Т
			, . 	12	cdr.	c KSd	2	-	9:0	ĮХh	4	3			DAU	12	115	13				5		
aye i r Ul .	Page 17 of				SAMPL	ER NAME PRINT Na SIGNATU	AND SIGNA me of SAMPL RE of SAMPL	ER:	E E lat	4	23/2	221	22	NW S	E Signed VDD/YY):	12/1	2 K	1 5	O" ni qmeT	Received on	(N/Y) eol 	Cooler (Y/V)	taani seiqmeS (N/Y)	
20	20								Š	1				-		ł	,	-	-	-	) 	-	t	1

F-ALL-Q-020rev.08, 12-Oct-2007

"important Note: By signing this form you are accepting Paec's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any involves not paid within 30 days.

Pittsburgh La	ab Sample Condit	ion L	Jpon	Re	ceipt			
Pace Analytical'	Client Name:	W	res	ta	~ Energy	, Project #	ŧ	
1						,		
Courier: $\square$ Fed Ex $\square$ Tracking #: $17.16$	UPS USPS Clent	$\mathcal{I}_{\mathcal{I}}^{\mathbb{D}}$	ommer	rcial	Pace Other _	·	Label LIMS Login	
Custody Seal on Coole	r/Box Present: Uves	In	5	Seals	intact: ves	$A_{no}$	L	
Thermometer Used	NA	/ Туре «	of Ice:	Wet	Blue None			
Cooler Temperature	Observed Temp	and the second	°C	Corre	ection Factor:	°C Fina	Temp:	°C
Temp should be above free	zing to 6°C							
					pH paper Lot#	Date and conten	i Initials of perso ts:	on examining
Comments:		Yes	No	N/A	1023391		10110	11-10/-
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Chain of Custody Reling	uished:	$ \mid $			3.	· . ·		
Sampler Name & Signat	ure on COC:	$\square$			4.			
Sample Labels match Co	C:				5.			
-includes date/time/ID	) Matrix:	$\mathbf{M}$	Ţ	<del>.</del>				
Samples Arrived within H	Iold Time:				6.			
Short Hold Time Analys	sis (<72hr remaining):		_	P	7.			
Rush Turn Around Tim	e Requested:		/		8.			
Sufficient Volume:					9.			,
Correct Containers Used	l:		ſ		10.			
-Pace Containers Use	ed:							
Containers Intact:					11.			
Orthophosphate field filte	ered				12.			
Hex Cr Aqueous sample	field filtered			/	13.			
Organic Samples cheo	ked for dechlorination:				14.			
Filtered volume received	for Dissolved tests				15.			
All containers have been ch	ecked for preservation.		-		16.	_		
exceptions: VOA, colifo Non-aqueous matrix	rm, TOC, O&G, Phenolics, I	Radon,	·	<u></u>	PH	LZ		
All containers meet meth	od preservation		·			Date/time of		
requirementer		لـــــــا		L	Lot # of added preservative	picacivation		
Headspace in VOA Vials	( >6mm):				17.			
Trip Blank Present:			$\backslash$		.18.			-
Trip Blank Custody Seals	Present			$\leq$				· · ·
Rad Samples Screened	< 0.5 mrem/hr				completed:	Date: 1	rioli	۲ I
<b>Client Notification/ Res</b>	olution:	<u> </u>					<u> </u>	
Person-Contacted	•			Date/	Fime:	Cont	acted By:	
Comments/ Resolution								
					· · · · · · · · · · · · · · · · · · ·			
· · · · · · · · · · · · · · · · · · ·								

# $\Box$ 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.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-9 5April2019) Page 18 of 20

