

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

by Haley & Aldrich, Inc.
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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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**2019 Annual Groundwater Monitoring
and Corrective Action Report**

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: Mark Nicholls
Kansas License No.: Professional Geologist No. 881
Title: Technical Expert 2
Company: 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.

Energy 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.

2019 Annual Groundwater Monitoring and Corrective Action Report

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.

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 I
SUMMARY OF ANALYTICAL RESULTS - ASSESSMENT MONITORING
EVERGY KANSAS CENTRAL, INC.
TECUMSEH ENERGY CENTER
BOTTOM ASH SETTLING AREA
TECUMSEH, KANSAS

Location	Upgradient					Downgradient										
	MW-7					MW-8				MW-9			MW-10			
	878.28					888.01		869.90*		886.98		865.60*	887.08		867.15*	
Measure Point (TOC)	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 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	--	<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 II
ANNUAL ASSESSMENT GROUNDWATER MONITORING - DETECTED APPENDIX IV GWPS
 JUNE 2019 SAMPLING EVENT
 EVERGY KANSAS CENTRAL, INC.
 TECUMSEH ENERGY CENTER
 BOTTOM ASH SETTLING AREA
 TECUMSEH, 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 (mg/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 (mg/L)		
MW-7 (upgradient)	0.002	NA
MW-10		0.006
MW-8		0.006
MW-9		0.0641**
CCR Appendix-IV Fluoride, Total (mg/L)		
MW-7 (upgradient)	0.371	NA
MW-10		4.0
MW-8		4.0
MW-9		4.0
CCR Appendix-IV Lithium, Total (mg/L)		
MW-7 (upgradient)	0.03	NA
MW-10		0.040
MW-8		0.040
MW-9		0.040
CCR Appendix-IV Molybdenum, Total (mg/L)		
MW-7 (upgradient)	0.014	NA
MW-10		0.100
MW-8		0.100
MW-9		0.100
CCR Appendix-IV Radium-226 & 228 Combined (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

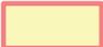
pCi/L = picoCuries per Liter

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.



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

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

MARCH 2021
SCALE: AS SHOWN



LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (MARCH 20, 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

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 20 MARCH 2019.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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

**BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
MARCH 20, 2019**



MARCH 2021

FIGURE 2

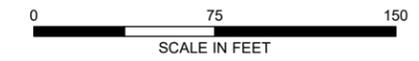


LEGEND

- 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

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 25 JUNE 2019.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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TECUMSEH, KANSAS

BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
JUNE 25, 2019



MARCH 2021

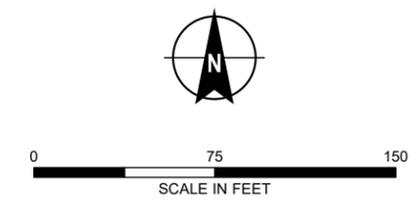


LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (MARCH 9, 2020)
- 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

NOTES

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
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



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TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

**BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
OCTOBER 10, 2019**



MARCH 2021

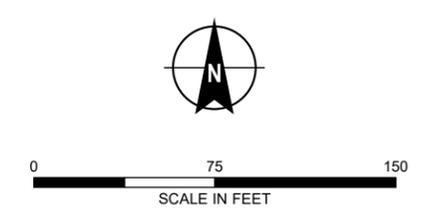


LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (DECEMBER 5, 2019)
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 0.5-FT INTERVAL (AMSL)
-  ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA

NOTES

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
4. AERIAL IMAGERY SOURCE: ESRI, NOVEMBER 7, 2019



ATTACHMENT 1

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

**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

File No. 129778-023
Updated October 2019



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B	Aerial Photographs
C	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 ¹ 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 ASD² 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.

¹ Referred to in this document as an “alternate source,” and the demonstration for such is referred to as an ASD.

² 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.

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 1.6×10^{-3} 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 1×10^{-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 (HNO₃) and sulfuric (H₂SO₄) 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 groundwater³.

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.

³ 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.

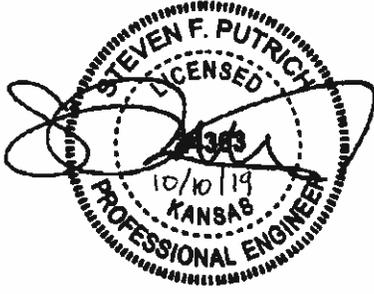
This certification and the underlying data and evaluation performed in this report support the conclusion that a source other than the CCR unit is the cause of the SSL above the groundwater protection standards of arsenic and cobalt found during assessment monitoring of this Unit (i.e., arsenic at monitoring 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: Steven F. Putrich, P.E.
Kansas License No.: PE24363
Title: Principal Consultant
Company: Haley & Aldrich, Inc.



Signed: 
Professional Geologist

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



6. References

1. AMEC, May 2011. Report of Dam Safety Assessment of Coal Combustion Surface Impoundments.
2. Environmental Risk Information Services. Database Report. March 2018.
3. Haley & Aldrich, Inc., 2017. Groundwater Sampling and Analysis Pan, Tecumseh Energy Center. October.
4. Haley & Aldrich, Inc., 2019. Annual Groundwater Monitoring and Corrective Action Report. January.
5. United States Geological Survey (USGS), 1950. Topographic Map, Grantville, 7.5-minute series.
6. USGS, 1951. Topographic Map, Grantville, 7.5-minute series.
7. USGS, 1970. Topographic Map, Grantville, 7.5-minute series.
8. USGS, 1975. Topographic Map, Grantville, 7.5-minute series.
9. USGS, 1981. Topographic Map, Grantville, 7.5-minute series.
10. USGS, 1983. Topographic Map, Grantville, 7.5-minute series.
11. USGS, 2012. Topographic Map, Grantville, 7.5-minute series.
12. Zeller, D.E., 1968. *The Stratigraphic Succession in Kansas*. Kansas Geological Survey Bulletin 189.

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 Analytical 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

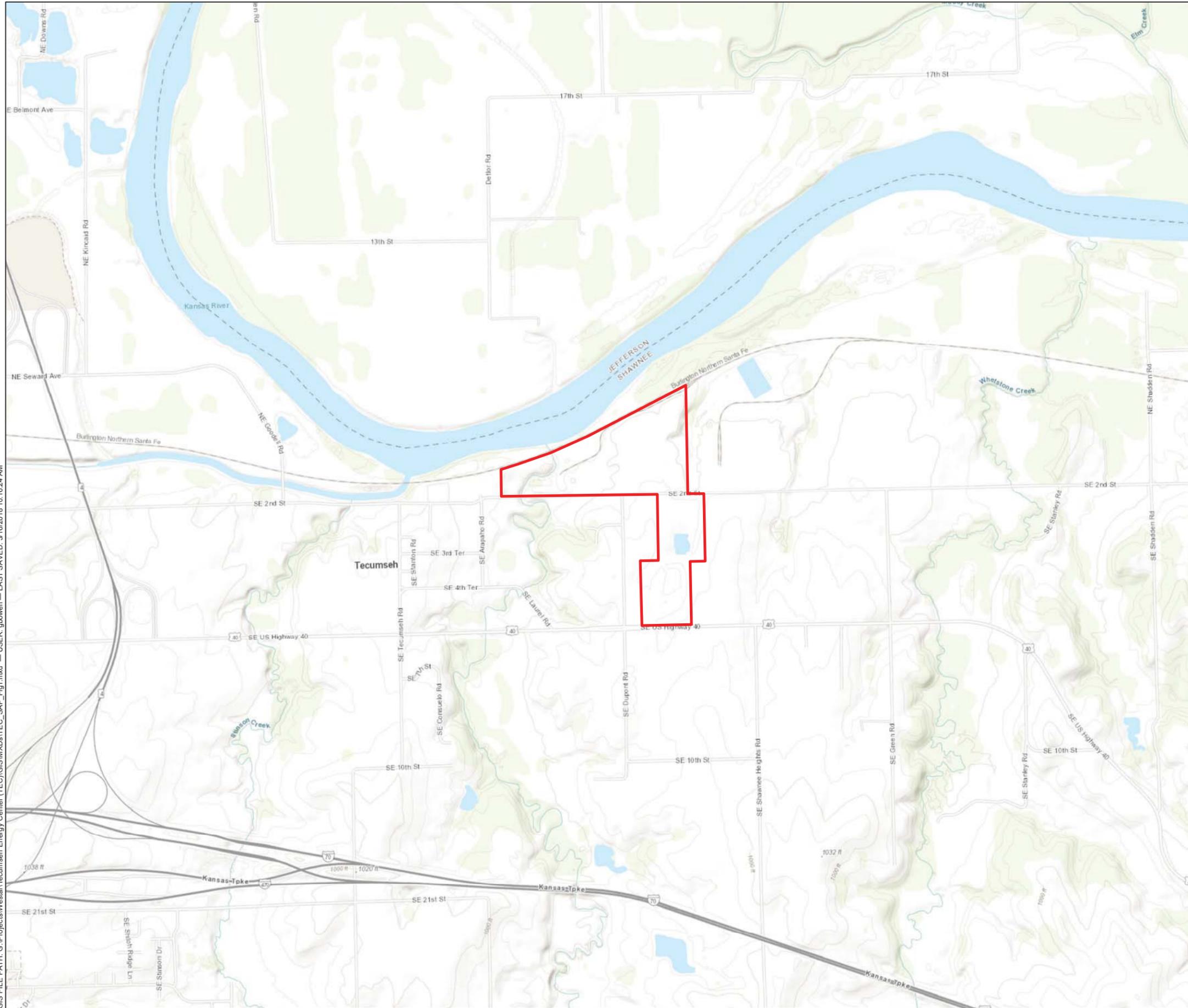
USGS = United States Geological Survey

TABLE III
HISTORICAL TOPOGRAPHIC MAP REVIEW SUMMARY
 WESTAR ENERGY, INC.
 TECUMSEH ENERGY CENTER
 BOTTOM ASH SETTLING AREA
 TECUMSEH, 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

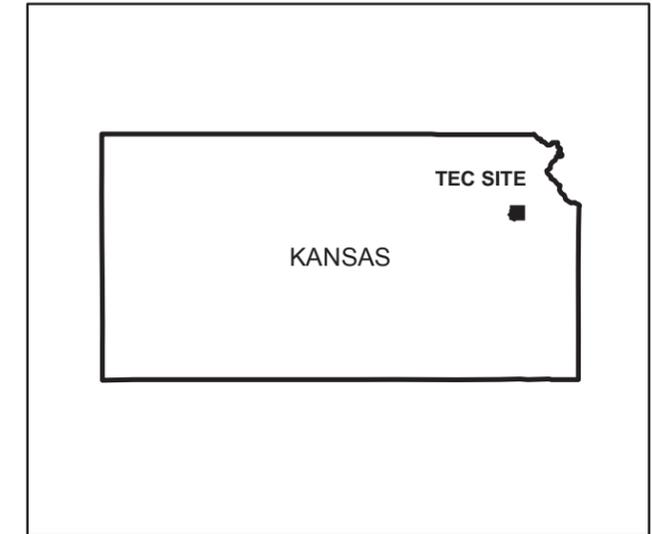
FIGURES

GIS FILE PATH: G:\Projects\Westar\Tecumseh Energy Center (TEC)\GISMXDs\TEC_SAP_Fig1.mxd — USER: gbowen — LAST SAVED: 3/16/2018 10:16:24 AM



LEGEND

 PROPERTY BOUNDARY



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.



**HALEY
ALDRICH**

WESTAR ENERGY
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

SITE LOCATION

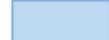
OCTOBER 2019
SCALE: AS SHOWN

FIGURE 1

GIS FILE PATH: G:\Projects\Westar\Tecumseh Energy Center (TEC)\GIS\MXDs\2019_04\CROSS SECTIONS - B-B' ASH SETTLING POND.mxd — USER: DZinsmaster — LAST SAVED: 6/24/2019 3:22:40 PM



LEGEND

-  MONITORING WELL
-  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.

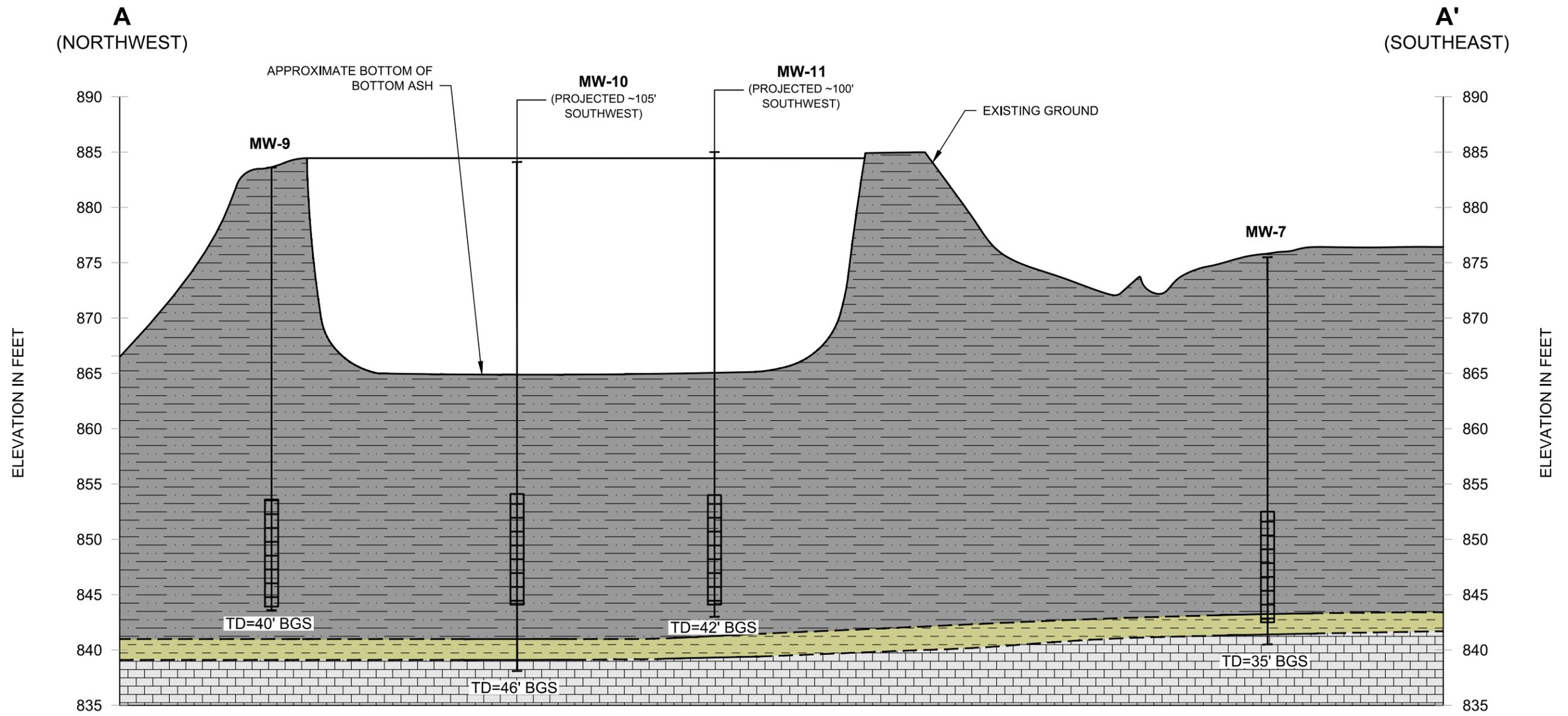


HALEY ALDRICH WESTAR ENERGY
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

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

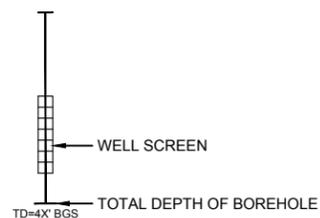
OCTOBER 2019
SCALE: AS SHOWN

FIGURE 2



LEGEND

- GLACIAL DEPOSITS/OVERBURDEN
- SHALE MEMBER OF THE SCRANTON FORMATION
- LIMESTONE MEMBER OF THE SCRANTON SHALE FORMATION



NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. VERTICAL SCALE IS EXAGGERATED 5 TIMES.
3. PROJECTIONS ARE IN DIRECTION FROM ACTUAL LOCATION.



WESTAR ENERGY
 TECUMSEH ENERGY CENTER (TEC)
 TECUMSEH, KANSAS

**BOTTOM ASH SETTLING AREA
 CONCEPTUAL GEOLOGIC CROSS
 SECTION A-A'**

SCALE: AS SHOWN
 OCTOBER 2019

FIGURE 3

APPENDIX A

Laboratory Reports

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,



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

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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

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SAMPLE SUMMARY

Project: TEC BOTTOM ASH SPLP 2019

Pace 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

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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

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA INLET **Lab ID: 60298624001** Collected: 04/02/19 12:45 Received: 04/02/19 15:30 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP		Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 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 Method: EPA 6020 Preparation Method: EPA 3020

Leachate Method/Date: EPA 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 Method: EPA 7470 Preparation Method: EPA 7470

Leachate Method/Date: EPA 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	
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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA MIDDLE **Lab ID: 60298624003** Collected: 04/02/19 12:50 Received: 04/02/19 15:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP		Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 1312; 04/04/19 00:00						
Barium	ND	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-39-3	
Beryllium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:25	7440-41-7	
Boron	0.17	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-42-8	
Cadmium	ND	mg/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	B
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 Method: EPA 6020 Preparation Method: EPA 3020 Leachate Method/Date: EPA 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 Method: EPA 7470 Preparation Method: EPA 7470 Leachate Method/Date: EPA 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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

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: 04/05/19 10:16 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days		Analytical Method: 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 Method: 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 Method: EPA 365.4						
Phosphorus	1.1	mg/L	0.10	1		04/06/19 10:55	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA OUTLET **Lab ID: 60298624005** Collected: 04/02/19 12:55 Received: 04/02/19 15:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP		Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 1312; 04/04/19 00:00						
Barium	0.14	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-39-3	
Beryllium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:27	7440-41-7	
Boron	0.39	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-42-8	
Cadmium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-43-9	
Calcium	15.5	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-70-2	
Chromium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-47-3	
Cobalt	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-48-4	
Copper	ND	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:27	7440-50-8	
Iron	0.055	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7439-89-6	
Lead	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7439-92-1	
Magnesium	2.6	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7439-95-4	
Manganese	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7439-96-5	
Molybdenum	ND	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:27	7439-98-7	
Nickel	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-02-0	
Potassium	ND	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-09-7	
Silica	7.2	mg/L	1.1	1	04/05/19 12:37	04/08/19 12:27	7631-86-9	
Silicon	3.3	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-21-3	
Silver	ND	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	B
Strontium	0.38	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:27	7440-24-6	
Titanium	ND	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	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7440-66-6	
6020 MET ICPM, SPLP		Analytical Method: EPA 6020 Preparation Method: EPA 3020 Leachate Method/Date: EPA 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 Method: EPA 7470 Preparation Method: EPA 7470 Leachate Method/Date: EPA 1312; 04/04/19 00:00						
Mercury	ND	mg/L	0.0020	1	04/05/19 16:19	04/08/19 12:46	7439-97-6	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA OUTLET LEACHATE **Lab ID:** 60298624006 Collected: 04/05/19 10:15 Received: 04/05/19 10:16 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days		Analytical Method: 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 Method: EPA 353.2						
Nitrogen, Nitrate	0.15	mg/L	0.10	1		04/05/19 15:03		B
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		B
365.4 Total Phosphorus		Analytical Method: EPA 365.4						
Phosphorus	ND	mg/L	0.10	1		04/06/19 10:58	7723-14-0	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA INLET LEACHATE **Lab ID:** 60298624007 Collected: 04/09/19 13:35 Received: 04/09/19 13:36 Matrix: Water
2

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7196 Chromium, Hexavalent								
Analytical Method: EPA 7196								
Chromium, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:19	18540-29-9	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA MIDDLE LEACHATE 2		Lab ID: 60298624008	Collected: 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 Chromium, Hexavalent		Analytical Method: EPA 7196						
Chromium, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:21	18540-29-9	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: TEC BA OUTLET								
LEACHATE 3								
Lab ID: 60298624009								
Collected: 04/09/19 13:35								
Received: 04/09/19 13:36								
Matrix: Water								
7196 Chromium, Hexavalent								
Analytical Method: EPA 7196								
Chromium, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:22	18540-29-9	

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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 577594 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury SPLP
 Associated Lab Samples: 60298624001, 60298624003, 60298624005

METHOD BLANK: 2370033 Matrix: Water

Associated Lab Samples: 60298624001, 60298624003, 60298624005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.0020	04/08/19 12:33	

LABORATORY CONTROL SAMPLE: 2370034

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.015	0.014	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2370036 2370035

Parameter	Units	60298624001		2370035		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Result	MSD Spike Conc.	MS Result	MSD Spike Conc.						
Mercury	mg/L	ND	0.015	0.015	0.014	0.015	96	97	75-125	1	20

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QUALITY CONTROL DATA

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 Samples: 60298624001, 60298624003, 60298624005

METHOD BLANK: 2369565 Matrix: Water

Associated Lab Samples: 60298624001, 60298624003, 60298624005

Parameter	Units	Blank Result	Reporting 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

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% 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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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

LABORATORY CONTROL SAMPLE: 2369566

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% 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 SPIKE DUPLICATE: 2369567 2369568

Parameter	Units	60298624001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	% Rec	% Rec					
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					
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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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 577492 Analysis Method: EPA 6020
 QC Batch Method: EPA 3020 Analysis Description: 6020 MET SPLP
 Associated Lab Samples: 60298624001, 60298624003, 60298624005

METHOD BLANK: 2369569 Matrix: Water

Associated Lab Samples: 60298624001, 60298624003, 60298624005

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 SPIKE DUPLICATE: 2369571 2369572

Parameter	Units	60298624001 Result	MS Spike Conc.	MSD Spike Conc.	2369571		2369572		% Rec Limits	RPD	Max RPD	Qual
					MS Result	MSD Result	MS % Rec	MSD % Rec				
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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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 577578 Analysis Method: EPA 300.0

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

Associated Lab Samples: 60298624002, 60298624004, 60298624006

METHOD BLANK: 2369968 Matrix: Water

Associated Lab Samples: 60298624002, 60298624004, 60298624006

Parameter	Units	Blank Result	Reporting 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	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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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 577533 Analysis Method: EPA 353.2
 QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
 Associated Lab Samples: 60298624002, 60298624004, 60298624006

METHOD BLANK: 2369705 Matrix: Water

Associated Lab Samples: 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

Parameter	Units	60298624002 Result	Spike Conc.	MS Result	MS % Rec	% 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

Parameter	Units	60298624006 Result	Dup Result	RPD	Max 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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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 577541 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60298624002, 60298624004, 60298624006

METHOD BLANK: 2369762 Matrix: Water

Associated Lab Samples: 60298624002, 60298624004, 60298624006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus	mg/L	ND	0.10	04/06/19 10:51	

LABORATORY CONTROL SAMPLE: 2369763

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.1	105	90-110	

MATRIX SPIKE SAMPLE: 2369764

Parameter	Units	60298624002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.16	2	2.3	105	90-110	

SAMPLE DUPLICATE: 2369765

Parameter	Units	60298624004 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	1.1	1.0	3	10	

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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 578184 Analysis Method: EPA 7196
 QC Batch Method: EPA 7196 Analysis Description: 7196 Chromium, Hexavalent
 Associated Lab Samples: 60298624007, 60298624008, 60298624009

METHOD BLANK: 2372388 Matrix: Water

Associated Lab Samples: 60298624007, 60298624008, 60298624009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chromium, Hexavalent	mg/L	ND	0.010	04/09/19 14:13	

LABORATORY CONTROL SAMPLE: 2372389

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/L	0.1	0.096	96	90-110	

MATRIX SPIKE SAMPLE: 2372390

Parameter	Units	60298624007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/L	ND	0.1	0.090	90	85-115	

SAMPLE DUPLICATE: 2372391

Parameter	Units	60298624008 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/L	ND	ND		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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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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: TEC BOTTOM ASH SPLP 2019

Pace 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	TEC BA OUTLET LEACHATE 3	EPA 7196	578184		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60298624



Client Name: Wester Energy

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-296 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 4.5 Corr. Factor -1.0 Corrected 3.5

Date and initials of person examining contents: 3/2/19

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>3 Day</u>
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>SL</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State: <u>OK</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/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: _____

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.

<u>CAS LAB ID #</u>	<u>SAMPLE DESCRIPTION</u>	<u>SAMPLE TYPE</u>	<u>DATE SAMPLED</u>
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.

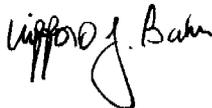
Samples will be retained for 120 days unless Continental is otherwise notified.

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.

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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



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

KDHE Environmental Laboratory Accreditation No. E-10146



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

Lab Number: 11070963
 Sample Description: TEC Fly Ash-SPLP

Date Sampled: 07/13/2011
 Time Sampled: 1420

<u>Analysis</u>	<u>Concentration</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>LOQ</u>
Aluminum, Tot. Rec., ICP-MS	83400	µg/L	1.0	0.03
Antimony, Tot. Rec., ICP-MS	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)	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-MS	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-MS	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/L	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	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

<u>Analysis</u>	<u>Date/Time Prepared</u>	<u>Date/Time Analyzed</u>	<u>QC Batch</u>	<u>Inst. Batch</u>	<u>Analyst Method(s)</u>
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-Continued-

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	Date/Time		Date/Time		QC	Inst.	Analyst	Method(s)
	Prepared		Analyzed		Batch	Batch		
Aluminum, Tot. Rec., ICP-M07/21/11	1200	08/02/11	1619		110721-3	2IP3214	JDL	6020A
Antimony, Tot. Rec., ICP-M07/21/11	1200	07/21/11	1914		110721-3	4IP3202	JDL	6020A
Arsenic, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Barium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Beryllium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Boron, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Cadmium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Calcium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Chromium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Cobalt, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Copper, Total, ICP	07/21/11	1130	07/25/11	1338	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	1338	110721-1	3IP4206	JDL	6010B
Lead, Total, ICP	07/21/11	1130	07/28/11	1351	110721-1	4IP4209	JDL	6010B
Magnesium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Manganese, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Mercury, Total	07/21/11	1126	07/22/11	1757	110721-1	3MA3203	JDL	7470A
Molybdenum, Total, ICP	07/21/11	1130	07/26/11	1807	110721-1	4IP4207	JDL	6010B
Nickel, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Potassium, Dissolved, ICP	07/22/11	1252	08/02/11	1955	110722-5	4IP4214	KMW	6010B
Selenium, Tot. Rec., ICP-M07/21/11	1200	07/21/11	1914		110721-3	4IP3202	JDL	6020A
Silicon as Silica	07/22/11	1200	08/01/11	1629	110722-3	3IP4213	KMW	6010B
Silver, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Sodium, Dissolved, ICP	07/22/11	1252	08/02/11	1955	110722-5	4IP4214	KMW	6010B
Strontium, Total, ICP	07/21/11	1130	07/28/11	1351	110721-1	4IP4209	JDL	6010B
Thallium, Tot. Rec., ICP-M07/21/11	1200	07/21/11	1914		110721-3	4IP3202	JDL	6020A
Titanium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Vanadium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Zinc, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Chloride	N/A		07/21/11	1215	1IC1202	1IC1202	MLL	300.0/9056A
Chromium, Hexavalent	N/A		07/21/11	1107	110721-1	110721-2	JND	7196A (Modified)
Fluoride	N/A		08/01/11	1437	1IC2213	1IC2213	MLL	300.0/9056A
Nitrate, as N	N/A		07/21/11	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	1422	110721-2	110721-3	KJH	SM 4500-P(B&F) (M
Sulfate	N/A		07/21/11	1215	1IC1202	1IC1202	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: 11070963

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

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

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

<u>Analysis</u>	<u>Concentration</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>LOQ</u>
Aluminum, Tot. Rec., ICP-MS	10400	µg/L	1.0	0.03
Antimony, Tot. Rec., ICP-MS	ND(5)	µg/L	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/L	1.0	0.2
Molybdenum, Total, ICP	12	µg/L	1.0	5
Nickel, Total, ICP	ND(5)	µg/L	1.0	5
Potassium, Dissolved, ICP	0.4 B	mg/L	1.0	0.3
Selenium, Tot. Rec., ICP-MS	ND(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 2.6	mg/L	1.0	0.5
Strontium, Total, ICP	1360	µg/L	1.0	5
Thallium, Tot. Rec., ICP-MS	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

<u>Analysis</u>	<u>Date/Time Prepared</u>	<u>Date/Time Analyzed</u>	<u>QC Batch</u>	<u>Inst. Batch</u>	<u>Analyst Method(s)</u>
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-Continued-

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

<u>Analysis</u>	<u>Date/Time Prepared</u>	<u>Date/Time Analyzed</u>	<u>QC Batch</u>	<u>Inst. Batch</u>	<u>Analyst</u>	<u>Method(s)</u>
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	
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	4IP4207	JDL	6010B	
Chromium, Total, ICP	07/21/11 1130 07/25/11 1343	110721-1	3IP4206	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	5IP4214	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	3IP4206	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	3IP4206	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 (Modified)	
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) (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

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.

<u>CAS LAB ID #</u>	<u>ANALYSIS</u>	<u>DATE/TIME</u> <u>SAMPLED</u>	<u>DATE/TIME</u> <u>ANALYZED</u>	<u>ELAPSED</u> <u>HRS:MIN</u>
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.

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.

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

Client: Westar Energy, Inc.
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Test	Testname	QC Batch	Method Blank	LCS	MS Lab No.
SL470	Final pH, SPLP Extract	110720-1	110720BLK1	110720LCS1	
SL602	SPLP Prep	110720-1	110720BLK1		
Lab numbers associated with this batch: 11070963 11070964					

SL802	Arsenic, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL303	Barium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL304	Beryllium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL305	Boron, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
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	11070964MS
SL313	Copper, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL326	Iron, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL311	Lead, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL331	Magnesium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL332	Manganese, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL333	Mercury, Total	110721-1	110721BLK1	110721LCS1	11070963MS
SL334	Molybdenum, Total, ICP	110721-1	110721BLK1	110721LCS1	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
SL366	Titanium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL368	Vanadium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL369	Zinc, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
Lab numbers associated with this batch: 11070963 11070964					

SL000	Aluminum, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
SL001	Antimony, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
SL023	Selenium, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
SL029	Thallium, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
Lab numbers associated with this batch: 11070963 11070964					

SL212	Silicon as Silica	110722-3	110722BLK3	110722LCS3	11070964MS
Lab numbers associated with this batch: 11070963 11070964					

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

Quality Control Report
Batch Summary

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

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Date Reported: 08/04/2011
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Test	Testname	QC Batch	Method	Blank	LCS	MS Lab No.
GL502	Chloride	1IC1202	BLK1IC1202	LCS1IC1202		11071334MS
Lab numbers associated with this batch: 11070963 11070964						
GL147	Chromium, Hexavalent	110721-1	110721BLK1	110721LCS1		11071608MS
Lab numbers associated with this batch: 11070963 11070964						
GL501	Fluoride	1IC2207	BLK1IC2207	LCS1IC2207		
Lab numbers associated with this batch: 11070964						
GL501	Fluoride	1IC2213	BLK1IC2213	LCS1IC2213		
Lab numbers associated with this batch: 11070963						
GL505	Nitrate, as N	1IC1202	BLK1IC1202	LCS1IC1202		
Lab numbers associated with this batch: 11070963 11070964						
GL510	Nitrate/Nitrite, as N					
Lab numbers associated with this batch: 11070963 11070964						
GL503	Nitrite, as N	1IC1202	BLK1IC1202	LCS1IC1202		
Lab numbers associated with this batch: 11070963 11070964						
GL218	Phosphorus, Total, as P	110721-2	110721BLK2	110721LCS2		11071101MS
Lab numbers associated with this batch: 11070963 11070964						
GL506	Sulfate	1IC1202	BLK1IC1202	LCS1IC1202		
Lab numbers associated with this batch: 11070963 11070964						



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Topeka, KS 66601

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

Analysis	Blank Data	% Rec LCS	Limits	Spike Level	Units	Spiked Sample (% Recovery)		Limits	Spike Level	Units	Spiked Sample Precision Data	
						MS	MSD				RPD	Limit
QC Batch: 110721-1												
For samples prepared on: 07/21/2011												
Spiked sample: 11070963												
Mercury, Total	ND(0.2)	89.1	80.0-120	5.0	µg/L	90.2	91.9	80.0-120	5.0	µg/L	1.9	20.0
QC Batch: 110721-1												
For samples prepared on: 07/21/2011												
Spiked sample: 11070964												
Arsenic, Total, ICP	ND(5)	96.5	80.0-120	500	µg/L	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/L	101	110.	80.0-120	1500	µg/L	8.5	20.0
Beryllium, Total, ICP	ND(2)	96.9	80.0-120	500	µg/L	104	103	80.0-120	500	µg/L	1.0	20.0
Boron, 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	µg/L	0.9	20.0
Cobalt, Total, ICP	ND(2)	94.8	80.0-120	500	µg/L	94.6	92.8	80.0-120	500	µg/L	1.9	20.0
Copper, Total, ICP	ND(10)	97.0	80.0-120	500	µg/L	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
Lead, 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
Manganese, Total, ICP	ND(5)	97.1	80.0-120	500	µg/L	98.0	96.7	80.0-120	500	µg/L	1.3	20.0
Molybdenum, Total, ICP	ND(5)	97.5	80.0-120	500	µg/L	98.1	97.6	80.0-120	500	µg/L	0.5	20.0
Nickel, Total, ICP	ND(5)	94.6	80.0-120	500	µg/L	94.6	93.1	80.0-120	500	µg/L	1.6	20.0
Silver, Total, ICP	ND(5)	95.0	80.0-120	100	µg/L	96.9	95.5	80.0-120	100	µg/L	1.5	20.0
Strontium, Total, ICP	ND(5)	107	80.0-120	100	µg/L	I	I	80.0-120	100	µg/L	**	20.0
Titanium, Total, ICP	ND(5)	99.9	80.0-120	500	µg/L	102	101	80.0-120	500	µg/L	1.0	20.0
Vanadium, Total, ICP	ND(5)	95.2	80.0-120	500	µg/L	95.4	94.6	80.0-120	500	µg/L	0.8	20.0
Zinc, Total, ICP	ND(10)	92.9	80.0-120	500	µg/L	90.7	89.9	80.0-120	500	µg/L	0.9	20.0
QC Batch: 110721-1												
For sample analyzed on: 07/21/2011												
Spiked sample: 11071608												
Chromium, Hexavalent	ND(0.010)	99.9	90.0-110	0.50	mg/L	MN	MN	85.0-115	0.50	mg/L	**	20.0
QC Batch: 110721-2												
For sample analyzed on: 07/21/2011												
Spiked sample: 11071101												
Phosphorus, Total, as P	ND(0.20)	96.6	90.0-110	1.0	mg/L	MN	MN	71.2-135	1.0	mg/L	**	21.2
QC Batch: 110721-3												
For samples prepared on: 07/21/2011												
Spiked sample: 11070963												
Aluminum, Tot. Rec., ICP-MS	20 J	99.6	85.0-115	51000	µg/L	104	101	80.0-120	51000	µg/L	2.9	20.0
Aluminum, Tot. Rec., ICP-MS	ND(30)	104	85.0-115	51000	µg/L			80.0-120			**	20.0
Antimony, Tot. Rec., ICP-MS	ND(5)	94.7	85.0-115	500	µg/L	94.1	93.6	80.0-120	500	µg/L	0.5	20.0
Selenium, Tot. Rec., ICP-MS	ND(5)	102	85.0-115	500	µg/L	99.1	98.4	80.0-120	500	µg/L	0.7	20.0
Thallium, 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
QC Batch: 110722-3												
For samples prepared on: 07/22/2011												
Spiked sample: 11070964												
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
QC Batch: 110722-5												
For samples prepared on: 07/22/2011												
Spiked sample: 11070964												
Potassium, Dissolved, ICP	0.7 BK	106	85.0-115	14.5	mg/L	107	108	80.0-120	14.5	mg/L	0.9	20.0
Sodium, Dissolved, ICP	1.5 BK	106	85.0-115	27.5	mg/L	105	106	80.0-120	27.5	mg/L	0.9	20.0
QC Batch: 11C1202												
For sample analyzed on: 07/21/2011												
Spiked sample:												
Nitrite, as N	ND(0.1)	96.1	90.0-110	2.0	mg/L	MN	MN	78.5-127			**	10.1
Nitrate, as N	ND(0.1)	96.7	90.0-110	2.0	mg/L	MN	MN	79.3-118			**	12.1
Sulfate	ND(1.0)	101	90.0-110	8.0	mg/L	MN	MN	81.8-125			**	10.4
QC Batch: 11C1202												
For sample analyzed on: 07/21/2011												
Spiked sample: 11071334												
Chloride	ND(1.0)	105	90.0-110	4.0	mg/L	MN	MN	82.1-126	80.0	mg/L	**	12.5





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

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



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

<u>Analysis</u>	<u>Date of</u>	<u>Instrument</u>	<u>Amount in</u>	<u>Amount</u>	<u>Percent</u>	
<u>Analysis</u>	<u>Analysis</u>	<u>Batch ID</u>	<u>Standard</u>	<u>Detected</u>	<u>Units</u>	<u>Recovery</u>
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	3IP4206	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	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	4IP4206	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	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	3IC2207	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 associated with this Continuing Calibration Verification:

<u>Laboratory Number</u>	<u>Instrument Batch</u>	<u>Sample Description</u>
11070963	1IC2213	TEC Fly Ash-SPLP

<u>Analysis</u>	<u>Date of</u>	<u>Instrument</u>	<u>Amount in</u>	<u>Amount</u>	<u>Percent</u>	
<u>Analysis</u>	<u>Analysis</u>	<u>Batch ID</u>	<u>Standard</u>	<u>Detected</u>	<u>Units</u>	<u>Recovery</u>
Chloride	07/21/2011	1IC1202	CCV recovery acceptable for this Instrument Batch.			

Quality Control Report
Continuing Calibration Verification Data Summary

Page: 14

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

Chloride	07/21/2011	2IC1202	CCV recovery acceptable for this Instrument Batch.
Nitrite, as N	07/21/2011	1IC1202	CCV recovery acceptable for this Instrument Batch.
Nitrite, as N	07/21/2011	2IC1202	CCV recovery acceptable for this Instrument Batch.
Nitrate, as N	07/21/2011	1IC1202	CCV recovery acceptable for this Instrument Batch.
Nitrate, as N	07/21/2011	2IC1202	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	3IP4206	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 recovery 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	4IP4207	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	4IP4206	CCV recovery acceptable for this Instrument Batch.
Potassium, Dissolved, ICP	08/02/2011	4IP4214	CCV 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	5IP3202	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 recovery 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	4IP3202	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 recovery acceptable for this Instrument Batch.
Titanium, Total, ICP	07/25/2011	4IP4206	CCV recovery acceptable for this Instrument Batch.
Vanadium, Total, ICP	07/25/2011	3IP4206	CCV recovery acceptable for this Instrument Batch.
Vanadium, Total, ICP	07/25/2011	4IP4206	CCV recovery acceptable for this Instrument Batch.
Vanadium, Total, ICP	07/26/2011	4IP4207	CCV recovery acceptable for this Instrument Batch.
Vanadium, Total, ICP	07/26/2011	5IP4207	CCV recovery acceptable for this Instrument Batch.

Quality Control Report
Continuing Calibration Verification Data Summary

Page: 15

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

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

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

one inch



Date: 2017
Source: NAIP
Scale: 1" to 1300'
Comments:

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



www.erisinfo.com | 1.866.517.5204

one inch 



Date: **2015**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



www.erisinfo.com | 1.866.517.5204

one inch 



Date: **2014**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2012**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2010**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2008**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch



Date: 2006
Source: NAIP
Scale: 1" to 1300'
Comments:



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



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one inch 



Date: **2005**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



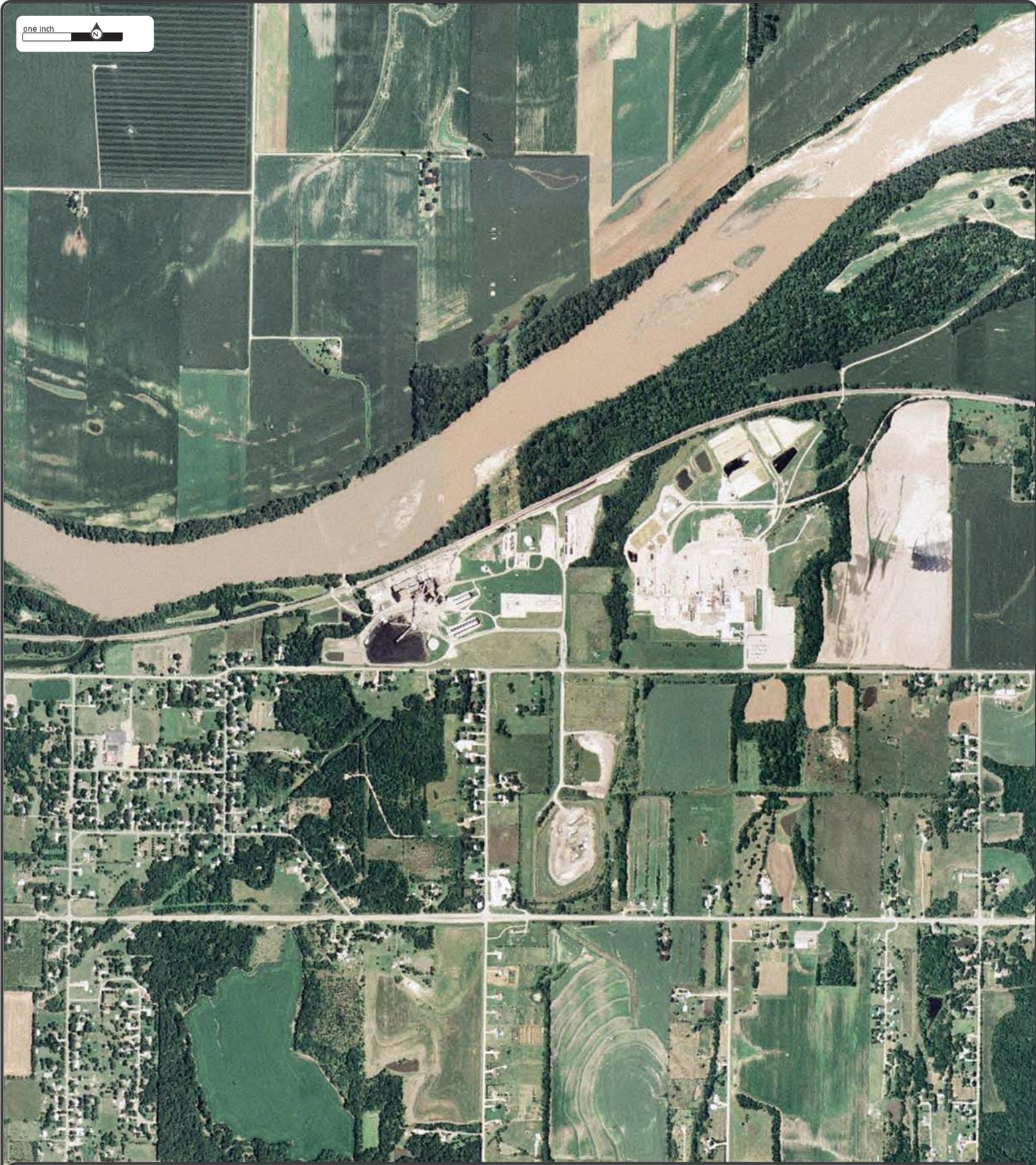
Subject: *5530 Se 2Nd Street Tecumseh KS*
Approx Center: 39.05151 / -95.56510