PACE Analytical Services Ra-226 Analysis

# **Quality Control Sample Performance Assessment**

/ Taug Alialy Incal			Analyst Must Manually Enter All Fields Highlighted in	r Yellow.	
Test:	Ra-226				
Analyst	NK1		Samula Matrix Snika Control Accessment	AIC/AICD 1	VISINGU 0
Date:	12/17/2019		Sample Collection Date:	11/18/2019	
Batch ID-	51475				
Matrix	DWO		Sample MS I D	30230055001	
			Sample MSD I.D.		
Method Blank Assessment			Soike I.D.:	19-022	
MB Sample ID	1822419		MS/MSD Decay Corrected Spike Concentration (pCi/mL):	32.116	
MB concentration:	0.000		Solle Value 1 hod in MC (m1).		
M/B Counting Uncertainty:	0.210		Spike Victime Lised in MCD (m) -	770	
MB MDC:	0.497		Opened to a provide a prov	0 663	
MB Numerical Performance Indicator	0.00			0.000	
MB Status vs Numorical Indicator	DID DIV			2.004	
MB Status vs. MDC:	Pass		MSD Target Conc. (pCi/L g. F):		
			WS Soike Uncertainty (calculated)	0 455	
Laboratory Control Sample Assessment	LCSD (Y or N)?	z	MSD Solke Incertainty (calculated):	2	
	LCS51475	LCSD51475	Canula Parily Sampa Pasily	0 306	
Count Date:	12/24/2019		Samela Decide notice allocations and the second sec		
Spike I.D.:	19-022		Cample Mean Council Once the Matrix Solide Decult	0.447	
Suike Concentration (nCi/mi )	30 115		Motiv Callo Boord Carter Product Incontrict And Carter	104.6	
	21.20		wauts opike result counting uncertainty (pc/r_, g, F):	1.283	
	0.10		Sample Matrix Spike Duplicate Result:		
	0.004	-	Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
I alder collor (prover g. F):	4.630		MS Numerical Performance Indicator:	-0.612	
Uncertainty (Calculated):	0.227		MSD Numerical Performance Indicator:		
Result (pC/L, g, F):	3.827		MS Percent Recovery:	95.54%	
LCS/LCSD Counting Uncertainty (pCi/L, g, F):	0.954		MSD Percent Recovery:		
Numerical Performance Indicator:	-2.02		MS Status vs Numerical Indicator:	N/A	
Percent Recovery:	79.14%		MSD Status vs Numerical Indicator:		
Status vs Numerical Indicator:	N/A		MS Status vs Recovery:	Pass	
Status vs Recovery:	Pass		MSD Status vs Recovery:		
Upper % Recovery Limits:	135%		MS/MSD Upper % Recovery Limits:	136%	
Lower % Recovery Limits:	73%		MS/MSD Lower % Recovery Limits:	71%	
Duction to Account of					
Unpicate Sample Assessment			Matrix Spike/Matrix Spike Duplicate Sample Assessment	*****	
Sample I.D.:	35517467001	Enter Duplicate	Sample I.D.		
Duplicate Sample I.D.	35517467001DUP	sample IDs if	Sample MS I.D.		
Sample Result (pCi/L, g, F);	0.210	other than	Sample MSD I D		
Sample Result Counting Uncertainty (pCi/L, q, F);	0.307	LCS/LCSD in	Samula Matrix Snike Result.		
Sample Duplicate Result (pCl/L, g, F);	0.127	the space below.	Matrix Spike Result Counting Uncertainty (nCi/l o EV		
Sample Duplicate Result Counting Uncertainty (pCI/L, g, F);	0.250		Sample Matrix Soike Duplicate Result:		
Are sample and/or duplicate results below RL?	See Below 推		Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):		
Duplicate Numerical Performance Indicator:	0.410	35517467001	Duplicate Numerical Performance Indicator:		
Duplicate RPD:	49.05%	35517467001DUP	(Based on the Percent Recoveries) MS/ MSD Duplicate RPD:		
Duplicate Status vs Numerical Indicator:	N/A		MS/ MSD Duplicate Status vs Numerical Indicator	1.000 <b>1.0</b> 00	
Duplicate Status vs RPD:	Failer		MS/ MSD Duplicate Status vs RPD:		
% RPD Limit	32%		% RPD Limit:		

## Evaluation of duplicate precision is not applieable if either the sample or duplicate results are below the RL.

Comments:

Batch-must be re-prepped due to unacceptable precision.

LELER

Ra-226 NELAC QC Printed: 12/24/2019 12:16 PM

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PACE Analytical Services Ra-228 Analysis

Pace Analytical	
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# **Quality Control Sample Performance Assessment**

Pace Analytical			Analyst Must Manually Enter All Fields Highlighted in	Yellow.	
Test	Ra-228				
Analyst	VAL		Sample Matrix Spike Control Assessment	MS/MSD 1	MS/MSD 2
Date:	12/19/2019		Sample Collection Date:	12/5/2019	
Worklist	51476		Sample I.D.	30339967001	
Matrix:	M		Sample MS I.D.	30339967001MS	
Method Blank Assessment			Sample Misu 1.0. Snike I.D.:	19-057	
	1822420		MS/MSD Decay Corrected Snike Concentration (nCt/m) V	36.019	
	262.0		manual devery derived operationation (powers).	0.00	
	177.0		Opice Volume Used in MCD (mL): Solice Volume Head in MCD (mL):	<b>NTN</b>	
	0.575			0 8/12	
	2000			200.0	
	3.02			0.400	
MIS Status VS Numerical Indicator: MR Status vs MDC	See Comment*		MSD Taroet Conc. (c., g, r.): MSD Taroet Conc. (pCl/L, g, F):		
			MS Spike Uncertainty (calculated):	0.647	
Laboratory Control Sample Assessment	LCSD (Y or N)?	z	MSD Spike Uncertainty (calculated):		
-	LCS51476	LCSD51476	Sample Result:	0.637	
Count Date:	12/24/2019		Sample Result 2 Sigma CSU (pCI/L, g, F):	0.399	
Spike I.D.:	19-057		Sample Matrix Spike Result:	9.366	
Decay Corrected Spike Concentration (pCi/mL):	35.792		Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):	1.896	
Volume Used (mL):	0.10		Sample Matrix Spike Duplicate Result:		
Aliauot Volume (L. a. F):	0.803		Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L. g. F):		
Target Conc. (pC/L, g, F):	4.455		MS Numerical Performance Indicator:	-0.247	
Uncertainty (Calculated):	0.321		MSD Numerical Performance Indicator:		
Result (pCi/L, g, F):	4.003		MS Percent Recovery:	97.13%	
LCS/LCSD 2 Sigma CSU (pCi/L, g, F);	0.917		MSD Percent Recovery:	******	
Numerical Performance Indicator:	-0.91		MS Status vs Numerical Indicator:	Pass	
Percent Recovery:	89.86%		MSD Status vs Numerical Indicator.		
Status vs Numerical Indicator:	N/A		MS Status vs Recovery:	Pass	
Status vs Recovery:	Pass		MSD Status vs Recovery:		
Upper % Recovery Limits:	135%		MS/MSD Upper % Recovery Limits:	135%	
Lower % Recovery Limits:	60%		MS/MSU Lower % Recovery Limits:	60%	
Dunlicata Samala Accacement			Matriv Snike/Matriv Snike Dunlicate Sample Assessment		
Cupilcate Satifyte Assessinent			Maula Opinci Maula Opinci Duplicate Cattiple Assessingtic		
Sample I.D.:	30339965002	Enter Duplicate	Sample I.D.		
Duplicate Sample I.D.	30339965002DUP	sample IDs if	Sample MS I.D.		
Sample Result (pCi/L, g, F):	2.216	other than	Sample MSD I.D.		
Sample Result 2 Sigma CSU (pCi/L, g, F):	0.596	LCS/LCSD in	Sample Matrix Spike Result		
Sample Duplicate Result (pCi/L, g, F):	1.845	the space below.	Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		
Sample Duplicate Result 2 Sigma CSU (pClift, g, F):	0.529		Sample Matrix Spike Duplicate Result		
Are sample and/or duplicate results below RL?	See Below #		Matrix Spike Duplicate Result 2 Sigma USU (pC/L, g, F);		
Duplicate Numerical Performance Indicator:	0.912	30339965002	Duplicate Numerical Performance Indicator:		
Duplicate RPD:	18.26%	30339965002DUP	(Based on the Percent Recoveries) MS/ MSU Duplicate RPD:		
Duplicate Status vs Numerical Indicator	Pass		MS/ MSU Duplicate Status VS Numerical Indicator;		
UUPIICATE STATUS	36%		MOV MOD DUPICATE STATUS STATUS		

## Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

\*The method blank result is below the reporting limit for this analysis and is acceptable.

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Ra-228 NELAC DW2 Printed: 12/26/2019 8:15 AM

**ATTACHMENT 2** 

**Statistical Analyses** 

ATTACHMENT 2-1

September 2018 Semi-Annual Sampling Event Statistical Analyses



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

# TECHNICAL MEMORANDUM

March 18, 2022 File No. 0204993-000

TO:	Evergy Kansas Central, Inc. (f/k/a Westar Energy, Inc.) Jared Morrison – Director, Water and Waste Programs
FROM:	Haley & Aldrich, Inc.
	Steven F. Putrich, P.E., Senior Associate — Engineering Principal
	Mark Nicholls, P.G., Senior Associate — Senior Hydrogeologist
SUBJECT:	September 2018 Semi-annual Groundwater Assessment Monitoring
	Data Statistical Evaluation
	Completed January 14, 2019
	Tecumseh Energy Center
	Bottom Ash Settling Area

Pursuant to Code of Federal Regulations Title 40 (40 CFR) §257.93 and §257.95 (Rule), this memorandum summarizes the statistical evaluation of the analytical results for the September 2018 semi-annual assessment monitoring groundwater sampling event for the Tecumseh Energy Center (TEC) Bottom Ash Settling Area (BASA). This semi-annual assessment monitoring groundwater sampling event was completed on September 6, 2018, with laboratory results received and validated in October 2018.

The statistical evaluation discussed in this memorandum was conducted to determine if Appendix IV groundwater monitoring constituents have been detected in downgradient wells at concentrations that represent a statistically significant increase (SSI) above background values and if one or more of the constituents have been detected at statistically significant levels (SSL) above the Groundwater Protection Standard (GWPS) consistent with the requirements of the Rule. GWPSs for each of the Appendix IV constituents have been set equal to the highest value of the maximum contaminant level, regional screening level, or background concentration.

# **Statistical Evaluation of Appendix IV Constituents**

The Rule provides four specific options for statistical evaluation of groundwater quality data collected at a coal combustion residuals (CCR) unit (40 CFR §257.93(f) (1-4)). The statistical method used for these evaluations (tolerance limit [TL]), was certified by Haley & Aldrich, Inc. on January 14, 2019. The TL method, as determined applicable for this sampling event, was used to evaluate potential SSLs above background. Background levels for each constituent listed in Appendix IV were computed as upper tolerance limits (UTL), and a minimum 95 percent confidence coefficient and 95 percent coverage. The most recent groundwater sampling event from each compliance well was compared to the corresponding background UTL to determine if an SSL existed.

Evergy Kansas Central, Inc. March 18, 2022 Page 2

# STATISTICAL EVALUATION

Either an interwell or intrawell evaluation was used to determine SSIs. Interwell evaluation compares the most recent values from downgradient compliance wells against a background dataset composed of upgradient well data, and the intrawell evaluation compares the most recent values from each compliance well against a background dataset composed of its own historical data. Because the CCR unit has transitioned into assessment monitoring, no statistical evaluations were conducted on Appendix III (detection monitoring) semi-annual assessment monitoring data.

The parametric TL methods were used to complete statistical evaluations of the referenced dataset. The TL procedure is one in which a concentration limit for each constituent is established from the distribution of the background data, with a minimum 95 percent confidence level. The upper endpoint of a TL is called the UTL. Depending on the data distribution, parametric or non-parametric TL procedures are used to evaluate groundwater monitoring data using this method. Parametric TLs utilize normally distributed data or normalized data via a transformation of the sample background data used to construct the limit. If the data are non-normal and a transformation is not indicated, non-parametric procedures (order statistics or bootstrap methods) are used to calculate the TL. If all the background data are non-detect, a maximum reporting limit may serve as an appropriate UTL.

These statistical evaluations were conducted using a background dataset for all Appendix IV constituents that were detected in the annual assessment monitoring sample event in June 2018 using parametric TLs. If an Appendix IV constituent concentration from the September 2018 sampling event was above the GWPS, the lower confidence limit (LCL) for the downgradient well constituent will be used to evaluate if an SSI is present. The LCL is the lower end of the confidence interval range, which is an estimated concentration range intended to contain the true mean or median of the population from which the sample is drawn. The confidence interval range is designed to locate the true population mean or median with a high degree of statistical confidence, or conversely, with a low probability of error.