ENVIRONMENTAL RISK INFORMATION SERVICES

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one inch 



Date: **2004**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2003**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: 1991
Source: USGS
Scale: 1" to 1300'
Comments:



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



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one inch 



Date: **1982**
Source: **NHAP**
Scale: **1" to 1300'**
Comments:



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

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one inch



Date: 1975
Source: USGS
Scale: 1" to 1300'
Comments:



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



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one inch 



Date: 1970
Source: USGS
Scale: 1" to 1300'
Comments:



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



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one inch 



Date: 1950
Source: AMS
Scale: 1" to 1300'
Comments:



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



www.erisinfo.com | 1.866.517.5204

one inch 



Date: **1948**
Source: **ASCS**
Scale: **1" to 1300'**
Comments: *BEST COPY AVAILABLE*



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



ENVIRONMENTAL RISK INFORMATION SERVICES

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APPENDIX C

Topographic Maps



TOPOGRAPHIC MAP RESEARCH RESULTS

Date: 2018-03-02

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

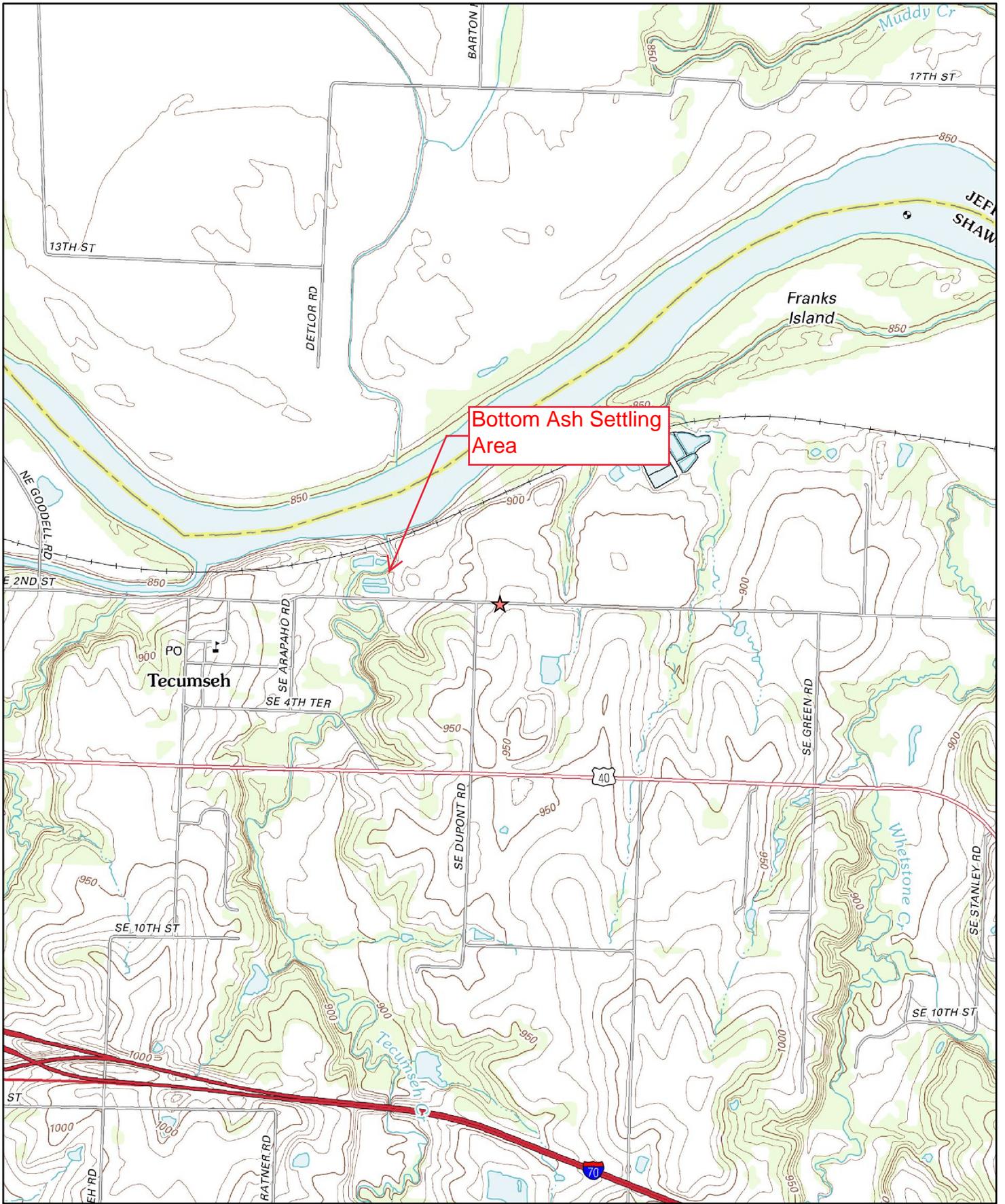
ERIS Order Number: 20180302347

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.

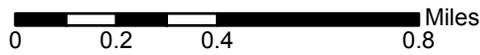
Year	Map Series
2012	7.5
1983	7.5
1981	7.5
1975	7.5
1970	7.5
1951	7.5
1950	7.5

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.*



2012

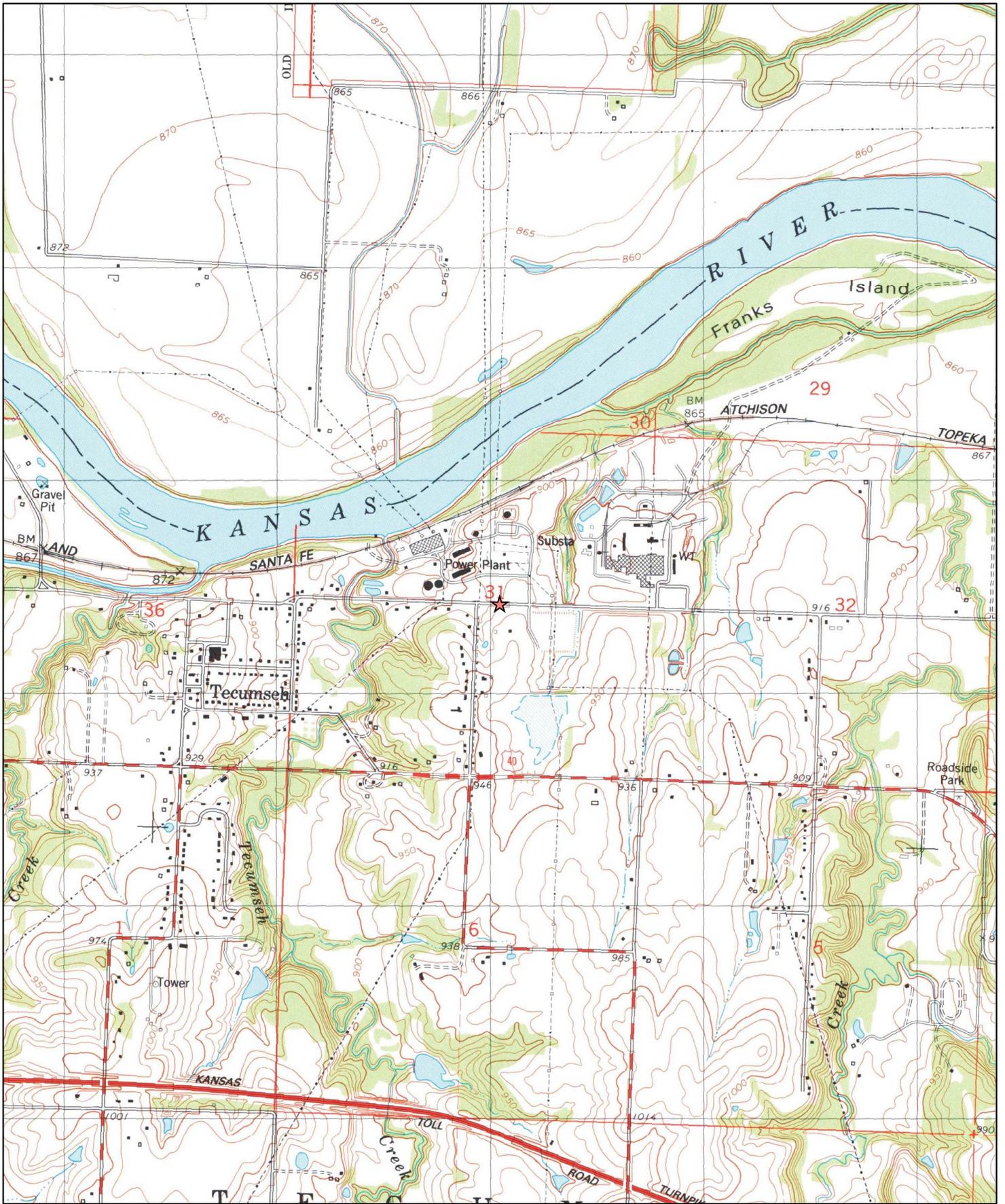


Order No. 20180302347

Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1983

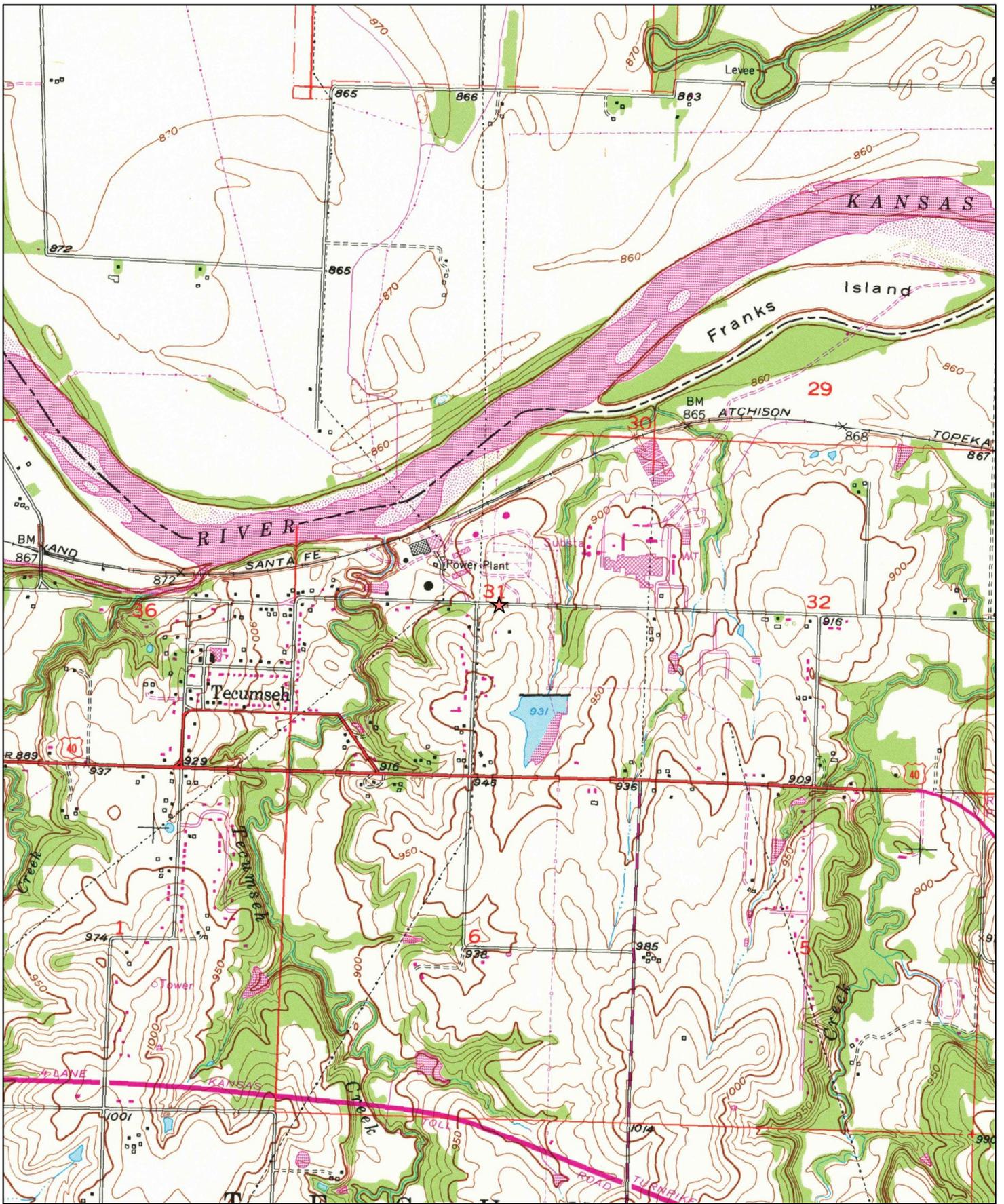


Order No. 20180302347

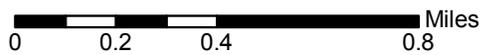
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1981

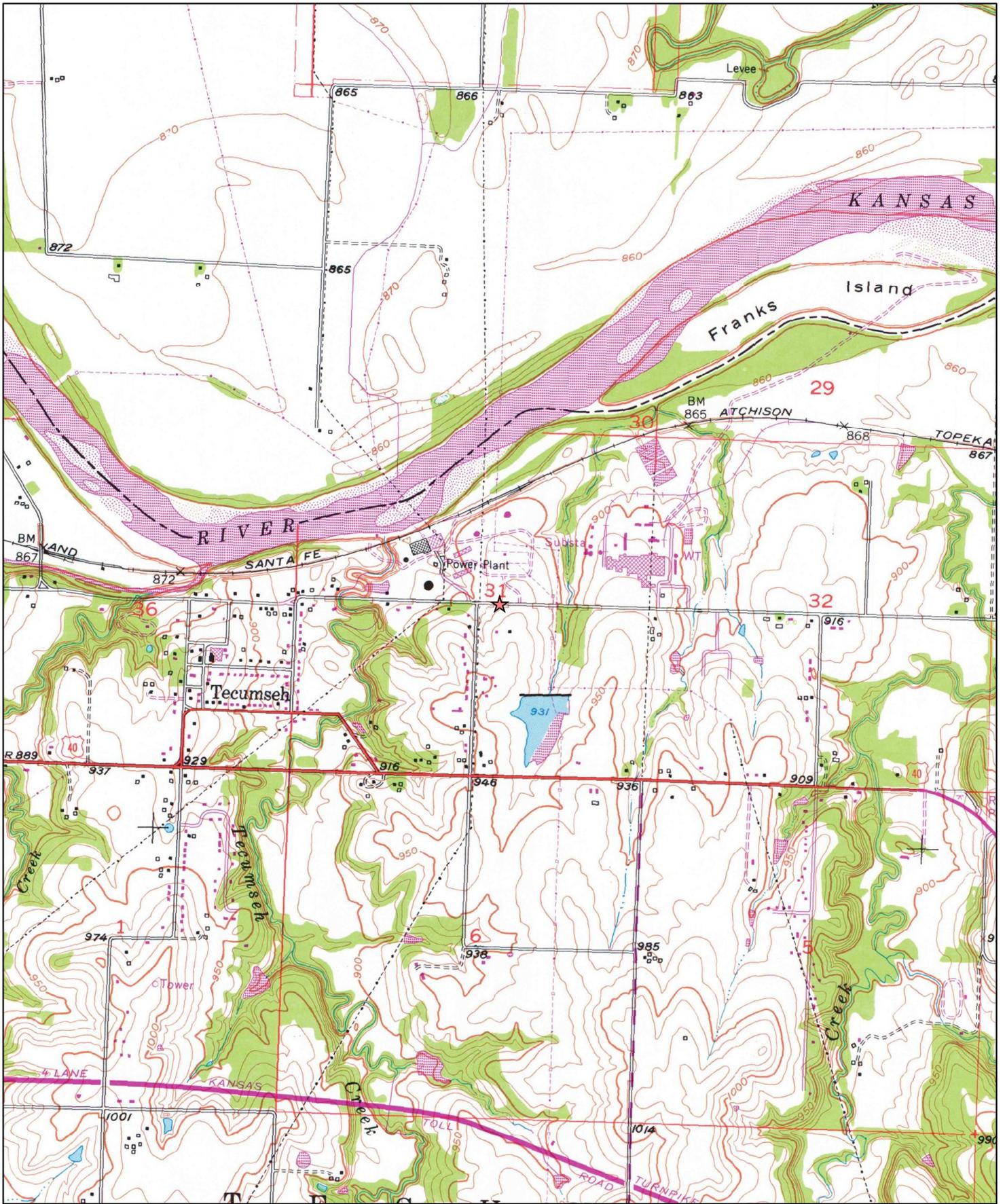


Order No. 20180302347

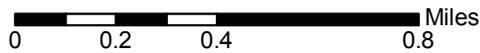
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1975

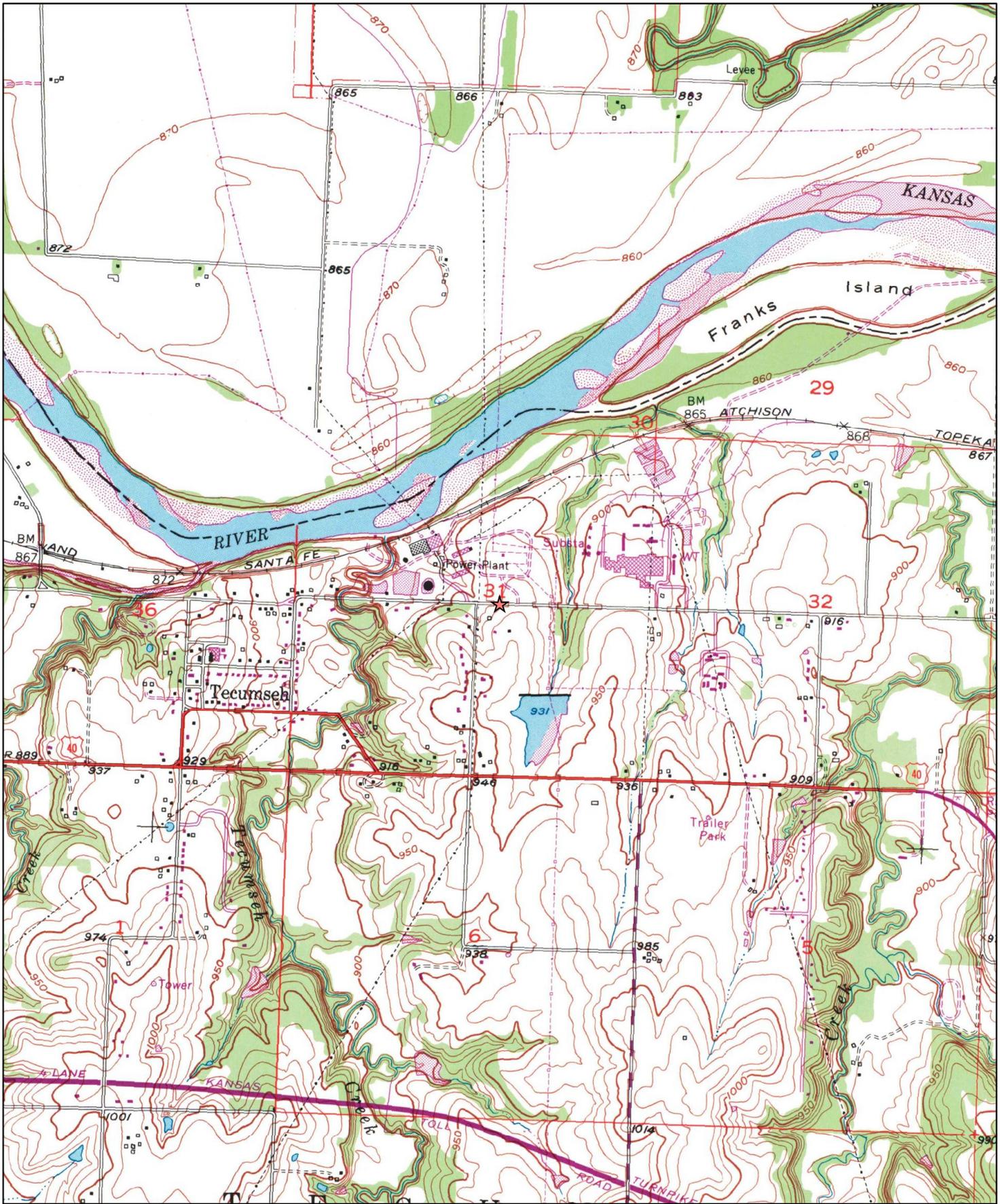


Order No. 20180302347

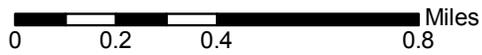
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1970