The UTLs were calculated from the background well dataset using Chemstat software after testing for outlier sample results that would warrant removal from the dataset based on likely error in sampling or measurement. Both visual and statistical outlier tests for the background data were performed using Chemstat and U.S. Environmental Protection Agency's ProUCL 5.1 software, and a visual inspection of the data was performed using box plots and distribution plots for the downgradient sample data. No sample data were identified as outliers that warranted removal from the dataset.

# **BACKGROUND DISTRIBUTIONS**

The groundwater analytical results for each sampling event from the background sample location (MW-7 for interwell evaluation) were combined to calculate the UTL for each detected Appendix IV constituent. The variability and distribution of the pooled dataset was evaluated to determine the method for UTL calculation. Per the document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, March 2009,* background concentrations were updated based on statistical evaluation of analytical results collected through September 2018.



Evergy Kansas Central, Inc. March 18, 2022 Page 3

# **RESULTS OF APPENDIX IV DOWNGRADIENT STATISTICAL COMPARISONS**

The sample concentrations from the downgradient wells for each of the detected Appendix IV constituents from the September 2018 semi-annual assessment monitoring event were compared to their respective background UTLs and GWPSs (Table I). A sample concentration greater than the background UTL is considered to represent an SSI. A sample concentration greater than the GWPS is considered to represent an SSL. The results of the groundwater assessment monitoring statistical evaluation are discussed below and provided in Table I. Based on this statistical evaluation on groundwater sampling data collected in September 2018, SSLs above GWPS that occurred at the TEC BASA include arsenic and cobalt at MW-9 and arsenic at MW-10. Details are listed on Table I.

Tables:

Table I – Summary of Semi-annual Assessment Groundwater Monitoring Statistical Evaluation



TABLE

## TABLE I SUMMARY OF SEMI-ANNUAL ASSESSMENT GROUNDWATER MONITORING STATISTICAL EVALUATION SEPTEMBER 2018 SAMPLING EVENT TECUMSEH ENERGY CENTER BOTTOM ASH SETTLING AREA

											MCL C	omparison							Inter-wel	l Analysis	Groundwat	er Protection Standar	rd
Location Id	Frequency of Detection	Percent Non-Detects	Range of Non- Detect	Maximum Detect	Variance	Standard Deviation	Coefficient of Variance	CCR MCL/RSL § 257.95(h)(2)*	Report Result Unit	Detection Exceedances (Y/N)	Number of Detection Exceedances	Number of Non-Detection Exceedances	Outlier Presence	Outlier Removed	Trend	Distribution Well*	September 2018 Concentration (mg/L)	Detect?	Upper Tolerance Limit (mg/L) <sup>1</sup>	SSI (exceedance above Background at Individual Well)	GWPS (Higher of MCL/RSL or Upper Tolerance Limit) mg/L	Exceedance above GWPS at Individual Well	SSL
			1		cc	CR Appendix-IV:	Arsenic, Total (m	g/L)	-		-	-											
MW-7 (upgradient)	10/10	0%	-	0.0021	4.489E-08	0.0002119	0.1358	0.010	mg/L	N	0	0	Yes	No	Stable	Non-parametric	0.0015	Y	0.0021		0.010		
MW-8	10/10	0%	-	0.0041	5.911E-07	0.0007688	0.3343	0.010	mg/L	N	0	0	NO	NO	Stable	Normal	0.0028	Y		Yes		N	NO
IVIVV-9	10/10	0%	-	0.14	0.0002754	0.01000	0.1521	0.010	mg/L	Ý	10	0	NO	NO	Stable	Normal	0.099	ř V		Yes		ř	Yes
10100-10	10/10	0%	-	0.077	0.0001534	B Appendix-IV-I	0.2008 Barium Total (m	0.010	rng/L	Ť	10	U	INO	INO	Stable	Normai	0.040	ř		res		ř	res
MW-7 (upgradient)	10/10	0%	-	0.10	0.00008988	0.00948	0 123	20	mg/l	N	0	0	No	No	Stable	Normal	0.079	Y	0.0953		2.0		
MW-8	10/10	0%	-	0.063	0.000007122	0.002669	0.04578	2.0	mg/L	N	0	0	No	No	Stable	Normal	0.057	Y	0.0555	No	2.0	N	No
MW-9	10/10	0%	-	0.91	0.006201	0.07875	0.0993	2.0	mg/L	N	0	0	No	No	Stable	Normal	0.91	Ŷ		Yes		N	No
MW-10	10/10	0%	-	0.35	0.0006844	0.02616	0.08779	2.0	mg/L	N	0	0	No	No	Stable	Normal	0.350	Ŷ		Yes		N	No
					C	CR Appendix-IV:	Cobalt, Total (mg	;/L)	0,			· ·											-
MW-7 (upgradient)	8/10	20%	0.001-0.001	0.0022	1.782E-07	0.0004222	0.3104	0.006	mg/L	N	0	0	No	No	Decreasing	Normal	0.0010	Y	0.0022		0.006		
MW-8	9/10	10%	0.001-0.001	0.0018	7.289E-08	0.00027	0.1956	0.006	mg/L	N	0	0	No	No	Stable	Normal	0.0014	Y		No		Ν	No
MW-9	10/10	0%	-	0.031	0.00004566	0.006757	0.3775	0.006	mg/L	Y	10	0	No	No	Stable	Normal	0.011	Y		Yes		Y	Yes
MW-10	8/10	20%	0.001-0.001	0.0065	0.000003451	0.001858	0.4863	0.006	mg/L	Y	2	0	No	No	Stable	Normal	0.0010	N		No		N	No
					CC	R Appendix-IV: F	luoride, Total (m	g/L)		-		-				-			-				
MW-7 (upgradient)	11/11	0%	-	0.37	0.00074	0.0272	0.08501	4.0	mg/L	N	0	0	Yes	No	Stable	Normal	0.33	Y	0.3715		4.0		
MW-8	11/11	0%	-	0.33	0.0008073	0.02841	0.1035	4.0	mg/L	N	0	0	No	No	Stable	Normal	0.31	Y		No		N	No
MW-9	11/11	0%	-	0.56	0.005067	0.07118	0.1677	4.0	mg/L	N	0	0	No	No	Stable	Normal	0.51	Y		Yes		N	No
MW-10	11/11	0%	-	0.55	0.001745	0.04178	0.09011	4.0	mg/L	N	0	0	No	No	Stable	Normal	0.51	Y		Yes		N	No
					CC	CR Appendix-IV: I	Lithium, Total (m	g/L)	4.		-	-	<b>I</b>			1 I			T				
MW-7 (upgradient)	10/10	0%	-	0.029	0.000008544	0.002923	0.1223	0.04	mg/L	N	0	0	Yes	No	Stable	Normal	0.029	Y	0.0295		0.040		
MW-8	10/10	0%	-	0.024	0.00001454	0.003814	0.1997	0.04	mg/L	N	0	0	No	No	Stable	Normal	0.022	Y		No		N	No
MW-9	8/10	20%	0.01-0.01	0.018	0.000006544	0.002558	0.1983	0.04	mg/L	N	0	0	NO	NO	NA	Non-parametric	0.012	Y		NO		N	No
MW-10	3/10	70%	0.01-0.01	0.011	0.0000001	0.0003162	0.03131	0.04	mg/L	N	0	0	No	No	Stable	Normal	0.010	N		No		Ν	No
NANA 7 (up gradiant)	10/10	0%		0.012		Appendix-IV: Mo	lybdenum, Total	(mg/L)	mg/1	N	0	0	Ne	Ne	Stable	Normal	0.0082	V	0.0128		0.100		
	10/10	0%	-	0.013	0.000003	0.001732	0.1040	0.100	mg/L	N	0	0	NO	NO	Stable	Normal	0.0082	ř V	0.0138	Voc	0.100	N	No
NIW-0	9/10	10%	-	0.044	0.00001218	0.00349	0.06902	0.100	mg/L	N	0	0	No	No	Stable	Normal	0.037	T N	-	No		N	No
MW-10	10/10	0%	0.001-0.001	0.0079	7 566E-07	0.0022	0.3/74	0.100	mg/L	N	0	0	No	No	Stable	Normal	0.0010	V		No		N	No
10100-10	10/10	070	-	0.0043	7.300L-07	nendix-IV: Radiu	m-226 & 228 Tot	al (pCi/L)	IIIB/L			0	110	110	JIANIE	Normai	0.0027	I		NO		IN	NU
MW-7 (upgradient)	10/10	0%	-	5.88	2.721	1.65	1.318	5.0	pCi/L	Y	1	0	Yes	No	Stable	Non-parametric	0.398	N	0.0059		5.0		
MW-8	10/10	0%	-	1.308	0.1376	0.371	0.407	5.0	pCi/L	N	0	0	No	No	Stable	Normal	1.29	N		Yes		N	No
MW-9	10/10	0%	-	3.249	0.4152	0.6443	0.346	5.0	pCi/L	N	0	0	No	No	Stable	Normal	2.53	Y		Yes		N	No
MW-10	10/10	0%	-	3.58	0.4863	0.6973	0.3229	5.0	pCi/L	N	0	0	No	No	Stable	Normal	3.58	Y		Yes		N	No