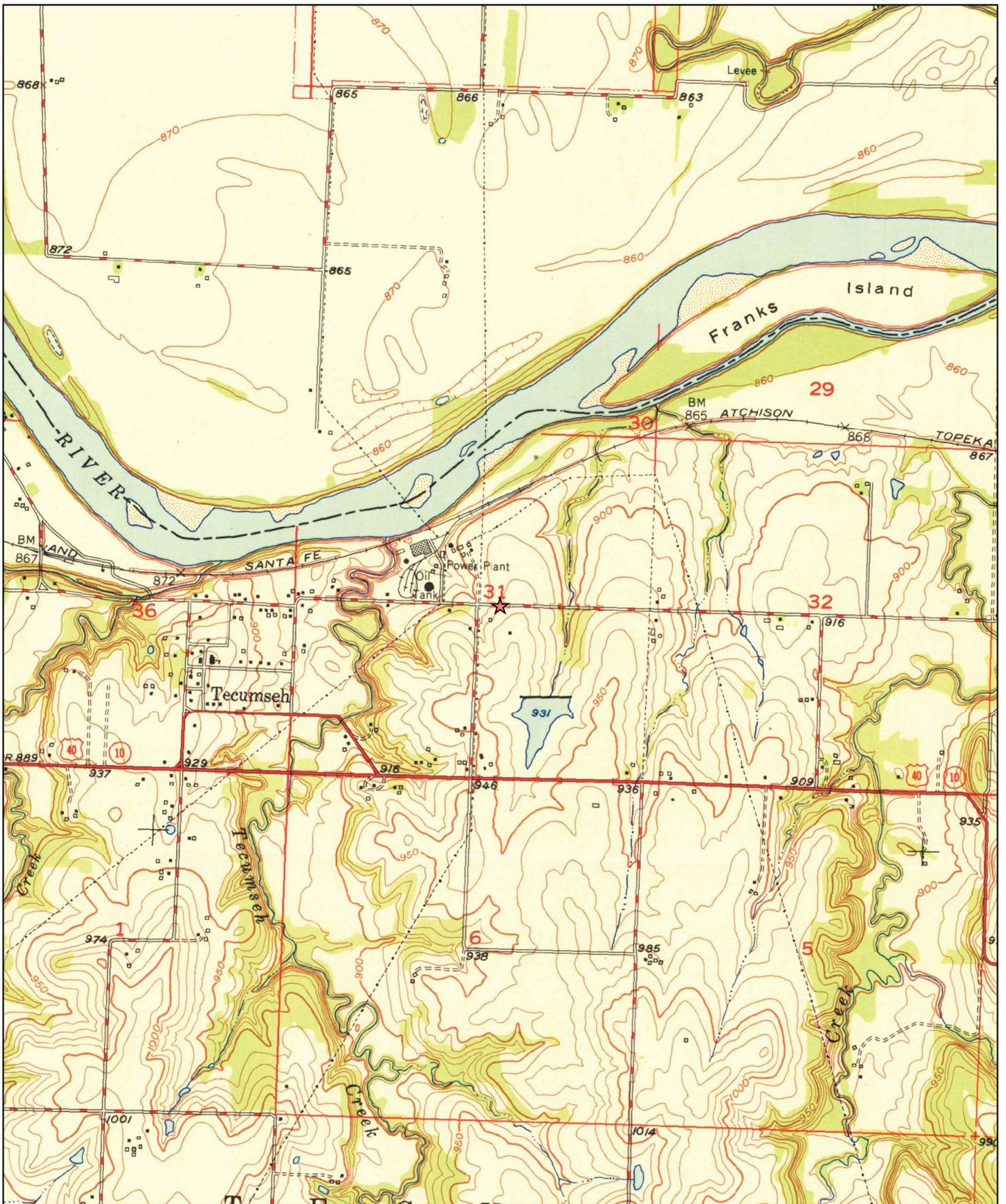


Order No. 20180302347

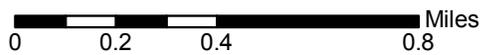
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1951

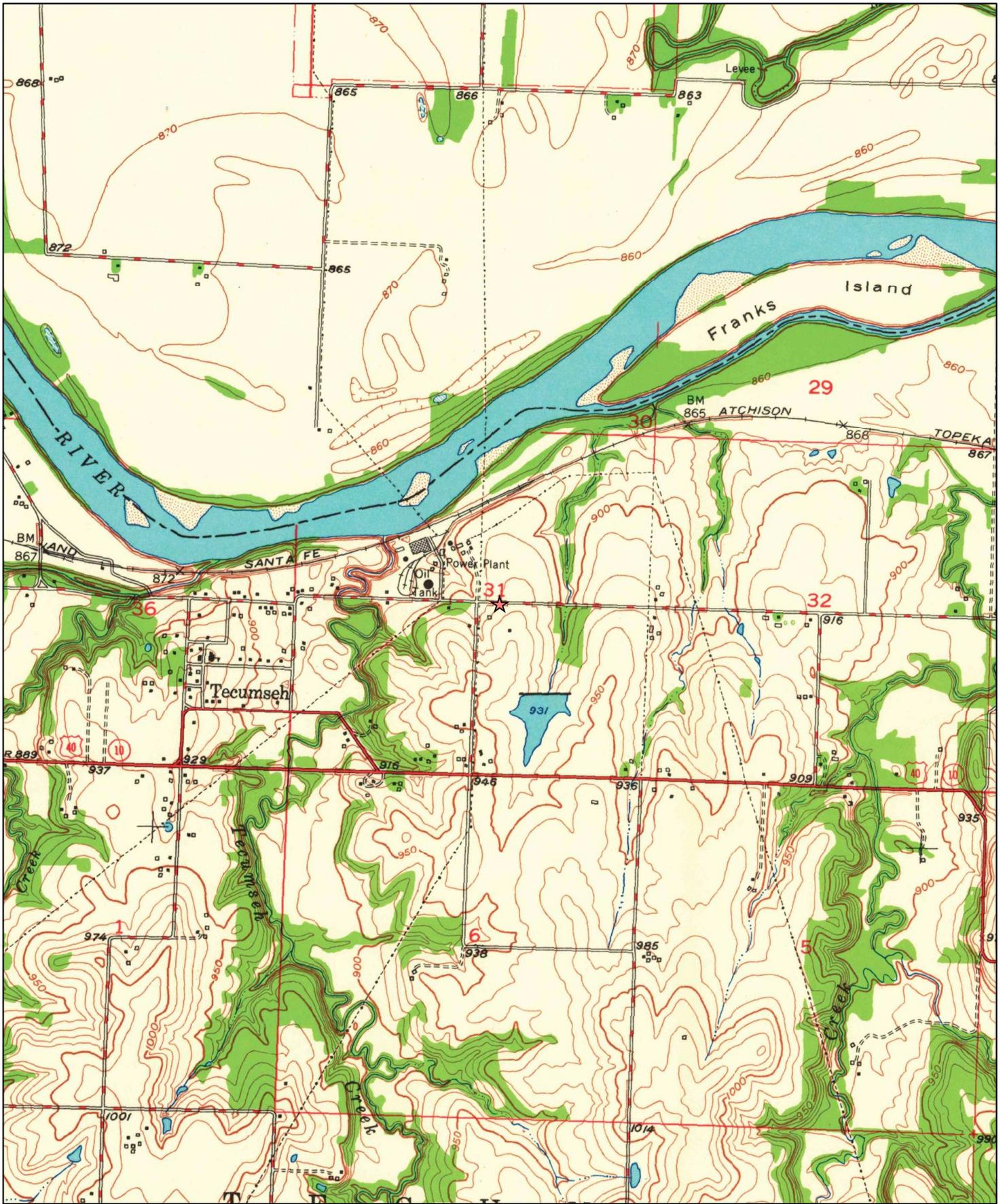


Order No. 20180302347

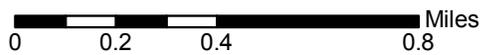
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1950



Order No. 20180302347

Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map



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).

TABLE I STATISTICALLY SIGNIFICANT LEVELS OF APPENDIX IV CONSTITUENTS

Well ID	Constituent	September 2018 Concentration (mg/L)	March 2019 Concentration (mg/L)
MW-9	Arsenic	0.099	0.04
	Cobalt	0.011	0.048
MW-10	Arsenic	0.04	0.028

Notes:
mg/L = milligrams per liter

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

Sincerely yours,
HALEY & ALDRICH, INC.


Steve Putrich, P.E.
Project Principal




Mark Nicholls, P.G.
Lead Hydrogeologist



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

**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

File No. 129778-023
Updated October 2019



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II	Historical Aerial Photograph Review Summary
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3	Bottom Ash Settling Area Conceptual Geologic Cross-Section A-A'

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A	Laboratory Reports
B	Aerial Photographs
C	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 ¹ 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 ASD² 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.

¹ Referred to in this document as an “alternate source,” and the demonstration for such is referred to as an ASD.

² 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.

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 1.6×10^{-3} 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 1×10^{-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 (HNO₃) and sulfuric (H₂SO₄) 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 groundwater³.

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.

³ 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.

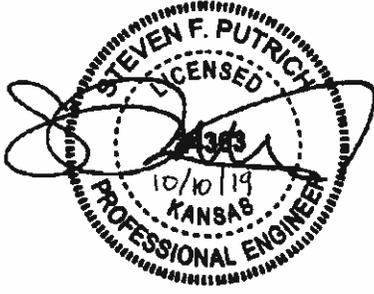
This certification and the underlying data and evaluation performed in this report support the conclusion that a source other than the CCR unit is the cause of the SSL above the groundwater protection standards of arsenic and cobalt found during assessment monitoring of this Unit (i.e., arsenic at monitoring 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: Steven F. Putrich, P.E.
Kansas License No.: PE24363
Title: Principal Consultant
Company: Haley & Aldrich, Inc.



Signed: 
Professional Geologist

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



6. References

1. AMEC, May 2011. Report of Dam Safety Assessment of Coal Combustion Surface Impoundments.
2. Environmental Risk Information Services. Database Report. March 2018.
3. Haley & Aldrich, Inc., 2017. Groundwater Sampling and Analysis Pan, Tecumseh Energy Center. October.
4. Haley & Aldrich, Inc., 2019. Annual Groundwater Monitoring and Corrective Action Report. January.
5. United States Geological Survey (USGS), 1950. Topographic Map, Grantville, 7.5-minute series.
6. USGS, 1951. Topographic Map, Grantville, 7.5-minute series.
7. USGS, 1970. Topographic Map, Grantville, 7.5-minute series.
8. USGS, 1975. Topographic Map, Grantville, 7.5-minute series.
9. USGS, 1981. Topographic Map, Grantville, 7.5-minute series.
10. USGS, 1983. Topographic Map, Grantville, 7.5-minute series.
11. USGS, 2012. Topographic Map, Grantville, 7.5-minute series.
12. Zeller, D.E., 1968. *The Stratigraphic Succession in Kansas*. Kansas Geological Survey Bulletin 189.

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 Analytical 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

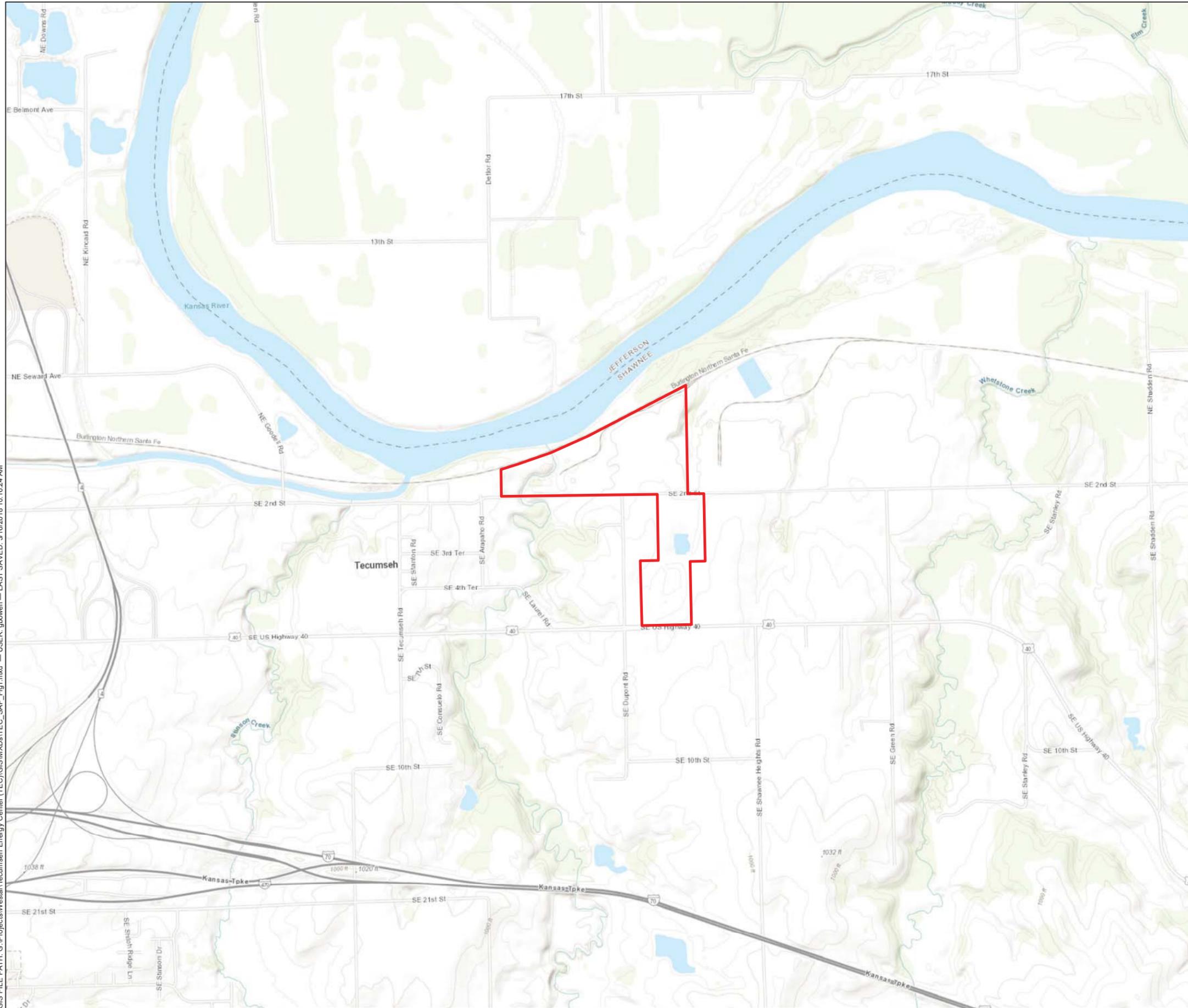
USGS = United States Geological Survey

TABLE III
HISTORICAL TOPOGRAPHIC MAP REVIEW SUMMARY
 WESTAR ENERGY, INC.
 TECUMSEH ENERGY CENTER
 BOTTOM ASH SETTLING AREA
 TECUMSEH, 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

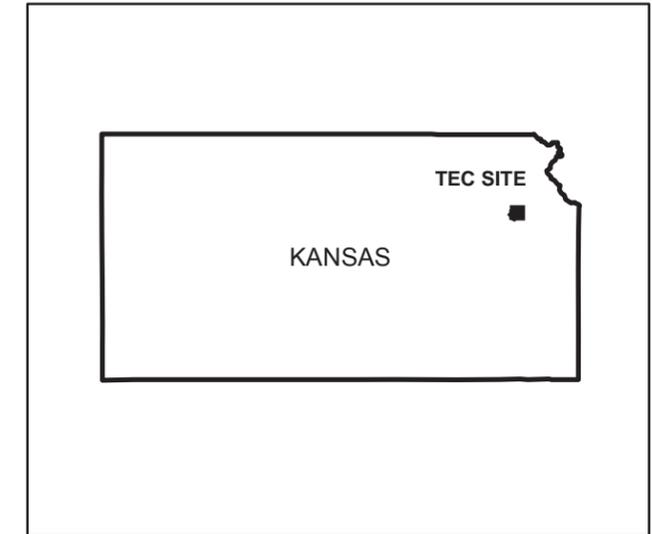
FIGURES

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LEGEND

 PROPERTY BOUNDARY



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.



**HALEY
ALDRICH**

WESTAR ENERGY
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

SITE LOCATION

OCTOBER 2019
SCALE: AS SHOWN

FIGURE 1

GIS FILE PATH: G:\Projects\Westar\Tecumseh Energy Center (TEC)\GIS\MXDs\2019_04\CROSS SECTIONS - B-B' ASH SETTLING POND.mxd — USER: DZinsmaster — LAST SAVED: 6/24/2019 3:22:40 PM

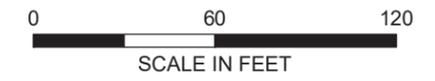


LEGEND

-  MONITORING WELL
-  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.

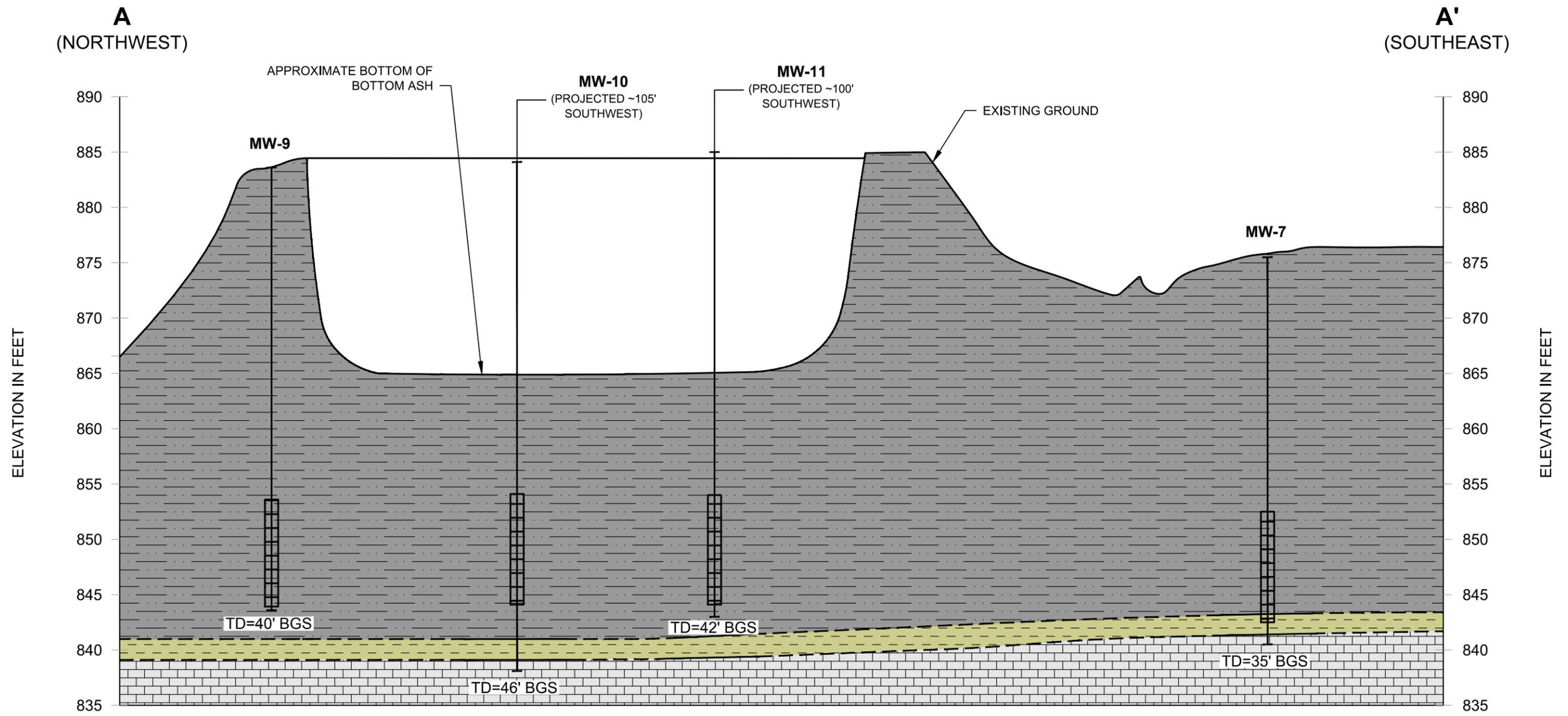


HALEY ALDRICH WESTAR ENERGY
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

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

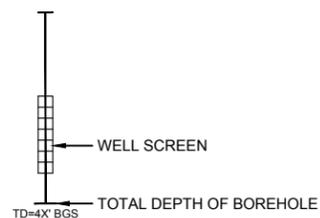
OCTOBER 2019
SCALE: AS SHOWN

FIGURE 2



LEGEND

- GLACIAL DEPOSITS/OVERBURDEN
- SHALE MEMBER OF THE SCRANTON FORMATION
- LIMESTONE MEMBER OF THE SCRANTON SHALE FORMATION



NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. VERTICAL SCALE IS EXAGGERATED 5 TIMES.
3. PROJECTIONS ARE IN DIRECTION FROM ACTUAL LOCATION.