### Notes:

<sup>1</sup> Based on baseline data collected from 08/30/2016 through 09/06/2018. \* Values obtained from U.S. Environmental Protection Agency Federal CCR Rule Title 40 Code of Federal Regulations (CFR) § 257.95(h)(2) on December 23, 2020.

CCR = coal combustion residuals

GWPS = Groundwater Protection Standard

MCL = maximum contaminant level

mg/L = milligrams per Liter

NA = not analyzed

pCi/L = picoCuries per Liter

SSI = statistically significant increase SSL = statistically significant level

UTL = upper tolerance limits

ATTACHMENT 2-2

March 2019 Semi-Annual Sampling Event Statistical Analyses



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

# TECHNICAL MEMORANDUM

March 18, 2022 File No. 0204993-000

TO:	Evergy Kansas Central, Inc. (f/k/a Westar Energy, Inc.) Jared Morrison – Director, Water and Waste Programs
FROM:	Haley & Aldrich, Inc. Steven F. Putrich, P.E., Senior Associate — Engineering Principal Mark Nicholls, P.G., Senior Associate — Senior Hydrogeologist
SUBJECT:	March 2019 Semi-annual Groundwater Assessment Monitoring Data Statistical Evaluation <b>Completed July 15, 2019</b> Tecumseh Energy Center Bottom Ash Settling Area

Pursuant to Code of Federal Regulations Title 40 (40 CFR) §257.93 and §257.95 (Rule), this memorandum summarizes the statistical evaluation of the analytical results for the March 2019 semiannual assessment monitoring groundwater sampling event for the Tecumseh Energy Center (TEC) Bottom Ash Settling Area (BASA). This semi-annual assessment monitoring groundwater sampling event was completed March 20 to 21, 2019 with laboratory results received and validated on April 15, 2019.

The statistical evaluation discussed in this memorandum was conducted to determine if Appendix IV groundwater monitoring constituents have been detected in downgradient wells at concentrations that represent a statistically significant increase (SSI) above background values and if one or more of the constituents have been detected at statistically significant levels (SSL) above the Groundwater Protection Standard (GWPS) consistent with the requirements of the Rule. GWPSs for each of the Appendix IV constituents have been set equal to the highest value of the maximum contaminant level, regional screening level, or background concentration.