WESTAR ENERGY
 TECUMSEH ENERGY CENTER (TEC)
 TECUMSEH, KANSAS

**BOTTOM ASH SETTLING AREA
 CONCEPTUAL GEOLOGIC CROSS
 SECTION A-A'**

SCALE: AS SHOWN
 OCTOBER 2019

FIGURE 3

APPENDIX A

Laboratory Reports

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,



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

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

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

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SAMPLE SUMMARY

Project: TEC BOTTOM ASH SPLP 2019

Pace 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

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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

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: **TEC BA INLET** Lab ID: **60298624001** Collected: 04/02/19 12:45 Received: 04/02/19 15:30 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP		Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 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 Method: EPA 6020 Preparation Method: EPA 3020

Leachate Method/Date: EPA 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 Method: EPA 7470 Preparation Method: EPA 7470

Leachate Method/Date: EPA 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	
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REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA MIDDLE **Lab ID: 60298624003** Collected: 04/02/19 12:50 Received: 04/02/19 15:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP		Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 1312; 04/04/19 00:00						
Barium	ND	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-39-3	
Beryllium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:25	7440-41-7	
Boron	0.17	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:25	7440-42-8	
Cadmium	ND	mg/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	B
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 Method: EPA 6020 Preparation Method: EPA 3020 Leachate Method/Date: EPA 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 Method: EPA 7470 Preparation Method: EPA 7470 Leachate Method/Date: EPA 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	

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ANALYTICAL RESULTS

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: 04/05/19 10:16 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days		Analytical Method: 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 Method: 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 Method: EPA 365.4						
Phosphorus	1.1	mg/L	0.10	1		04/06/19 10:55	7723-14-0	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: **TEC BA OUTLET** Lab ID: **60298624005** Collected: 04/02/19 12:55 Received: 04/02/19 15:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, SPLP		Analytical Method: EPA 6010 Preparation Method: EPA 3010 Leachate Method/Date: EPA 1312; 04/04/19 00:00						
Barium	0.14	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-39-3	
Beryllium	ND	mg/L	0.0010	1	04/05/19 12:37	04/08/19 12:27	7440-41-7	
Boron	0.39	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-42-8	
Cadmium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-43-9	
Calcium	15.5	mg/L	0.10	1	04/05/19 12:37	04/08/19 12:27	7440-70-2	
Chromium	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-47-3	
Cobalt	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-48-4	
Copper	ND	mg/L	0.010	1	04/05/19 12:37	04/08/19 12:27	7440-50-8	
Iron	0.055	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7439-89-6	
Lead	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7439-92-1	
Magnesium	2.6	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7439-95-4	
Manganese	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7439-96-5	
Molybdenum	ND	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:27	7439-98-7	
Nickel	ND	mg/L	0.0050	1	04/05/19 12:37	04/08/19 12:27	7440-02-0	
Potassium	ND	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-09-7	
Silica	7.2	mg/L	1.1	1	04/05/19 12:37	04/08/19 12:27	7631-86-9	
Silicon	3.3	mg/L	0.50	1	04/05/19 12:37	04/08/19 12:27	7440-21-3	
Silver	ND	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	B
Strontium	0.38	mg/L	0.020	1	04/05/19 12:37	04/08/19 12:27	7440-24-6	
Titanium	ND	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	mg/L	0.050	1	04/05/19 12:37	04/08/19 12:27	7440-66-6	
6020 MET ICPM, SPLP		Analytical Method: EPA 6020 Preparation Method: EPA 3020 Leachate Method/Date: EPA 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 Method: EPA 7470 Preparation Method: EPA 7470 Leachate Method/Date: EPA 1312; 04/04/19 00:00						
Mercury	ND	mg/L	0.0020	1	04/05/19 16:19	04/08/19 12:46	7439-97-6	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA OUTLET LEACHATE **Lab ID:** 60298624006 Collected: 04/05/19 10:15 Received: 04/05/19 10:16 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days		Analytical Method: 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 Method: EPA 353.2						
Nitrogen, Nitrate	0.15	mg/L	0.10	1		04/05/19 15:03		B
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		B
365.4 Total Phosphorus		Analytical Method: EPA 365.4						
Phosphorus	ND	mg/L	0.10	1		04/06/19 10:58	7723-14-0	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA INLET LEACHATE **Lab ID:** 60298624007 Collected: 04/09/19 13:35 Received: 04/09/19 13:36 Matrix: Water
2

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7196 Chromium, Hexavalent								
Analytical Method: EPA 7196								
Chromium, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:19	18540-29-9	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA MIDDLE LEACHATE 2		Lab ID: 60298624008	Collected: 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 Chromium, Hexavalent								
Analytical Method: EPA 7196								
Chromium, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:21	18540-29-9	

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ANALYTICAL RESULTS

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

Sample: TEC BA OUTLET LEACHATE 3		Lab ID: 60298624009	Collected: 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 Chromium, Hexavalent		Analytical Method: EPA 7196						
Chromium, Hexavalent	ND	mg/L	0.010	1		04/09/19 14:22	18540-29-9	

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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 577594

Analysis Method: EPA 7470

QC Batch Method: EPA 7470

Analysis Description: 7470 Mercury SPLP

Associated Lab Samples: 60298624001, 60298624003, 60298624005

METHOD BLANK: 2370033

Matrix: Water

Associated Lab Samples: 60298624001, 60298624003, 60298624005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.0020	04/08/19 12:33	

LABORATORY CONTROL SAMPLE: 2370034

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.015	0.014	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2370036 2370035

Parameter	Units	60298624001		MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	ND	Spike Conc.	Conc.	Result	Conc.	Result	Conc.	% Rec	% Rec				
Mercury	mg/L	ND	ND	0.015	0.015	0.014	0.015	0.015	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.

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QUALITY CONTROL DATA

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 Samples: 60298624001, 60298624003, 60298624005

METHOD BLANK: 2369565 Matrix: Water

Associated Lab Samples: 60298624001, 60298624003, 60298624005

Parameter	Units	Blank Result	Reporting 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

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% 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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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

LABORATORY CONTROL SAMPLE: 2369566

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% 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 SPIKE DUPLICATE: 2369567 2369568

Parameter	Units	60298624001		MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	Result						
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					
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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QUALITY CONTROL DATA

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

QC Batch: 577492 Analysis Method: EPA 6020
QC Batch Method: EPA 3020 Analysis Description: 6020 MET SPLP
Associated Lab Samples: 60298624001, 60298624003, 60298624005

METHOD BLANK: 2369569 Matrix: Water
Associated Lab Samples: 60298624001, 60298624003, 60298624005

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 SPIKE DUPLICATE: 2369571 2369572

Parameter	Units	60298624001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
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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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 577533 Analysis Method: EPA 353.2
 QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
 Associated Lab Samples: 60298624002, 60298624004, 60298624006

METHOD BLANK: 2369705 Matrix: Water

Associated Lab Samples: 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

Parameter	Units	60298624002 Result	Spike Conc.	MS Result	MS % Rec	% 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

Parameter	Units	60298624006 Result	Dup Result	RPD	Max 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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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 577541

Analysis Method: EPA 365.4

QC Batch Method: EPA 365.4

Analysis Description: 365.4 Phosphorus

Associated Lab Samples: 60298624002, 60298624004, 60298624006

METHOD BLANK: 2369762

Matrix: Water

Associated Lab Samples: 60298624002, 60298624004, 60298624006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus	mg/L	ND	0.10	04/06/19 10:51	

LABORATORY CONTROL SAMPLE: 2369763

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.1	105	90-110	

MATRIX SPIKE SAMPLE: 2369764

Parameter	Units	60298624002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.16	2	2.3	105	90-110	

SAMPLE DUPLICATE: 2369765

Parameter	Units	60298624004 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	1.1	1.0	3	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC BOTTOM ASH SPLP 2019

Pace Project No.: 60298624

QC Batch: 578184 Analysis Method: EPA 7196
 QC Batch Method: EPA 7196 Analysis Description: 7196 Chromium, Hexavalent
 Associated Lab Samples: 60298624007, 60298624008, 60298624009

METHOD BLANK: 2372388 Matrix: Water

Associated Lab Samples: 60298624007, 60298624008, 60298624009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chromium, Hexavalent	mg/L	ND	0.010	04/09/19 14:13	

LABORATORY CONTROL SAMPLE: 2372389

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/L	0.1	0.096	96	90-110	

MATRIX SPIKE SAMPLE: 2372390

Parameter	Units	60298624007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/L	ND	0.1	0.090	90	85-115	

SAMPLE DUPLICATE: 2372391

Parameter	Units	60298624008 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/L	ND	ND		20	

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REPORT OF LABORATORY ANALYSIS

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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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: TEC BOTTOM ASH SPLP 2019

Pace 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	TEC BA OUTLET LEACHATE 3	EPA 7196	578184		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60298624



Client Name: Wester Energy

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-296 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 4.5 Corr. Factor -1.0 Corrected 3.5

Date and initials of person examining contents: 3/2/19

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>3 Day</u>
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>SL</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State: <u>OK</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/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: _____

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.

<u>CAS LAB ID #</u>	<u>SAMPLE DESCRIPTION</u>	<u>SAMPLE TYPE</u>	<u>DATE SAMPLED</u>
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.

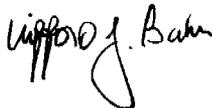
Samples will be retained for 120 days unless Continental is otherwise notified.

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.

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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



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

KDHE Environmental Laboratory Accreditation No. E-10146



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

Lab Number: 11070963
 Sample Description: TEC Fly Ash-SPLP

Date Sampled: 07/13/2011
 Time Sampled: 1420

<u>Analysis</u>	<u>Concentration</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>LOQ</u>
Aluminum, Tot. Rec., ICP-MS	83400	µg/L	1.0	0.03
Antimony, Tot. Rec., ICP-MS	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)	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-MS	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-MS	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/L	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	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

<u>Analysis</u>	<u>Date/Time Prepared</u>	<u>Date/Time Analyzed</u>	<u>QC Batch</u>	<u>Inst. Batch</u>	<u>Analyst Method(s)</u>
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-Continued-

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	Date/Time		Date/Time		QC	Inst.	Analyst	Method(s)
	Prepared		Analyzed		Batch	Batch		
Aluminum, Tot. Rec., ICP-M07/21/11	1200	08/02/11	1619	110721-3	2IP3214	JDL	6020A	
Antimony, Tot. Rec., ICP-M07/21/11	1200	07/21/11	1914	110721-3	4IP3202	JDL	6020A	
Arsenic, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Barium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Beryllium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Boron, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Cadmium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Calcium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Chromium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Cobalt, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Copper, Total, ICP	07/21/11	1130	07/25/11	1338	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	1338	110721-1	3IP4206	JDL	6010B
Lead, Total, ICP	07/21/11	1130	07/28/11	1351	110721-1	4IP4209	JDL	6010B
Magnesium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Manganese, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Mercury, Total	07/21/11	1126	07/22/11	1757	110721-1	3MA3203	JDL	7470A
Molybdenum, Total, ICP	07/21/11	1130	07/26/11	1807	110721-1	4IP4207	JDL	6010B
Nickel, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Potassium, Dissolved, ICP	07/22/11	1252	08/02/11	1955	110722-5	4IP4214	KMW	6010B
Selenium, Tot. Rec., ICP-M07/21/11	1200	07/21/11	1914	110721-3	4IP3202	JDL	6020A	
Silicon as Silica	07/22/11	1200	08/01/11	1629	110722-3	3IP4213	KMW	6010B
Silver, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Sodium, Dissolved, ICP	07/22/11	1252	08/02/11	1955	110722-5	4IP4214	KMW	6010B
Strontium, Total, ICP	07/21/11	1130	07/28/11	1351	110721-1	4IP4209	JDL	6010B
Thallium, Tot. Rec., ICP-M07/21/11	1200	07/21/11	1914	110721-3	4IP3202	JDL	6020A	
Titanium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Vanadium, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Zinc, Total, ICP	07/21/11	1130	07/25/11	1338	110721-1	3IP4206	JDL	6010B
Chloride	N/A		07/21/11	1215	1IC1202	1IC1202	MLL	300.0/9056A
Chromium, Hexavalent	N/A		07/21/11	1107	110721-1	110721-2	JND	7196A (Modified)
Fluoride	N/A		08/01/11	1437	1IC2213	1IC2213	MLL	300.0/9056A
Nitrate, as N	N/A		07/21/11	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	1422	110721-2	110721-3	KJH	SM 4500-P(B&F) (M
Sulfate	N/A		07/21/11	1215	1IC1202	1IC1202	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: 11070963

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

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

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

<u>Analysis</u>	<u>Concentration</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>LOQ</u>
Aluminum, Tot. Rec., ICP-MS	10400	µg/L	1.0	0.03
Antimony, Tot. Rec., ICP-MS	ND(5)	µg/L	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/L	1.0	0.2
Molybdenum, Total, ICP	12	µg/L	1.0	5
Nickel, Total, ICP	ND(5)	µg/L	1.0	5
Potassium, Dissolved, ICP	0.4 B	mg/L	1.0	0.3
Selenium, Tot. Rec., ICP-MS	ND(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 2.6	mg/L	1.0	0.5
Strontium, Total, ICP	1360	µg/L	1.0	5
Thallium, Tot. Rec., ICP-MS	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

<u>Analysis</u>	<u>Date/Time Prepared</u>	<u>Date/Time Analyzed</u>	<u>QC Batch</u>	<u>Inst. Batch</u>	<u>Analyst Method(s)</u>
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-Continued-

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

<u>Analysis</u>	<u>Date/Time Prepared</u>	<u>Date/Time Analyzed</u>	<u>QC Batch</u>	<u>Inst. Batch</u>	<u>Analyst</u>	<u>Method(s)</u>
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	
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	4IP4207	JDL	6010B	
Chromium, Total, ICP	07/21/11 1130 07/25/11 1343	110721-1	3IP4206	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	5IP4214	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	3IP4206	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	3IP4206	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 (Modified)	
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) (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

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.

<u>CAS LAB ID #</u>	<u>ANALYSIS</u>	<u>DATE/TIME</u> <u>SAMPLED</u>	<u>DATE/TIME</u> <u>ANALYZED</u>	<u>ELAPSED</u> <u>HRS:MIN</u>
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.

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.

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

Quality Control Report
Batch Summary

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

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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	
SL602	SPLP Prep	110720-1	110720BLK1		
Lab numbers associated with this batch: 11070963 11070964					

SL802	Arsenic, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL303	Barium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL304	Beryllium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL305	Boron, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
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	11070964MS
SL313	Copper, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL326	Iron, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL311	Lead, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL331	Magnesium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL332	Manganese, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL333	Mercury, Total	110721-1	110721BLK1	110721LCS1	11070963MS
SL334	Molybdenum, Total, ICP	110721-1	110721BLK1	110721LCS1	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
SL366	Titanium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL368	Vanadium, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
SL369	Zinc, Total, ICP	110721-1	110721BLK1	110721LCS1	11070964MS
Lab numbers associated with this batch: 11070963 11070964					

SL000	Aluminum, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
SL001	Antimony, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
SL023	Selenium, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
SL029	Thallium, Tot. Rec., ICP-MS	110721-3	110721BLK3	110721LCS3	11070963MS
Lab numbers associated with this batch: 11070963 11070964					

SL212	Silicon as Silica	110722-3	110722BLK3	110722LCS3	11070964MS
Lab numbers associated with this batch: 11070963 11070964					

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

Quality Control Report
Batch Summary

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

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	Chloride	1IC1202	BLK1IC1202	LCS1IC1202		11071334MS
Lab numbers associated with this batch: 11070963 11070964						
GL147	Chromium, Hexavalent	110721-1	110721BLK1	110721LCS1		11071608MS
Lab numbers associated with this batch: 11070963 11070964						
GL501	Fluoride	1IC2207	BLK1IC2207	LCS1IC2207		
Lab numbers associated with this batch: 11070964						
GL501	Fluoride	1IC2213	BLK1IC2213	LCS1IC2213		
Lab numbers associated with this batch: 11070963						
GL505	Nitrate, as N	1IC1202	BLK1IC1202	LCS1IC1202		
Lab numbers associated with this batch: 11070963 11070964						
GL510	Nitrate/Nitrite, as N					
Lab numbers associated with this batch: 11070963 11070964						
GL503	Nitrite, as N	1IC1202	BLK1IC1202	LCS1IC1202		
Lab numbers associated with this batch: 11070963 11070964						
GL218	Phosphorus, Total, as P	110721-2	110721BLK2	110721LCS2		11071101MS
Lab numbers associated with this batch: 11070963 11070964						
GL506	Sulfate	1IC1202	BLK1IC1202	LCS1IC1202		
Lab numbers associated with this batch: 11070963 11070964						



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	Blank Data	% Rec LCS	Limits	Spike Level	Units	Spiked Sample (% Recovery)		Limits	Spike Level	Units	Spiked Sample Precision Data	
						MS	MSD				RPD	Limit
QC Batch: 110721-1 For samples prepared on: 07/21/2011 Spiked sample: 11070963												
Mercury, Total	ND(0.2)	89.1	80.0-120	5.0	µg/L	90.2	91.9	80.0-120	5.0	µg/L	1.9	20.0
QC Batch: 110721-1 For samples prepared on: 07/21/2011 Spiked sample: 11070964												
Arsenic, Total, ICP	ND(5)	96.5	80.0-120	500	µg/L	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/L	101	110.	80.0-120	1500	µg/L	8.5	20.0
Beryllium, Total, ICP	ND(2)	96.9	80.0-120	500	µg/L	104	103	80.0-120	500	µg/L	1.0	20.0
Boron, 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	µg/L	0.9	20.0
Cobalt, Total, ICP	ND(2)	94.8	80.0-120	500	µg/L	94.6	92.8	80.0-120	500	µg/L	1.9	20.0
Copper, Total, ICP	ND(10)	97.0	80.0-120	500	µg/L	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
Lead, 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
Manganese, Total, ICP	ND(5)	97.1	80.0-120	500	µg/L	98.0	96.7	80.0-120	500	µg/L	1.3	20.0
Molybdenum, Total, ICP	ND(5)	97.5	80.0-120	500	µg/L	98.1	97.6	80.0-120	500	µg/L	0.5	20.0
Nickel, Total, ICP	ND(5)	94.6	80.0-120	500	µg/L	94.6	93.1	80.0-120	500	µg/L	1.6	20.0
Silver, Total, ICP	ND(5)	95.0	80.0-120	100	µg/L	96.9	95.5	80.0-120	100	µg/L	1.5	20.0
Strontium, Total, ICP	ND(5)	107	80.0-120	100	µg/L	I	I	80.0-120	100	µg/L	**	20.0
Titanium, Total, ICP	ND(5)	99.9	80.0-120	500	µg/L	102	101	80.0-120	500	µg/L	1.0	20.0
Vanadium, Total, ICP	ND(5)	95.2	80.0-120	500	µg/L	95.4	94.6	80.0-120	500	µg/L	0.8	20.0
Zinc, Total, ICP	ND(10)	92.9	80.0-120	500	µg/L	90.7	89.9	80.0-120	500	µg/L	0.9	20.0
QC Batch: 110721-1 For sample analyzed on: 07/21/2011 Spiked sample: 11071608												
Chromium, Hexavalent	ND(0.010)	99.9	90.0-110	0.50	mg/L	MN	MN	85.0-115	0.50	mg/L	**	20.0
QC Batch: 110721-2 For sample analyzed on: 07/21/2011 Spiked sample: 11071101												
Phosphorus, Total, as P	ND(0.20)	96.6	90.0-110	1.0	mg/L	MN	MN	71.2-135	1.0	mg/L	**	21.2
QC Batch: 110721-3 For samples prepared on: 07/21/2011 Spiked sample: 11070963												
Aluminum, Tot. Rec., ICP-MS	20 J	99.6	85.0-115	51000	µg/L	104	101	80.0-120	51000	µg/L	2.9	20.0
Aluminum, Tot. Rec., ICP-MS	ND(30)	104	85.0-115	51000	µg/L			80.0-120			**	20.0
Antimony, Tot. Rec., ICP-MS	ND(5)	94.7	85.0-115	500	µg/L	94.1	93.6	80.0-120	500	µg/L	0.5	20.0
Selenium, Tot. Rec., ICP-MS	ND(5)	102	85.0-115	500	µg/L	99.1	98.4	80.0-120	500	µg/L	0.7	20.0
Thallium, 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
QC Batch: 110722-3 For samples prepared on: 07/22/2011 Spiked sample: 11070964												
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
QC Batch: 110722-5 For samples prepared on: 07/22/2011 Spiked sample: 11070964												
Potassium, Dissolved, ICP	0.7 BK	106	85.0-115	14.5	mg/L	107	108	80.0-120	14.5	mg/L	0.9	20.0
Sodium, Dissolved, ICP	1.5 BK	106	85.0-115	27.5	mg/L	105	106	80.0-120	27.5	mg/L	0.9	20.0
QC Batch: 11C1202 For sample analyzed on: 07/21/2011 Spiked sample:												
Nitrite, as N	ND(0.1)	96.1	90.0-110	2.0	mg/L	MN	MN	78.5-127			**	10.1
Nitrate, as N	ND(0.1)	96.7	90.0-110	2.0	mg/L	MN	MN	79.3-118			**	12.1
Sulfate	ND(1.0)	101	90.0-110	8.0	mg/L	MN	MN	81.8-125			**	10.4
QC Batch: 11C1202 For sample analyzed on: 07/21/2011 Spiked sample: 11071334												
Chloride	ND(1.0)	105	90.0-110	4.0	mg/L	MN	MN	82.1-126	80.0	mg/L	**	12.5





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

Page: 12

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



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

<u>Analysis</u>	<u>Date of</u>	<u>Instrument</u>	<u>Amount in</u>	<u>Amount</u>	<u>Percent</u>
<u>Analysis</u>	<u>Batch ID</u>	<u>Standard</u>	<u>Detected</u>	<u>Units</u>	<u>Recovery</u>
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	3IP4206	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	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	4IP4206	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	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	3IC2207	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 associated with this Continuing Calibration Verification:

<u>Laboratory Number</u>	<u>Instrument Batch</u>	<u>Sample Description</u>
11070963	1IC2213	TEC Fly Ash-SPLP

<u>Analysis</u>	<u>Date of</u>	<u>Instrument</u>	<u>Amount in</u>	<u>Amount</u>	<u>Percent</u>
<u>Analysis</u>	<u>Batch ID</u>	<u>Standard</u>	<u>Detected</u>	<u>Units</u>	<u>Recovery</u>
Chloride	07/21/2011	1IC1202	CCV recovery acceptable for this Instrument Batch.		

Quality Control Report
Continuing Calibration Verification Data Summary

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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

Chloride	07/21/2011	2IC1202	CCV recovery acceptable for this Instrument Batch.
Nitrite, as N	07/21/2011	1IC1202	CCV recovery acceptable for this Instrument Batch.
Nitrite, as N	07/21/2011	2IC1202	CCV recovery acceptable for this Instrument Batch.
Nitrate, as N	07/21/2011	1IC1202	CCV recovery acceptable for this Instrument Batch.
Nitrate, as N	07/21/2011	2IC1202	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	3IP4206	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 recovery 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	4IP4207	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	4IP4206	CCV recovery acceptable for this Instrument Batch.
Potassium, Dissolved, ICP	08/02/2011	4IP4214	CCV 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	5IP3202	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 recovery 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	4IP3202	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 recovery acceptable for this Instrument Batch.
Titanium, Total, ICP	07/25/2011	4IP4206	CCV recovery acceptable for this Instrument Batch.
Vanadium, Total, ICP	07/25/2011	3IP4206	CCV recovery acceptable for this Instrument Batch.
Vanadium, Total, ICP	07/25/2011	4IP4206	CCV recovery acceptable for this Instrument Batch.
Vanadium, Total, ICP	07/26/2011	4IP4207	CCV recovery acceptable for this Instrument Batch.
Vanadium, Total, ICP	07/26/2011	5IP4207	CCV recovery acceptable for this Instrument Batch.

Quality Control Report
Continuing Calibration Verification Data Summary

Page: 15

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

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

Continental Analytical Services Cooler/Sample Receipt Form

CAS Order No. 57218

Client Name: Wortner

CAS File No.: 7101

Sample ID's in cooler: See coc

Cooler / 1 of 1 for this CAS Order No.

Cooler Identification: CAS Cooler #: / Client's Cooler Letter/Hand Delivered
Other:

Date/Time Cooler Received: 7 / 14 / 11 9 : 00

Delivered By: UPS/FedX/AB Express/ASAP/Land Air Exp/Field Svcs/Mail/Walk-In/Other:

Custody Seal: Present: Intact / Broken Absent: Seal No:

Seal Name: Seal Date:

Seal matches Chain of Custody: Yes / No / N/A

Type of Packing Material: Blue Ice/Ice/Melted Ice Bubble/Foam/Paper/Peanuts/Vermiculite/ None/Other:

Cooler Temperature (°C): Original Reading (°C) 27.4 Corrected Reading (°C) 26.4 - 28.4

Temp. By: Temp. Blank Surface: Glass Plastic/Metal/Other: Cooler

Thermo. ID No.: 554 Thermo. Correction Factor (°C): + -1.0

Evidence of Cooling: date received = date sampled

Sample Receipt Discrepancies: No Yes (see below for discrepancies)

Note: CAS will proceed with sample analyses, addressing each discrepancy as shown, until/unless directed otherwise by the client.

- Chain of Custody not present information taken from:
 - Cover Letter Container
 - PO CAS Proj. Mgr.
- Container label absent
- Chain of Custody incomplete [see detail below]
- Chain of Custody missing date/time sampled (excl. TB or Dup)
- Date or Time sampled obtained from container label
- Chain of Custody missing sampler's name
- Chain of Custody missing matrix (sample type)
- Missing relinquished information: signature date time
- Sample excluded from Chain of Custody
- Sample listed on Chain of Custody, not received
- Sample description on container and Chain of Custody do not agree
- Air bubbles in Aqueous VOA vials larger than pea-size [approx. 6 mm]
- Cooler temperature exceeded 0.1 - 6.0 °C requirement [Do not mark if samples do not require cooling to 0.1 - 6.0 °C.]
- Broken or leaking containers (detail actions below)
- Sample container type or labeled chemical preservation inappropriate
- Other discrepancies:

Detail to discrepancies/comments:

Completed by: mwr Date Completed: 7-14-11

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

one inch



Date: 2017
Source: NAIP
Scale: 1" to 1300'
Comments:

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



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one inch 



Date: **2015**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



one inch 



Date: **2014**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2012**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2010**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2008**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch



Date: 2006
Source: NAIP
Scale: 1" to 1300'
Comments:



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



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one inch 



Date: **2005**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2004**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: **2003**
Source: **NAIP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: 1991
Source: USGS
Scale: 1" to 1300'
Comments:



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



ENVIRONMENTAL RISK INFORMATION SERVICES

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one inch 



Date: **1982**
Source: **NHAP**
Scale: **1" to 1300'**
Comments:



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



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one inch 



Date: 1975
Source: USGS
Scale: 1" to 1300'
Comments:



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



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one inch



Date: 1970
Source: USGS
Scale: 1" to 1300'
Comments:



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



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one inch 



Date: 1950
Source: AMS
Scale: 1" to 1300'
Comments:



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



www.erisinfo.com | 1.866.517.5204

one inch 



Date: **1948**
Source: **ASCS**
Scale: **1" to 1300'**
Comments: *BEST COPY AVAILABLE*



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



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APPENDIX C

Topographic Maps



TOPOGRAPHIC MAP RESEARCH RESULTS

Date: 2018-03-02

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

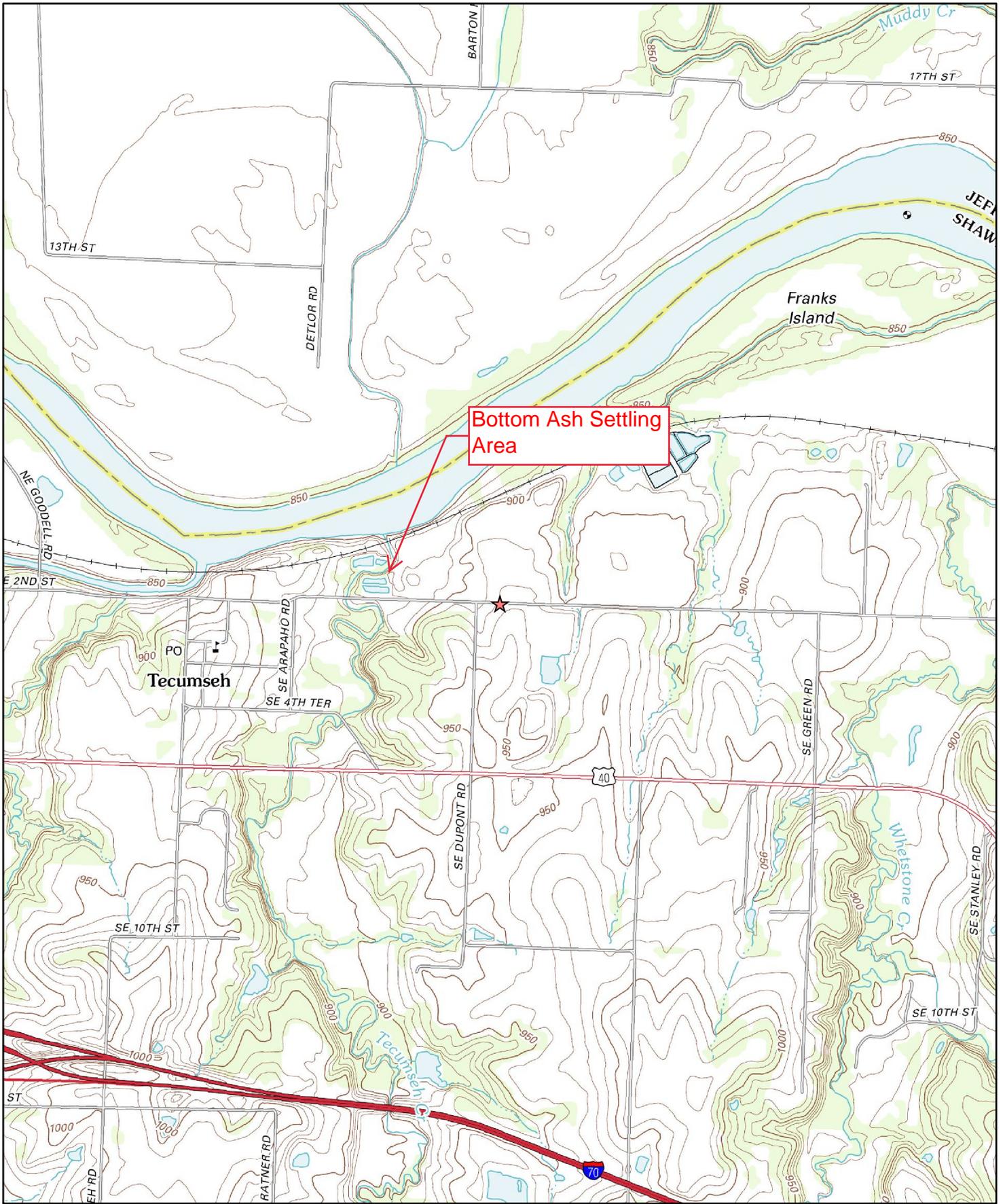
ERIS Order Number: 20180302347

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.

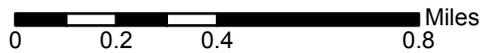
Year	Map Series
2012	7.5
1983	7.5
1981	7.5
1975	7.5
1970	7.5
1951	7.5
1950	7.5

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.*



2012

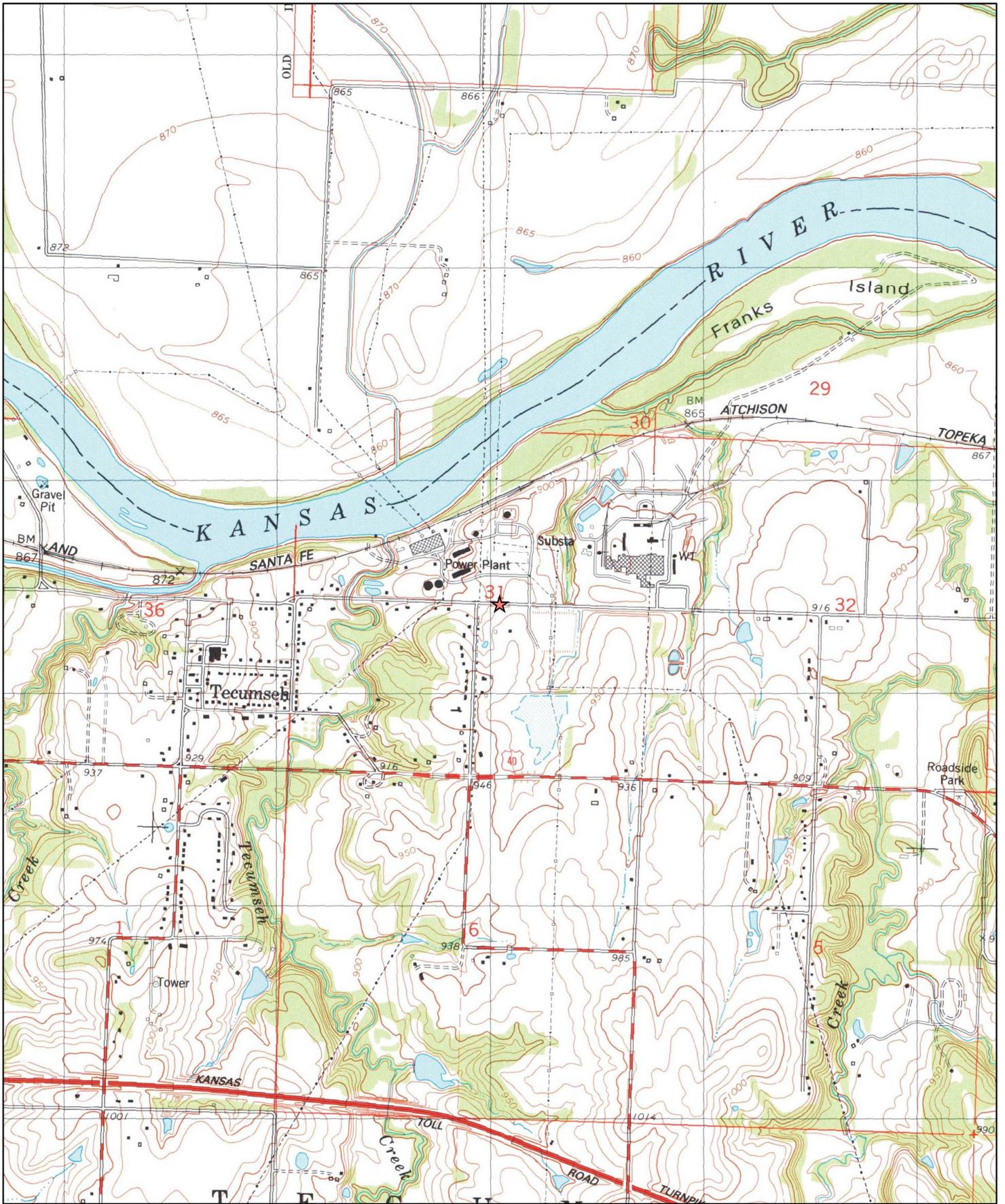


Order No. 20180302347

Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1983

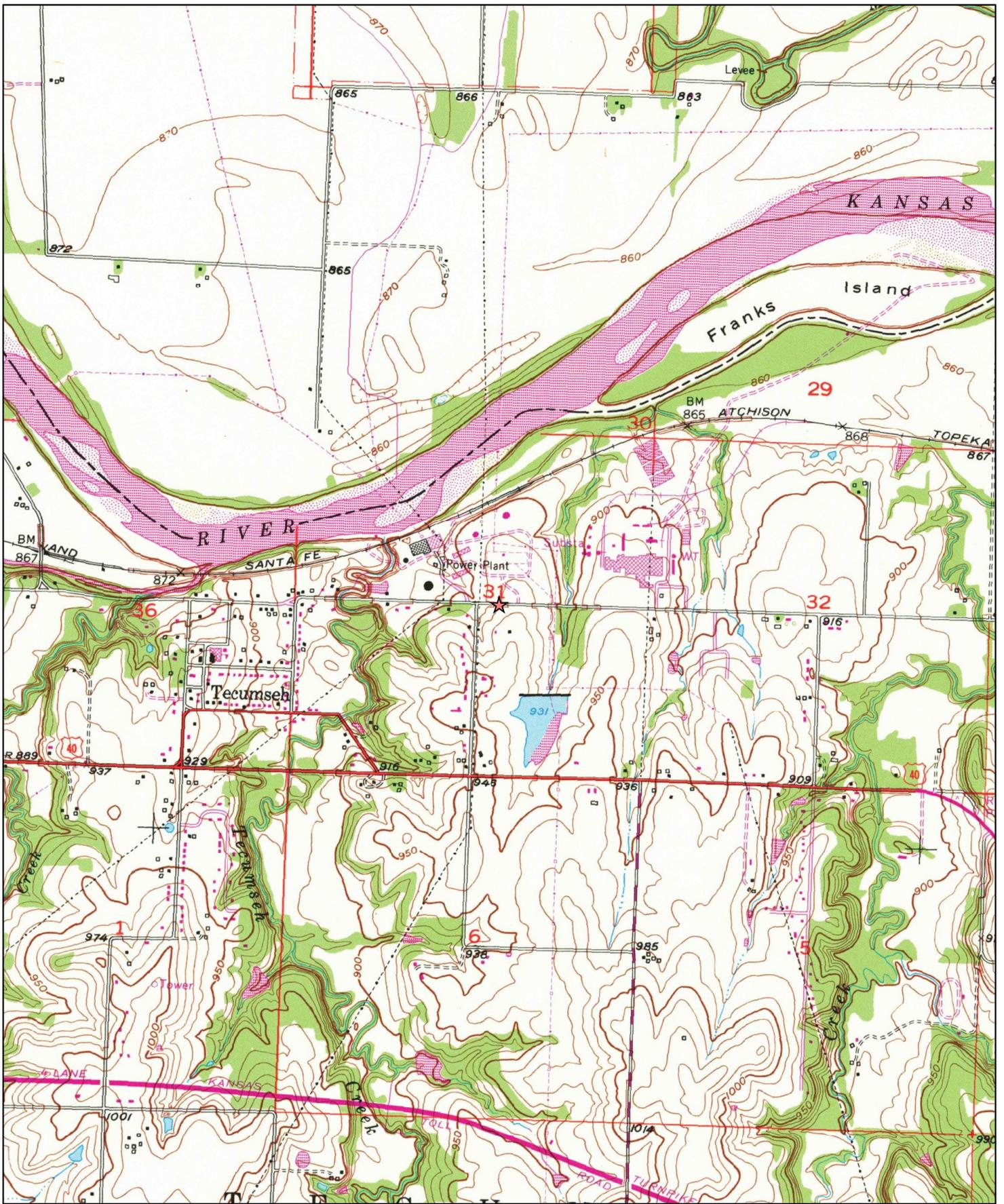


Order No. 20180302347

Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





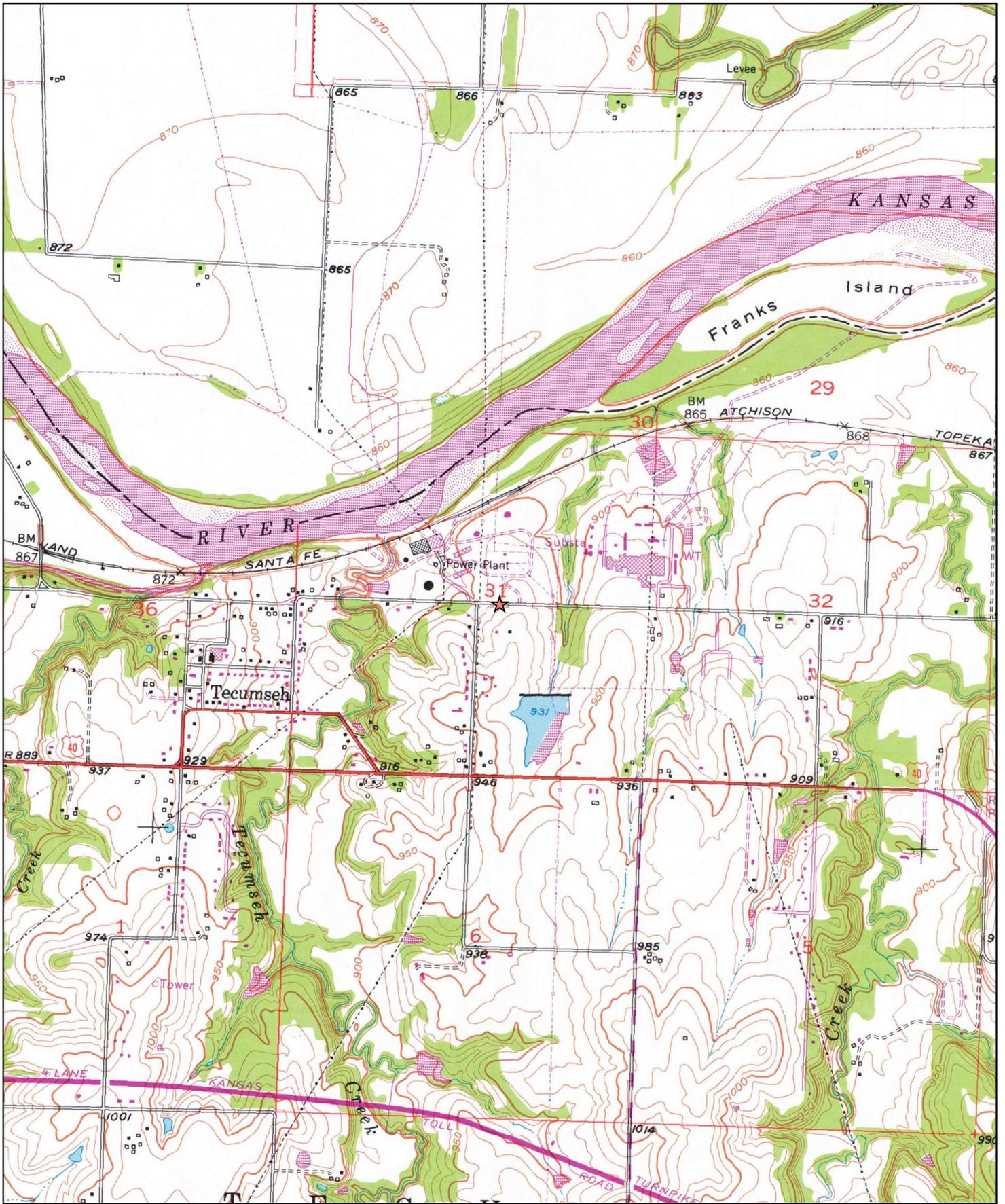
1981  Miles

Order No. 20180302347

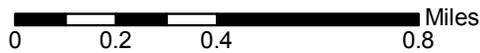
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1975

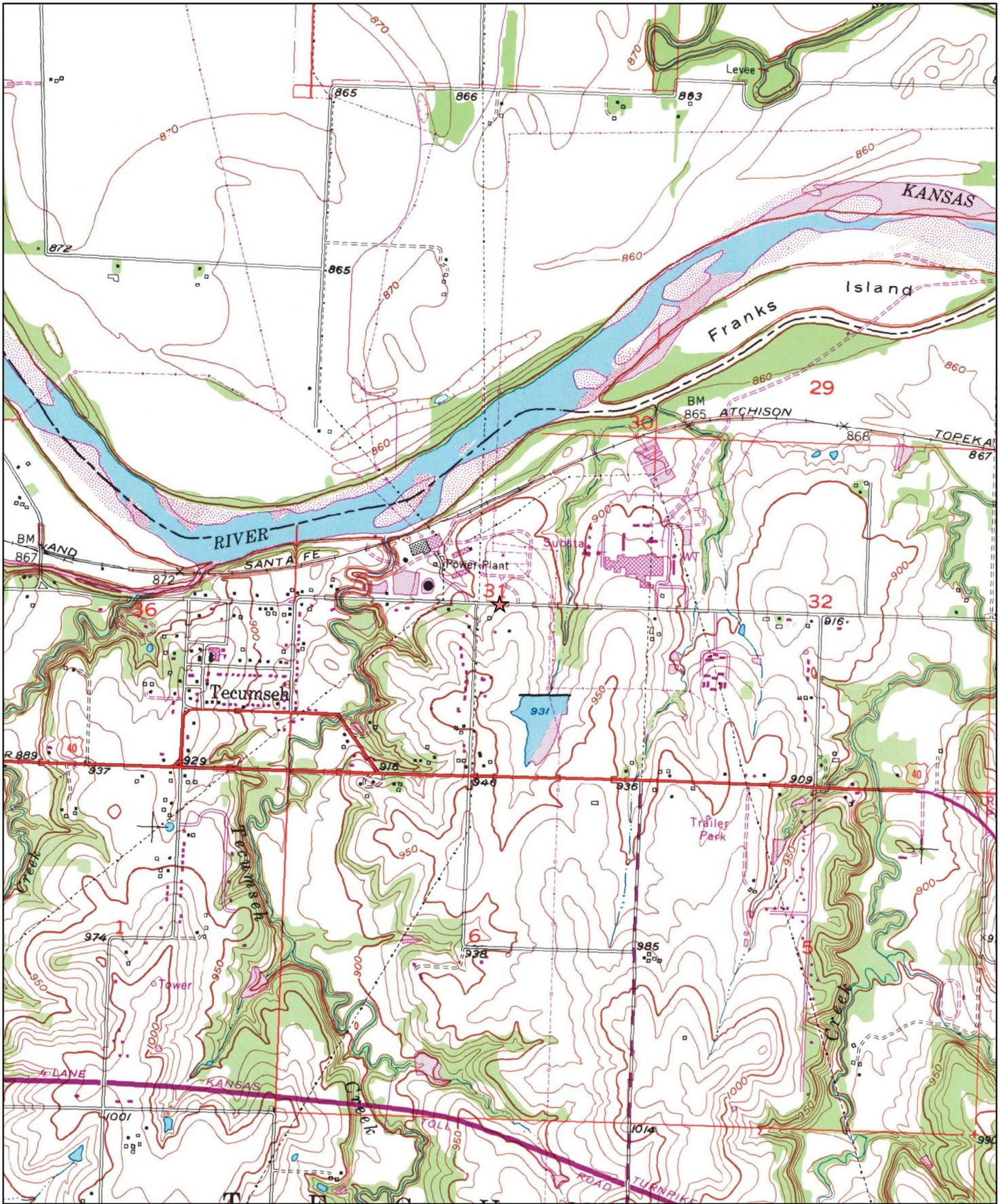


Order No. 20180302347

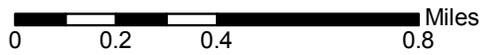
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1970