# **Statistical Evaluation of Appendix IV Constituents**

The Rule provides four specific options for statistical evaluation of groundwater quality data collected at a coal combustion residuals (CCR) unit (40 CFR §257.93(f)(1-4)). The statistical method used for these evaluations (tolerance limit [TL]), was certified by Haley & Aldrich, Inc. on January 14, 2019. The TL method, as determined applicable for this sampling event, was used to evaluate potential SSLs above background. Background levels for each constituent listed in Appendix IV were computed as upper tolerance limits (UTL), and a minimum 95 percent confidence coefficient and 95 percent coverage. The most recent groundwater sampling event from each compliance well was compared to the corresponding background UTL to determine if an SSL existed.

Evergy Kansas Central, Inc. March 18, 2022 Page 2

# STATISTICAL EVALUATION

Either an interwell or intrawell evaluation was used to determine SSIs. Interwell evaluation compares the most recent values from downgradient compliance wells against a background dataset composed of upgradient well data, and the intrawell evaluation compares the most recent values from each compliance well against a background dataset composed of its own historical data. Because the CCR unit has transitioned into assessment monitoring, no statistical evaluations were conducted on Appendix III (detection monitoring) semi-annual assessment monitoring data.

The parametric TL methods were used to complete statistical evaluations of the referenced dataset. The TL procedure is one in which a concentration limit for each constituent is established from the distribution of the background data, with a minimum 95 percent confidence level. The upper endpoint of a TL is called the UTL. Depending on the data distribution, parametric or non-parametric TL procedures are used to evaluate groundwater monitoring data using this method. Parametric TLs utilize normally distributed data or normalized data via a transformation of the sample background data used to construct the limit. If the data are non-normal and a transformation is not indicated, non-parametric procedures (order statistics or bootstrap methods) are used to calculate the TL. If all the background data are non-detect, a maximum reporting limit may serve as an appropriate UTL.

These statistical evaluations were conducted using a background dataset for all Appendix IV constituents that were detected in the annual assessment monitoring sample event in June 2018 using parametric TLs. If an Appendix IV constituent concentration from the March 2019 sampling event was above the GWPS, the lower confidence limit (LCL) for the downgradient well constituent will be used to evaluate if an SSI is present. The LCL is the lower end of the confidence interval range, which is an estimated concentration range intended to contain the true mean or median of the population from which the sample is drawn. The confidence interval range is designed to locate the true population mean or median with a high degree of statistical confidence, or conversely, with a low probability of error.

The UTLs were calculated from the background well dataset using Chemstat software after testing for outlier sample results that would warrant removal from the dataset based on likely error in sampling or measurement. Both visual and statistical outlier tests for the background data were performed using Chemstat and U.S. Environmental Protection Agency's ProUCL 5.1 software, and a visual inspection of the data was performed using box plots and distribution plots for the downgradient sample data. No sample data were identified as outliers that warranted removal from the dataset.

# **BACKGROUND DISTRIBUTIONS**

The groundwater analytical results for each sampling event from the background sample location (MW-7 for interwell evaluation) were combined to calculate the UTL for each detected Appendix IV constituent. The variability and distribution of the pooled dataset was evaluated to determine the method for UTL calculation. Per the document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, March 2009,* background concentrations were updated based on statistical evaluation of analytical results collected through June 2018.



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# **RESULTS OF APPENDIX IV DOWNGRADIENT STATISTICAL COMPARISONS**

The sample concentrations from the downgradient wells for each of the detected Appendix IV constituents from the March 2019 semi-annual assessment monitoring event were compared to their respective background UTLs and GWPSs (Table I). A sample concentration greater than the background UTL is considered to represent an SSI. A sample concentration greater than the GWPS is considered to represent an SSL. The results of the groundwater assessment monitoring statistical evaluation are discussed below and provided in Table I. Based on this statistical evaluation on groundwater sampling data collected in March 2019, SSLs above GWPS that occurred at the TEC BASA include arsenic and cobalt at MW-9 and arsenic at MW-10. Details are listed on Table I.

Tables:

Table I – Summary of Semi-annual Assessment Groundwater Monitoring Statistical Evaluation



TABLE

### TABLE I SUMMARY OF SEMI-ANNUAL ASSESSMENT GROUNDWATER MONITORING STATISTICAL EVALUATION MARCH 2019 SAMPLING EVENT TECUMSEH ENERGY CENTER BOTTOM ASH SETTLING AREA