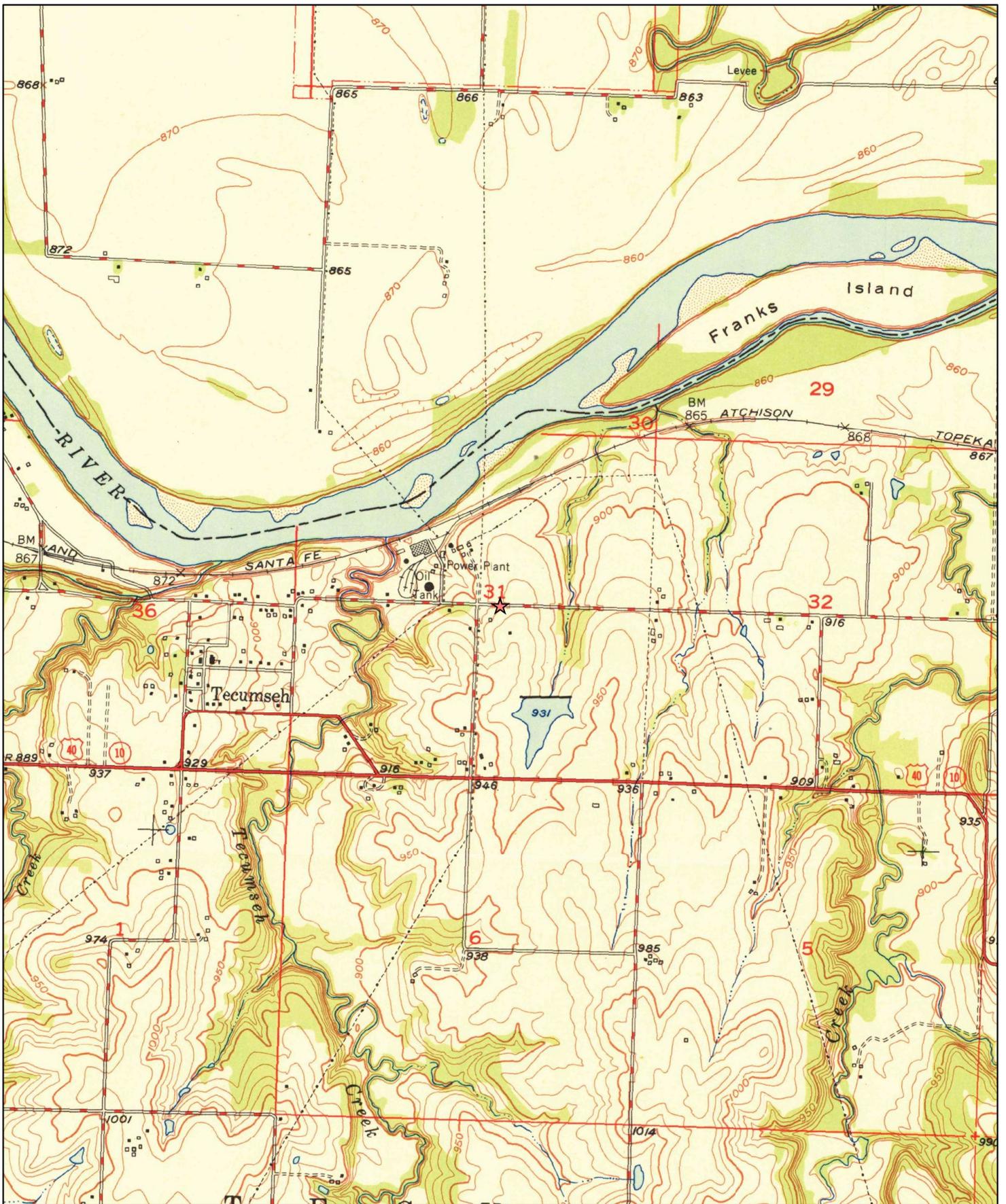


Order No. 20180302347

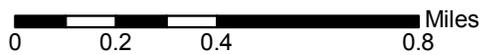
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1951

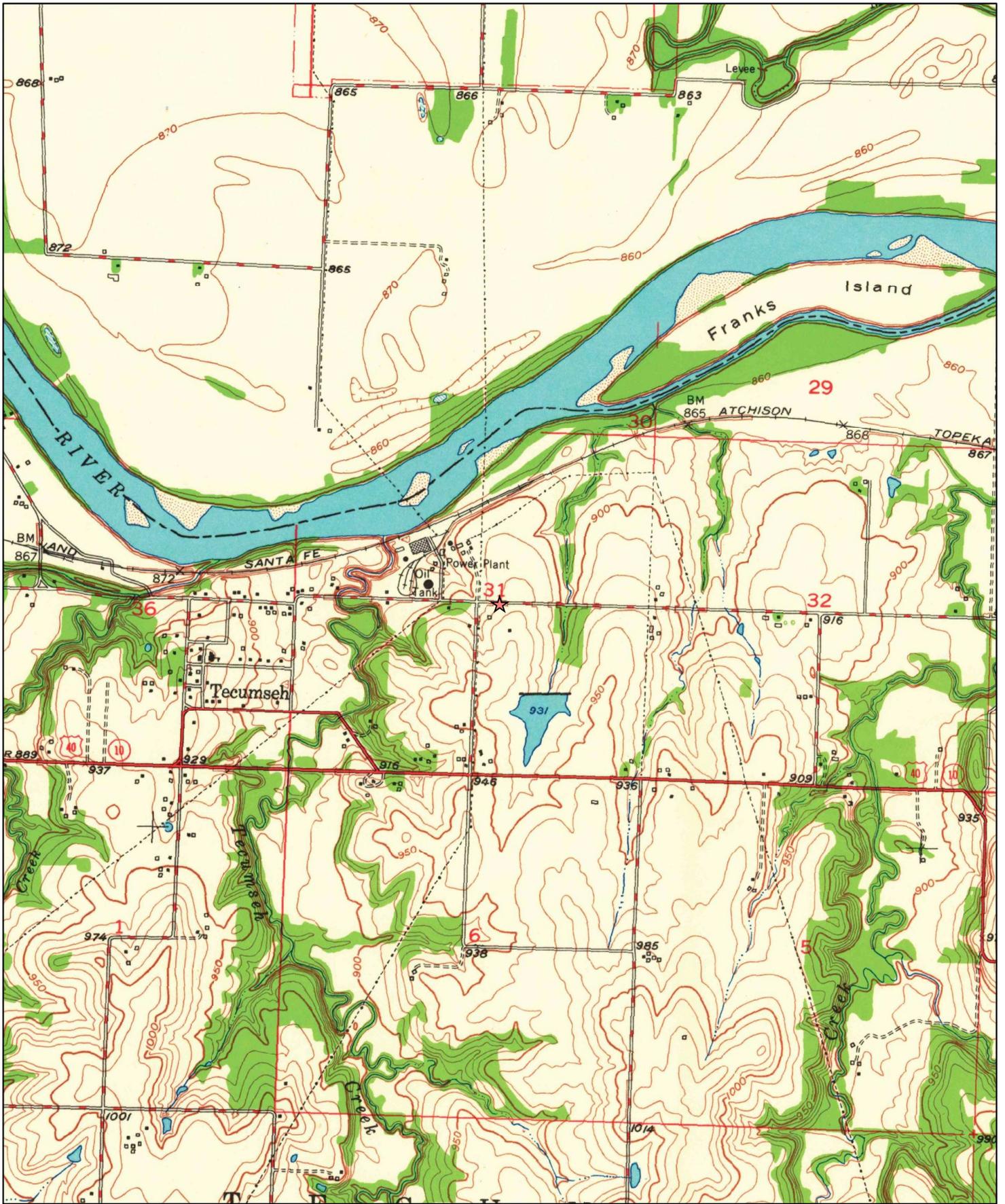


Order No. 20180302347

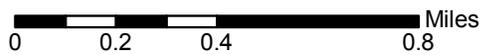
Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





1950



Order No. 20180302347

Quadrangle(s): Grantville, KS

Source: USGS 7.5 Minute Topographic Map





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

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

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,



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

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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

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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297581

Method: EPA 200.7

Description: 200.7 Metals, Total

Client: WESTAR ENERGY

Date: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297581

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: WESTAR ENERGY

Date: 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

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297581

Method: EPA 245.1

Description: 245.1 Mercury

Client: WESTAR ENERGY

Date: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297581

Method: SM 2540C

Description: 2540C Total Dissolved Solids

Client: WESTAR ENERGY

Date: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297581

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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297581

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days

Client: WESTAR ENERGY

Date: 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.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC SI CCR

Pace Project No.: 60297581

Sample: MW-7-032019		Lab ID: 60297581001	Collected: 03/20/19 15:37	Received: 03/21/19 17:00	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: SM 2540C						
Total Dissolved Solids	1340	mg/L	5.0	1		03/22/19 15:40		
4500H+ pH, Electrometric		Analytical Method: SM 4500-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 Method: 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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC SI CCR

Pace Project No.: 60297581

Sample: MW-10-032119	Lab ID: 60297581002	Collected: 03/21/19 08:34	Received: 03/21/19 17:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total								
Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: SM 2540C								
Total Dissolved Solids	1190	mg/L	5.0	1		03/22/19 15:41		
4500H+ pH, Electrometric								
Analytical Method: SM 4500-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 Method: EPA 300.0								
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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC SI CCR

Pace Project No.: 60297581

Sample: MW-9-032119		Lab ID: 60297581003		Collected: 03/21/19 11:00		Received: 03/21/19 17:00		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
200.7 Metals, Total									
Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: SM 2540C									
Total Dissolved Solids	1440	mg/L	5.0	1		03/22/19 15:41			
4500H+ pH, Electrometric									
Analytical Method: SM 4500-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 Method: EPA 300.0									
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		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC SI CCR

Pace Project No.: 60297581

Sample: MW-8-032119		Lab ID: 60297581004		Collected: 03/21/19 12:28		Received: 03/21/19 17:00		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
200.7 Metals, Total									
Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: SM 2540C									
Total Dissolved Solids	1440	mg/L	5.0	1		03/22/19 15:41			
4500H+ pH, Electrometric									
Analytical Method: SM 4500-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 Method: EPA 300.0									
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		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC SI CCR
Pace Project No.: 60297581

QC Batch: 575586 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 60297581001, 60297581002, 60297581003, 60297581004

METHOD BLANK: 2361248 Matrix: Water
Associated Lab Samples: 60297581001, 60297581002, 60297581003, 60297581004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	<0.00020	0.00020	03/28/19 10:59	

LABORATORY CONTROL SAMPLE: 2361249

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.005	0.0045	90	85-115	

MATRIX SPIKE SAMPLE: 2361250

Parameter	Units	60297581003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	<0.00020	0.005	0.0046	92	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2361251 2361252

Parameter	Units	60297657001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.005	0.005	0.0050	0.0050	101	99	70-130	2	20	

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QUALITY CONTROL DATA

Project: TEC SI CCR
Pace Project No.: 60297581

QC Batch: 575351 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60297581001, 60297581002, 60297581003, 60297581004

METHOD BLANK: 2360336 Matrix: Water
Associated Lab Samples: 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

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	1	0.98	98	85-115	
Beryllium	mg/L	1	0.98	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	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2360338 2360339

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

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QUALITY CONTROL DATA

Project: TEC SI CCR

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 Samples: 60297581001, 60297581002, 60297581003, 60297581004

METHOD BLANK: 2360396 Matrix: Water
 Associated Lab Samples: 60297581001, 60297581002, 60297581003, 60297581004

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

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% 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 DUPLICATE: 2360398 2360399

Parameter	Units	60297581002		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
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

Parameter	Units	60297582005 Result	Spike Conc.	MS Result	MS % Rec	% 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	

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QUALITY CONTROL DATA

Project: TEC SI CCR

Pace Project No.: 60297581

MATRIX SPIKE SAMPLE:		2360400					
Parameter	Units	60297582005 Result	Spike Conc.	MS Result	MS % Rec	% 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	

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QUALITY CONTROL DATA

Project: TEC SI CCR

Pace Project No.: 60297581

QC Batch: 575162

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60297581001

METHOD BLANK: 2359339

Matrix: Water

Associated Lab Samples: 60297581001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	03/22/19 15:39	

LABORATORY CONTROL SAMPLE: 2359340

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	992	99	80-120	

SAMPLE DUPLICATE: 2359341

Parameter	Units	60297248003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	6680	6630	1	10	

SAMPLE DUPLICATE: 2359342

Parameter	Units	60297249004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	4710	4720	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC SI CCR

Pace Project No.: 60297581

QC Batch: 575163

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60297581002, 60297581003, 60297581004

METHOD BLANK: 2359343

Matrix: Water

Associated Lab Samples: 60297581002, 60297581003, 60297581004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	03/22/19 15:40	

LABORATORY CONTROL SAMPLE: 2359344

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	986	99	80-120	

SAMPLE DUPLICATE: 2359345

Parameter	Units	60297582001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	976	941	4	10	

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QUALITY CONTROL DATA

Project: TEC SI CCR

Pace Project No.: 60297581

QC Batch: 575267 Analysis Method: SM 4500-H+B

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

Associated Lab Samples: 60297581001, 60297581002, 60297581003, 60297581004

SAMPLE DUPLICATE: 2360124

Parameter	Units	60297253001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.9	1	5	H6

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QUALITY CONTROL DATA

Project: TEC SI CCR

Pace Project No.: 60297581

QC Batch: 576049

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60297581001, 60297581002, 60297581003, 60297581004

METHOD BLANK: 2363299

Matrix: Water

Associated Lab Samples: 60297581001, 60297581002, 60297581003, 60297581004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	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 CONTROL SAMPLE: 2363300

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	102	90-110	
Fluoride	mg/L	2.5	2.6	106	90-110	
Sulfate	mg/L	5	5.3	105	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2363301 2363302

Parameter	Units	60296837001		MSD		MS		MSD		% Rec Limits	Max		Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	RPD		RPD		
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		
Sulfate	mg/L	ND	100000	100000	107000	107000	102	102	90-110	0	15		

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QUALITY CONTROL DATA

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

Associated Lab Samples: 60297581001

METHOD BLANK: 2364278

Matrix: Water

Associated Lab Samples: 60297581001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	<1.0	1.0	03/29/19 12:14	

LABORATORY CONTROL SAMPLE: 2364279

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.3	106	90-110	

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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.

REPORT OF LABORATORY ANALYSIS

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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		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO# : 60297581

60297581

Client Name: Westar Energy

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-296 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 2.0 Corr. Factor -1.0 Corrected 1.0

Date and initials of person examining contents:
2/3/2019

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/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: _____

Pace Container Order #468046

Order By :	Ship To :	Return To:
Company <u>WESTAR ENERGY</u>	Company <u>WESTAR ENERGY</u>	Company <u>Pace Analytical Kansas</u>
Contact <u>Griffin, Brandon</u>	Contact <u>Griffin, Brandon</u>	Contact <u>Wilson, Heather</u>
Email <u>brandon.l.griffin@westarenergy.</u>	Email <u>brandon.l.griffin@westarenergy.</u>	Email <u>heather.wilson@pacelabs.com</u>
Address <u>818 S. Kansas Ave</u>	Address <u>818 S. Kansas Ave</u>	Address <u>9608 Loiret Blvd.</u>
Address 2 _____	Address 2 _____	Address 2 _____
City <u>Topeka</u>	City <u>Topeka</u>	City <u>Lenexa</u>
State <u>KS</u> Zip <u>66612</u>	State <u>KS</u> Zip <u>66612</u>	State <u>KS</u> Zip <u>66219</u>
Phone <u>785-575-8135</u>	Phone <u>785-575-8135</u>	Phone <u>1(913)563-1407</u>

Info			
Project Name <u>TEC SI CCR- App III & IV</u>	Due Date <u>02/27/2019</u>	Profile <u>9657, 1</u>	Quote _____
Project <u>Wilson, Heather</u>	Return _____	Carrier <u>Most Economical</u>	Locatio <u>KS</u>

Trip Blanks <input type="checkbox"/> Include Trip Blanks	Bottle <input type="checkbox"/> Blank <input checked="" type="checkbox"/> Pre-Printed No Sample IDs <input type="checkbox"/> Pre-Printed With Sample IDs	<input type="checkbox"/> Boxed Cases <input type="checkbox"/> Individually Wrapped <input type="checkbox"/> Grouped By Sample
Return Shipping <input checked="" type="checkbox"/> No Shipper <input type="checkbox"/> With Shipper	Misc <input type="checkbox"/> Sampling Instructions <input checked="" type="checkbox"/> Custody Seal <input checked="" type="checkbox"/> Temp. Blanks <input checked="" type="checkbox"/> Coolers _____ <input type="checkbox"/> Syringes _____	
COC Options <input type="checkbox"/> Number of Blanks _____ <input checked="" type="checkbox"/> Pre-Printed _____ <u>1</u>	<input type="checkbox"/> Extra Bubble Wrap <input type="checkbox"/> Short Hold/Rush <input type="checkbox"/> DI <u>Liter(s)</u> <input type="checkbox"/> USDA Regulated Soils	

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
4	WT	Metals	1-1L plastic w/HNO3	4	0	010719-2AJN	
4	WT	300.0 Anions/pH/TDS	1L plastic unpreserved	4	0	010719-2APJ	

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
PP COC (1), PP labels w/o sample IDs Lenexa return Scott to take on 2/28/19

Ship Date :	02/27/2019
Prepared	Ben
Verified By:	

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,



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

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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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	MK1	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

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297615

Method: EPA 903.1

Description: 903.1 Radium 226

Client: WESTAR ENERGY

Date: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297615

Method: EPA 904.0

Description: 904.0 Radium 228

Client: WESTAR ENERGY

Date: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60297615

Method: Total Radium Calculation

Description: Total Radium 228+226

Client: WESTAR ENERGY

Date: 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.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC SI CCR

Pace Project No.: 60297615

Sample: MW-7-032019 **Lab ID: 60297615001** 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	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC SI CCR

Pace Project No.: 60297615

Sample: MW-10-032119 **Lab ID: 60297615002** 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	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC SI CCR

Pace Project No.: 60297615

Sample: MW-9-032119 **Lab ID: 60297615003** Collected: 03/21/19 11:00 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	0.170 ± 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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC SI CCR

Pace Project No.: 60297615

Sample: MW-8-032119 **Lab ID: 60297615004** 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	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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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 Radium 228

Associated Lab Samples: 60297615001, 60297615002, 60297615003, 60297615004

METHOD BLANK: 1633600

Matrix: Water

Associated Lab Samples: 60297615001, 60297615002, 60297615003, 60297615004

Parameter	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.

REPORT OF LABORATORY ANALYSIS

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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 Samples:	60297615001, 60297615002, 60297615003, 60297615004		

METHOD BLANK:	1633599	Matrix:	Water
Associated Lab Samples:	60297615001, 60297615002, 60297615003, 60297615004		

Parameter	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.

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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		

REPORT OF LABORATORY ANALYSIS

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Pittsburgh Lab Sample Condition Upon Receipt



Client Name: Westar Energy

Project # 30285862

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: VT4687425223

Label	<u>ET</u>
LIMS Login	<u>ET</u>

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Thermometer Used 11 Type of Ice: Wet Blue None

Cooler Temperature Observed Temp 1.1 °C Correction Factor: 0.0 °C Final Temp: 1.1 °C

Temp should be above freezing to 6°C

Comments:	pH paper Lot#			Date and Initials of person examining contents: <u>ET 3-22-19</u>
	Yes	No	N/A	
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: <u>WT</u>				
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:	/			11.
Orthophosphate field filtered			/	12.
Hex Cr Aqueous Compliance/NPDES sample field filtered			/	13.
Organic Samples checked for dechlorination:			/	14.
Filtered volume received for Dissolved tests			/	15.
All containers have been checked for preservation.	/			16.
All containers needing preservation are found to be in compliance with EPA recommendation.	/			
exceptions: VOA, coliform, TOC, O&G, Phenolics				
				Initial when completed: <u>ET</u> Date/time of preservation
				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	/			Initial when completed: <u>ET</u> Date: <u>3-22-19</u>

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

A check in this box indicates that additional information has been stored in ereports.