Location Id	Frequency of Detection	Percent Non-Detects	Range of Non- Detect	Maximum Detect	Variance	Standard Deviation	Coefficient of Variance	CCR MCL/RSL §257.95(h)(2)*	Report Result Unit	Detection Exceedances (Y/N)	Number of Detection Exceedances	Number of Non-Detection Exceedances	Outlier Presence	Outlier Removed	Trend	Distribution Well*	March 2019 Concentration (mg/L)	Detect?	Upper Tolerance Limit (mg/L) <sup>1</sup>	SSI (exceedance above Background at Individual Well)	GWPS (Higher of MCL/RSL or Upper Tolerance Limit) mg/L	Exceedance above GWPS at Individual Well	SSL
					CCR A	Appendix-IV: Arse	enic, Total (mg/L	)						•									
MW-7 (upgradient)	11/11	0%	-	0.0021	4.055E-08	0.0002014	0.1288	0.010	mg/L	N	0	0	Yes	No	Stable	Non-parametric	0.0016	Y	0.002		0.010		
MW-8	11/11	0%	-	0.0041	0.00000532	0.0007294	0.3171	0.010	mg/L	N	0	0	No	No	Stable	Normal	0.0023	Y		Yes		N	No
MW-9	11/11	0%	-	0.14	0.000682	0.02611	0.254	0.010	mg/L	Y	11	0	No	No	Stable	Normal	0.040	Y		Yes		Y	Yes
MW-10	11/11	0%	-	0.077	0.0002306	0.01519	0.2664	0.010	mg/L	Y	11	0	No	No	Stable	Normal	0.028	Y		Yes		Y	Yes
		-			CCR A	Appendix-IV: Bari	um, Total (mg/L)	)															
MW-7 (upgradient)	11/11	0%	-	0.1	0.00008096	0.008998	0.1166	2.0	mg/L	N	0	0	Yes	No	Stable	Normal	0.078	Y	0.095		2.000		
MW-8	11/11	0%	-	0.063	0.000008091	0.002844	0.04912	2.0	mg/L	N	0	0	No	No	Stable	Normal	0.054	Y		No		N	No
MW-9	11/11	0%	-	0.91	0.0114	0.1068	0.1387	2.0	mg/L	N	0	0	No	No	Stable	Normal	0.54	Y		Yes		N	No
MW-10	11/11	0%	-	0.36	0.0009655	0.03107	0.1023	2.0	mg/L	Ν	0	0	No	No	Stable	Normal	0.36	Y		Yes		N	No
					CCR A	ppendix-IV: Cadm	nium, Total (mg/	L)															
MW-7 (upgradient)	0/10	100%	0.0005-0.0005	-	0	0	0	0.0050	mg/L	N	0	0	NA	NA	NA	NA	0.00050	N	0.001		0.005		
MW-8	0/10	100%	0.0005-0.0005	-	0	0	0	0.0050	mg/L	N	0	0	NA	NA	NA	NA	0.00050	N		No		N	No
MW-9	3/10	70%	0.0005-0.0005	0.0013	6.387E-08	0.0002527	0.4191	0.0050	mg/L	N	0	0	Yes	No	NA	Non-parametric	0.0013	Y		Yes		N	No
MW-10	0/10	100%	0.0005-0.0005	-	0	0	0	0.0050	mg/L	N	0	0	NA	NA	NA	NA	0.00050	Ν		No		N	No
	P		•	m	CCR	Appendix-IV: Cob	alt, Total (mg/L)		-		1	1	-	<b>T</b>	<b>1</b>			<b>T</b>					
MW-7 (upgradient)	9/11	18%	0.001-0.001	0.0022	1.656E-07	0.000407	0.2945	0.006	mg/L	N	0	0	No	No	Decreasing	Normal	0.0016	Y	0.002		0.006		
MW-8	9/11	18%	0.001-0.001	0.0018	7.873E-08	0.0002806	0.2085	0.006	mg/L	N	0	0	No	No	Stable	Normal	0.0010	Y		No		N	No
MW-9	11/11	0%	-	0.048	0.0001235	0.01111	0.5384	0.006	mg/L	Y	11	0	No	No	Stable	Normal	0.048	Y		Yes		Y	Yes
MW-10	9/11	18%	0.001-0.001	0.0065	0.00003638	0.001907	0.5298	0.006	mg/L	Y	2	0	No	No	Stable	Normal	0.0014	Y		No		N	No
		T	1	Т	CCR A	ppendix-IV: Fluo	ride, Total (mg/L	.)		T	I	1											L
MW-7 (upgradient)	12/12	0%	-	0.37	0.0009727	0.03119	0.09901	4.0	mg/L	N	0	0	No	No	Stable	Non-parametric	0.38	Y	0.371		4.000		ļ
MW-8	12/12	0%	-	0.33	0.0008992	0.02999	0.1107	4.0	mg/L	N	0	0	No	No	Stable	Normal	0.23	Y		No		N	No
MW-9	12/12	0%	-	0.56	0.004772	0.06908	0.1641	4.0	mg/L	N	0	0	No	No	Stable	Normal	0.38	Y		No		N	No
MW-10	12/12	0%	-	0.55	0.001697	0.04119	0.08827	4.0	mg/L	N	0	0	No	No	Stable	Normal	0.50	Y		Yes		N	No
		1	1	Т	CCR A	Appendix-IV: Lithi	ium, Total (mg/L	)		1	1	1			1			1	1				
MW-7 (upgradient)	11/11	0%	-	0.029	0.000009218	0.003036	0.1251	0.04	mg/L	N	0	0	Yes	No	Stable	Normal	0.028	Y	0.030		0.040		
MW-8	11/11	0%	-	0.024	0.00001349	0.003673	0.1942	0.04	mg/L	N	0	0	No	No	Stable	Normal	0.017	Ŷ		No		N	No
MW-9	9/11	18%	0.01-0.01	0.021	0.00001185	0.003443	0.2525	0.04	mg/L	N	0	0	NO	NO	Stable	Normai	0.021	Ŷ		No		N	NO
MW-10	3/11	/3%	0.01-0.01	0.011	9.091E-08	0.0003015	0.02988	0.04	mg/L	N	0	0	No	No	NA	Non-parametric	0.010	N		No		N	No
	44/44	0%	1	0.012			denum, Totai (m	g/L)		N	0	0	N	N-	Chable	Nerral	0.0050	I	0.014		0.100		
ww-7 (upgradient)	11/11	0%	-	0.013	0.00000547	0.002339	0.2334	0.10	mg/L	N	0	0	NO	INO N.	Stable	Normal	0.0050	Ŷ	0.014		0.100	N	NI-
NIW-8	11/11	0%	-	0.044	0.00001707	0.004132	0.1074	0.10	mg/L	N	0	0	NO	NO	Stable	Normal	0.031	Y		Yes		N	NO
NIN 10	10/11	9%	0.001-0.001	0.0079	7 1255 07	0.002208	0.3482	0.10	mg/L	N	0	0	No	No	Stable	Normal	0.0062	Y V		NO		N	No
10100-10	11/11	0%	-	0.0049	7.125E-07	0.0008441	0.2450	0.10	ilig/L	IN	0	0	INO	NO	Stable	Normai	0.0029	Ŷ	]	NO		N	
MW-7 (upgradient)	11/11	0%		5.88	2.57	1 603	1 308	50	nCi/l	v	1	0	Voc	No	Stable	Non-parametric	0.0090	N	5 900		5 900		
M\M/_Q	11/11	0%	-	1 308	0.1/2	0.3769	0 4227	5.0	nCi/l	N	0	0	No	No	Stable	Normal	0.0090	IN NI	5.500	No	3.300	N	No
MW-9	11/11	0%	-	3 249	0.142	0.3708	0.4327	5.0	nCi/l	N	0	0	No	No	Stable	Normal	0.405	N		No		N	No
MW-10	11/11	0%	-	3.58	0.4693	0.685	0.4051	5.0	nCi/l	N	0	0	No	No	Stable	Normal	1 57	N		No		N	No
14144-10	11/11	070	-	5.50	0.4055	0.005	0.3233	5.0	PC1/L	IN IN	v	U	NU	110	JUDIC	Normai	1.57	IN		INU		IN IN	NU

Notes:

<sup>1</sup> Based on baseline data collected from 08/30/2016 through 06/11/2018.

\* Values obtained from U.S. Environmental Protection Agency Federal CCR Rule Title 40 Code of Federal Regulations (CFR) § 257.95(h)(2) on December 23, 2020.

CCR = coal combustion residuals

GWPS = Groundwater Protection Standard

MCL = maximum contaminant level

mg/L = milligrams per Liter

NA = not analyzed

pCi/L = picoCuries per Liter

SSI = statistically significant increase

SSL = statistically significant level

UTL = upper tolerance limits

**ATTACHMENT 3** 

**Revised Groundwater Potentiometric Maps** 



LEGEND	
MW-8 849.64	WELL NAME AND GROUNDWATER ELEVATION (MARCH 2019)
<b>•</b>	MONITORING WELL
	PIEZOMETER OBSERVATION ONLY
	GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
	ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
	GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
	BOTTOM ASH SETTLING AREA

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 20 MARCH 2019.

3. AMSL = ABOVE MEAN SEA LEVEL

4. THE APPROXIMATE GROUNDWATER FLOW RATE WAS CALCULATED USING HYDRAULIC CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES FROM SLUG TESTS COMPLETED IN APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, 07 NOVEMBER 2019



150

75 SCALE IN FEET

EVERGY KANSAS CENTRAL, INC. TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

> BOTTOM ASH SETTLING AREA GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP MARCH 20, 2019

Severgy MARCH 2022



LEGEND	
MW-8 849.64	WELL NAME AND GROUNDWATER ELEVATION (JUNE 2019)
<b>•</b>	MONITORING WELL
+	PIEZOMETER OBSERVATION ONLY
	GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
	ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
←	GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
	BOTTOM ASH SETTLING AREA

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 25 JUNE 2019.

3. AMSL = ABOVE MEAN SEA LEVEL

4. THE APPROXIMATE GROUNDWATER FLOW RATE WAS CALCULATED USING HYDRAULIC CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES FROM SLUG TESTS COMPLETED IN APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, 07 NOVEMBER 2019



150

75 SCALE IN FEET

EVERGY KANSAS CENTRAL, INC. TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

> BOTTOM ASH SETTLING AREA GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP JUNE 25, 2019

Severgy MARCH 2022



LEGEND	
MW-8 849.64	WELL NAME AND GROUNDWATER ELEVATION (OCTOBER 2019)
<b>•</b>	MONITORING WELL
	PIEZOMETER OBSERVATION ONLY
	GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT INTERVAL (AMSL)
	ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
	GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
	BOTTOM ASH SETTLING AREA

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 10 OCTOBER 2019.

3. AMSL = ABOVE MEAN SEA LEVEL

4. THE APPROXIMATE GROUNDWATER FLOW RATE WAS CALCULATED USING HYDRAULIC CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES FROM SLUG TESTS COMPLETED IN APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, 07 NOVEMBER 2019



150

75 SCALE IN FEET

EVERGY KANSAS CENTRAL, INC. TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

> BOTTOM ASH SETTLING AREA GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP OCTOBER 10, 2019

Severgy MARCH 2022



LEGEND	
MW-8 849.64	WELL NAME AND GROUNDWATER ELEVATION (DECEMBER 5, 2019)
<b>•</b>	MONITORING WELL
	PIEZOMETER OBSERVATION ONLY
	GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 1-FT IN ERVAL (AMSL)
	ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
	GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
	BOTTOM ASH SETTLING AREA

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 05 DECEMBER 2019.

3. AMSL = ABOVE MEAN SEA LEVEL

4. THE APPROXIMATE GROUNDWATER FLOW RATE WAS CALCULATED USIB HYDRAULIC CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES FROM SLUG TESTS COMPLETED IN APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, 07 Ø VEMBER 2019



150

SCALE IN FEET

EVERGY KANSAS CENTRAL, INC. TECUMSEH ENERGY CENTER TECUMSEH, KANSAS

> BOTTOM ASH SETTLING AREA GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP DECEMBER 05, 2019

Severgy MARCH 2022