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

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

ATTACHMENT 1-2

June 2019 Sampling Event Laboratory Analytical Report

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,



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



REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60307292

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: WESTAR ENERGY

Date: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC SI CCR

Pace Project No.: 60307292

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days

Client: WESTAR ENERGY

Date: 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.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC SI CCR

Pace Project No.: 60307292

Sample: MW-8-062519		Lab ID: 60307292001	Collected: 06/25/19 09:50	Received: 06/27/19 08:35	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: EPA 300.0						
Fluoride	<0.20	mg/L	0.20	1		07/09/19 03:53	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC SI CCR

Pace Project No.: 60307292

Sample: MW-9-062519		Lab ID: 60307292002	Collected: 06/25/19 12:00	Received: 06/27/19 08:35	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: EPA 300.0						
Fluoride	<0.20	mg/L	0.20	1		07/09/19 04:07	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC SI CCR

Pace Project No.: 60307292

Sample: MW-10-062519		Lab ID: 60307292003	Collected: 06/25/19 14:10	Received: 06/27/19 08:35	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: EPA 300.0						
Fluoride	<0.20	mg/L	0.20	1		07/09/19 04:22	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC SI CCR

Pace Project No.: 60307292

Sample: MW-7-062519	Lab ID: 60307292004	Collected: 06/25/19 16:20	Received: 06/27/19 08:35	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: EPA 300.0						
Fluoride	0.32	mg/L	0.20	1		07/09/19 04:37	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC SI CCR

Pace Project No.: 60307292

QC Batch: 594115 Analysis Method: EPA 245.1
 QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
 Associated Lab Samples: 60307292001, 60307292002, 60307292003, 60307292004

METHOD BLANK: 2435092 Matrix: Water
 Associated Lab Samples: 60307292001, 60307292002, 60307292003, 60307292004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.20	0.20	07/05/19 15:14	

LABORATORY CONTROL SAMPLE: 2435093

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	93	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2435094 2435095

Parameter	Units	60306868001		60306868002		60306868003		60306868004		% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec						
Mercury	ug/L	<0.20	5	5	4.6	4.5	92	90	70-130	3	20		

MATRIX SPIKE SAMPLE: 2435096

Parameter	Units	60306868002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.20	5	4.5	90	70-130	

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

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: 2437479 Matrix: Water
Associated Lab Samples: 60307292001, 60307292002, 60307292003, 60307292004

Parameter	Units	Blank Result	Reporting 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 SPIKE DUPLICATE: 2437481 2437482

Parameter	Units	60307292003		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec				
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	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC SI CCR

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 Samples: 60307292001, 60307292002, 60307292003, 60307292004

METHOD BLANK: 2437487 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

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% 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	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2437489 2437490

Parameter	Units	60307291002		MS		MSD		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result							
Antimony	mg/L	<0.0010	0.04	0.04	0.04	0.040	0.039	101	98	70-130	3	20		
Arsenic	mg/L	<0.0010	0.04	0.04	0.04	0.043	0.042	106	104	70-130	2	20		
Cadmium	mg/L	<0.00050	0.04	0.04	0.04	0.039	0.037	96	93	70-130	3	20		
Cobalt	mg/L	0.0026	0.04	0.04	0.04	0.047	0.045	110	107	70-130	3	20		
Molybdenum	mg/L	<0.0010	0.04	0.04	0.04	0.042	0.041	104	101	70-130	3	20		
Selenium	mg/L	<0.0010	0.04	0.04	0.04	0.039	0.038	97	95	70-130	2	20		
Thallium	mg/L	<0.0010	0.04	0.04	0.04	0.042	0.041	106	103	70-130	3	20		

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QUALITY CONTROL DATA

Project: TEC SI CCR

Pace Project No.: 60307292

QC Batch: 595185 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60307292001, 60307292002, 60307292003, 60307292004

METHOD BLANK: 2438440 Matrix: Water
 Associated Lab Samples: 60307292001, 60307292002, 60307292003, 60307292004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	<0.20	0.20	07/08/19 18:58	

LABORATORY CONTROL SAMPLE: 2438441

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.4	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2438442 2438443

Parameter	Units	60307333007		MS		MSD		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result							
Fluoride	mg/L	0.40	2.5	2.5	2.5	2.9	2.9	99	99	80-120	0	15		

MATRIX SPIKE SAMPLE: 2438444

Parameter	Units	60307291005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.24	2.5	2.8	102	80-120	

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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

REPORT OF LABORATORY ANALYSIS

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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		

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Sample Condition Upon Receipt

WO#: 60307292



Client Name: Westar Energy

Courier: FedEx [] UPS [] VIA [X] Clay [] PEX [] ECI [] Pace [] Xroads [] Client [] Other []

Tracking #: _____ Pace Shipping Label Used? Yes [] No [X]

Custody Seal on Cooler/Box Present: Yes [X] No [] Seals intact: Yes [X] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [X] Other []

Thermometer Used: T-296 Type of Ice: Wet [X] Blue [] None []

Cooler Temperature (°C): As-read 2-3 Corr. Factor -1.0 Corrected 1.3

Date and initials of person examining contents:

2/6/19

Temperature should be above freezing to 6°C

Table with 2 columns: Question/Field and Yes/No/N/A checkboxes. Rows include Chain of Custody, Samples arrived, Short Hold Time, Rush Turn Around Time, Sufficient volume, Containers used, Containers intact, Unpreserved soils, Filtered volume, Sample labels match, Samples contain multiple phases, Containers requiring pH preservation, Cyanide water sample checks, Trip Blank present, Headspace in VOA vials, Samples from USDA Regulated Area, Additional labels attached.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: Analyses on COC are inaccurate due to an IT glitch in our bottle order system. Please see attached COC HMW 7/1/19

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.

Page: _____ of _____

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: WESTAR ENERGY		Report To: Brandon Griffin		Attention: Jared Morrison	
Address: 818 Kansas Ave		Copy To: Jared Morrison, Heath Horny		Company Name: WESTAR ENERGY	
Topeka, KS 66612		Purchase Order No.: 10TEC-0000007956		Address: SEE SECTION A	
Email To: brandon.griffin@westarenergy.com		Project Name: TEC SICR		Site Location: KS	
Phone: (785) 575-8135 Fax:		Project Number:		STATE: KS	
Requested Due Date/TAT: 7 DAY					

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOIL/SOLID SL OIL OL WIPE WP AIR AR OTHER OT TISSUE TS	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
		COMPOSITE START	COMPOSITE END/GRAB						
1	MW-8-062519			06/25	950				60307292
2	MW-9-062519			06/25	1200				BPM 26P14 001
3	MW-10-062519			06/25	1410				002
4	MW-7-062519			06/25	1620				003
5									004
6									
7									
8									
9									
10									
11									
12									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
200.7 Total Metals*, B, Ca, Ba, Be, Cr, Pb, Li	E.L. Fredrickson	06/27	835	Victoria Babin/Pace	06/27	835	Y N Y
200.8 Total Metals**: Sb, As, Cd, Co, Mo, Se, Tl							

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: E.L. Fredrickson DATE Signed (MM/DD/YYYY): 06/27/19
 SIGNATURE of SAMPLER: E.L. Fredrickson

*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.

ATTACHMENT 1-3

October 2019 Sampling Event Laboratory Analytical Report

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,



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



REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC BASA CCR

Pace Project No.: 60317942

Method: EPA 200.7

Description: 200.7 Metals, Total

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC BASA CCR

Pace Project No.: 60317942

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: 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:

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PROJECT NARRATIVE

Project: TEC BASA CCR

Pace Project No.: 60317942

Method: SM 2540C

Description: 2540C Total Dissolved Solids

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC BASA CCR

Pace Project No.: 60317942

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC BASA CCR

Pace Project No.: 60317942

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days

Client: 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.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC BASA CCR

Pace Project No.: 60317942

Sample: MW-10	Lab ID: 60317942001	Collected: 10/09/19 14:51		Received: 10/11/19 15:41		Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: SM 2540C						
Total Dissolved Solids	1260	mg/L	13.3	1		10/16/19 10:14		
4500H+ pH, Electrometric		Analytical Method: SM 4500-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 Method: EPA 300.0						
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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC BASA CCR

Pace Project No.: 60317942

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: MW-9								
Lab ID: 60317942002								
Collected: 10/10/19 08:45 Received: 10/11/19 15:41 Matrix: Water								
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: SM 2540C								
Total Dissolved Solids	1110	mg/L	13.3	1		10/17/19 16:59		
4500H+ pH, Electrometric Analytical Method: SM 4500-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 Method: EPA 300.0								
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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC BASA CCR

Pace Project No.: 60317942

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: MW-8								
Lab ID: 60317942003								
Collected: 10/10/19 11:44 Received: 10/11/19 15:41 Matrix: Water								
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: SM 2540C								
Total Dissolved Solids	1380	mg/L	13.3	1		10/17/19 16:59		
4500H+ pH, Electrometric Analytical Method: SM 4500-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 Method: EPA 300.0								
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	

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ANALYTICAL RESULTS

Project: TEC BASA CCR

Pace Project No.: 60317942

Sample: MW-7	Lab ID: 60317942004	Collected: 10/10/19 14:23		Received: 10/11/19 15:41		Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: SM 2540C						
Total Dissolved Solids	1000	mg/L	13.3	1		10/17/19 16:59		
4500H+ pH, Electrometric		Analytical Method: SM 4500-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 Method: EPA 300.0						
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	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC BASA CCR

Pace Project No.: 60317942

QC Batch: 615723 Analysis Method: EPA 200.7
 QC Batch Method: 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 Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	10/17/19 16:14	
Boron	mg/L	<0.10	0.10	10/17/19 16:14	
Calcium	mg/L	<0.20	0.20	10/17/19 16:14	
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 SPIKE DUPLICATE: 2513544 2513545

Parameter	Units	2513544		2513545		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60317942001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
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

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QUALITY CONTROL DATA

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 Samples: 60317942001, 60317942002, 60317942003, 60317942004

METHOD BLANK: 2513526 Matrix: Water
Associated Lab Samples: 60317942001, 60317942002, 60317942003, 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 SPIKE DUPLICATE: 2513528 2513529

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60317942001 Result	Spike Conc.	Spike Conc.	Result						
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

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QUALITY CONTROL DATA

Project: TEC BASA CCR

Pace Project No.: 60317942

QC Batch: 616101

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60317942001

METHOD BLANK: 2514937

Matrix: Water

Associated Lab Samples: 60317942001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	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

Parameter	Units	60317792003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	93.5	93.0	1	10	

SAMPLE DUPLICATE: 2514940

Parameter	Units	60317867005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1740	1760	1	10	

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QUALITY CONTROL DATA

Project: TEC BASA CCR

Pace Project No.: 60317942

QC Batch: 616086 Analysis Method: SM 4500-H+B

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

Associated Lab Samples: 60317942001, 60317942002, 60317942003, 60317942004

SAMPLE DUPLICATE: 2514885

Parameter	Units	60317530002 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.3	7.3	1	5	H6

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QUALITY CONTROL DATA

Project: TEC BASA CCR

Pace Project No.: 60317942

QC Batch: 615749

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60317942002, 60317942003, 60317942004

METHOD BLANK: 2513647

Matrix: Water

Associated Lab Samples: 60317942001, 60317942002, 60317942003, 60317942004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	10/16/19 15:48	
Fluoride	mg/L	<0.20	0.20	10/16/19 15:48	
Sulfate	mg/L	<1.0	1.0	10/16/19 15:48	

LABORATORY CONTROL SAMPLE: 2513648

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2513649 2513650

Parameter	Units	60317619001		MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Conc.	Result	Result	% Rec	% Rec						
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				

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QUALITY CONTROL DATA

Project: TEC BASA CCR

Pace Project No.: 60317942

QC Batch: 617263	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60317942001	

METHOD BLANK: 2519017 Matrix: Water
Associated Lab Samples: 60317942001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	10/21/19 10:52	
Fluoride	mg/L	<0.20	0.20	10/21/19 10:52	
Sulfate	mg/L	<1.0	1.0	10/21/19 10:52	

LABORATORY CONTROL SAMPLE: 2519018

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Fluoride	mg/L	2.5	2.3	94	90-110	
Sulfate	mg/L	5	4.8	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2519019 2519020

Parameter	Units	60317142007		MS		MSD		% Rec	% Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Conc.	Result	Result						
Chloride	mg/L	8.3J	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 SAMPLE: 2519021

Parameter	Units	60318577004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
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	

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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.

REPORT OF LABORATORY ANALYSIS

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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		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60317942

60317942

Client Name: Weber

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: F 212 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 3.0 Corr. Factor 0.4 Corrected 3.4

Date and initials of person examining contents: 15/11/19

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/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: _____

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,



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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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: TEC BASA CCR

Pace Project No.: 60317943

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60317943001	MW-10	EPA 903.1	MK1	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

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC BASA CCR

Pace Project No.: 60317943

Method: EPA 903.1

Description: 903.1 Radium 226

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC BASA CCR

Pace Project No.: 60317943

Method: EPA 904.0

Description: 904.0 Radium 228

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC BASA CCR

Pace Project No.: 60317943

Method: Total Radium Calculation

Description: Total Radium 228+226

Client: 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.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC BASA CCR

Pace Project No.: 60317943

Sample: MW-10 **Lab ID: 60317943001** Collected: 10/09/19 14:51 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	0.794 ± 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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC BASA CCR

Pace Project No.: 60317943

Sample: MW-9 **Lab ID: 60317943002** Collected: 10/10/19 08:45 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	0.696 ± 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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC BASA CCR

Pace Project No.: 60317943

Sample: MW-8 **Lab ID: 60317943003** Collected: 10/10/19 11:44 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	0.114 ± 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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC BASA CCR

Pace Project No.: 60317943

Sample: MW-7 **Lab ID: 60317943004** 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	

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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 Samples: 60317943001, 60317943002, 60317943003, 60317943004

METHOD BLANK: 1778706 Matrix: Water

Associated Lab Samples: 60317943001, 60317943002, 60317943003, 60317943004

Parameter	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.

REPORT OF LABORATORY ANALYSIS

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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 Samples: 60317943001, 60317943002, 60317943003, 60317943004

METHOD BLANK: 1778711

Matrix: Water

Associated Lab Samples: 60317943001, 60317943002, 60317943003, 60317943004

Parameter	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.

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60317943
Barcode
60317943

Client Name: Weber

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [x] Xroads [] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [] No [x]

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [x] Foam [] None [] Other []

Thermometer Used: F2K Type of Ice: Wet [x] Blue [] None []

Cooler Temperature (°C): As-read 3.0 Corr. Factor 0.4 Corrected 3.4

Date and initials of person examining contents: 10/2/19

Temperature should be above freezing to 6°C

Table with 3 columns: Question, Yes/No/N/A checkboxes, and Notes. Rows include Chain of Custody, Samples arrived, Short Hold Time, Rush Turn Around Time, Sufficient volume, Containers used, Containers intact, Unpreserved soils, Filtered volume, Sample labels match, Samples contain multiple phases, Containers requiring pH preservation, Cyanide water sample checks, Trip Blank present, Headspace in VOA vials, Samples from USDA Regulated Area, Additional labels attached.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Date:

Chain of Custody

Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: **KS**

Cert. Needed: Yes No

Owner Received Date: **10/11/2019** Results Requested By: **11/6/2019**

Workorder: **60317943** Workorder Name: **TEC BASA CCR**

Report To: **Subcontract To**

Heather Wilson
Pace Analytical Kansas
9608 Loiret Blvd.
Lenexa, KS 66219
Phone 1(913)563-1407

Pace Analytical Pittsburgh
1638 Roseytown Road
Suites 2,3, & 4
Greensburg, PA 15601
Phone (724)850-5600

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers		Radium-226 & Total Radium	Radium-228	LAB USE ONLY
						HNO3				
1	MW-10	PS	10/9/2019 14:51	60317943001	Water	2		X		001
2	MW-9	PS	10/10/2019 08:45	60317943002	Water	2	AMW 10/15/19	X		002
3	MW-8	PS	10/10/2019 11:44	60317943003	Water	2		X		003
4	MW-7	PS	10/10/2019 14:23	60317943004	Water	2		X		004
5										

Transfers	Released By	Date/Time	Received By	Date/Time	Received on Ice	Y or N	Samples Intact	Y or N	Comments
1	Heather Wilson	10/15/19 18:04	MJSA	10-10-19		N			*Please provide QC sheets. 10-10-19 09:50 MJS (10/16/19)
2									
3									

Cooler Temperature on Receipt: **2.0°C** Custody Seal **Y** or **N** Received on Ice **Y** or **N** Samples Intact **Y** or **N**

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

WO#: 30330215



30330215

Pittsburgh Lab Sample Condition Upon Receipt

#-30330215



Client Name: Pace KS

Project # _____

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: 121929807870

Label	<u>MJS</u>
LIMS Login	<u>MJS</u>

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Thermometer Used 9 Type of Ice: Wet Blue None

Cooler Temperature Observed Temp 2.6 °C Correction Factor: +0.0 °C Final Temp: 2.6 °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot#	Date and initials of person examining contents:
				<u>10D3581</u>	<u>MJS 10-16-79</u>
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: <u>UA</u>					
Samples Arrived within Hold Time:	/			6.	
Short Hold Time Analysis (<72hr remaining):		/		7.	
Rush Turn Around Time Requested:		/		8.	
Sufficient Volume:	/	/		9.	<u>MJS 10-16-79 Only Received 1BPIN for sample MW-9</u>
Correct Containers Used:	/			10.	
-Pace Containers Used:	/				
Containers Intact:	/			11.	
Orthophosphate field filtered			/	12.	
Hex Cr Aqueous sample field filtered			/	13.	
Organic Samples checked for dechlorination:			/	14.	
Filtered volume received for Dissolved tests			/	15.	
All containers have been checked for preservation.	/			16.	<u>pu 2</u>
exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix					
All containers meet method preservation requirements.	/			Initial when completed	<u>MJS</u> Date/time of preservation
				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	/			Initial when completed	<u>MJS</u> Date: <u>10-19-79</u>

Client Notification/ Resolution:

Person-Contacted: _____ Date/Time: _____ Contacted-By: _____

Comments/ Resolution: _____

A check in this box indicates that additional information has been stored in ereports.

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

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

Quality Control Sample Performance Assessment

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Test: Ra-226
Analyst: MK1
Date: 10/24/2019
Batch ID: 50446
Matrix: DW



Method Blank Assessment	
MB Sample ID	1778706
MB concentration:	0.085
M/B Counting Uncertainty:	0.263
MB MDC:	0.910
MB Numerical Performance Indicator:	0.63
MB Status vs. Numerical Indicator:	N/A
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	
LCSD (Y or N)?	N
LCSD50446	LCSD50446
Count Date:	11/8/2019
Spike I.D.:	19-022
Spike Concentration (pCi/mL):	32.116
Volume Used (mL):	0.10
Aliquot Volume (L, g, F):	0.648
Target Conc. (pCi/L, g, F):	4.955
Uncertainty (Calculated):	0.233
Result (pCi/L, g, F):	4.783
LCSD Counting Uncertainty (pCi/L, g, F):	0.973
Numerical Performance Indicator:	-0.34
Percent Recovery:	96.53%
Status vs Numerical Indicator:	N/A
Upper % Recovery Limits:	Pass
Lower % Recovery Limits:	135%
	73%

Duplicate Sample Assessment	
Sample I.D.:	Enter Duplicate
Duplicate Sample I.D.:	sample IDs if
Sample Result (pCi/L, g, F):	other than
Sample Duplicate Result (pCi/L, g, F):	LCS/LCSD in
Sample Duplicate Result (pCi/L, g, F):	the space below.
Are sample and/or duplicate results below RL?	
Duplicate Numerical Performance Indicator:	
Duplicate RPD:	
Duplicate Status vs Numerical Indicator:	See Below ##
Duplicate Status vs RPD:	
% RPD Limit:	

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

Comments:

11-8-19

Sample Matrix Spike Control Assessment	
Sample Collection Date:	MS/MSD 1
Sample I.D.:	10/6/2019
Sample MS I.D.:	30330221001
Sample MSD I.D.:	30330221001MS
Spike I.D.:	19-022
MS/MSD Decay Corrected Spike Concentration (pCi/mL):	32.118
Spike Volume Used in MS (mL):	0.10
Spike Volume Used in MSD (mL):	0.20
MS Aliquot (L, g, F):	0.655
MSD Aliquot (L, g, F):	9.801
MS Target Conc. (pCi/L, g, F):	0.650
MSD Target Conc. (pCi/L, g, F):	9.875
MS Spike Uncertainty (calculated):	0.461
MSD Spike Uncertainty (calculated):	0.464
Sample Result Counting Uncertainty (pCi/L, g, F):	-0.061
Sample Matrix Spike Result:	0.601
Matrix Spike Result Counting Uncertainty (pCi/L, g, F):	12.228
Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):	2.291
MS Numerical Performance Indicator:	0.884
MSD Numerical Performance Indicator:	110.90%
MS Percent Recovery:	86.32%
MSD Percent Recovery:	109.36%
MS Status vs Numerical Indicator:	N/A
MSD Status vs Numerical Indicator:	N/A
MS Status vs Recovery:	Pass
MSD Status vs Recovery:	Pass
MS/MSD Upper % Recovery Limits:	136%
MS/MSD Lower % Recovery Limits:	71%

Matrix Spike/Matrix Spike Duplicate Sample Assessment	
Sample I.D.:	50238593005
Sample MS I.D.:	50238593010
Sample MSD I.D.:	50238593009
Sample Matrix Spike Result:	8.399
Sample Matrix Spike Duplicate Result:	1.169
Sample Matrix Spike Duplicate Result Counting Uncertainty (pCi/L, g, F):	10.739
Duplicate Numerical Performance Indicator:	1.390
MS/MSD Duplicate Status vs Numerical Indicator:	23.56%
MS/MSD Duplicate Status vs RPD:	N/A
% RPD Limit:	Pass
	32%

11/8/19

Quality Control Sample Performance Assessment

Analyst Must Manually Enter All Fields Highlighted in Yellow.

Test: Ra-228
Analyst: VAL
Date: 10/28/2019
Worklist: 50449
Matrix: WT



Method Blank Assessment	
MB Sample ID	1778711
MB concentration:	0.283
M/B 2 Sigma CSU:	0.317
MB MDC:	0.662
MB Numerical Performance Indicator:	1.75
MB Status vs Numerical Indicator:	Pass
MB Status vs. MDC:	Pass

Laboratory Control Sample Assessment	
LCSD (Y or N)?	N
LCS50449	LCS50449
Count Date:	11/1/2019
Spike I.D.:	19-026
Decay Corrected Spike Concentration (pCi/ml):	34.866
Volume Used (mL):	0.10
Aliquot Volume (L, g, F):	0.801
Target Conc. (pCi/L, g, F):	4.351
Uncertainty (Calculated):	0.213
Result (pCi/L, g, F):	4.027
LCS/LCSD 2 Sigma CSU (pCi/L, g, F):	0.948
Numerical Performance Indicator:	-0.65
Percent Recovery:	92.54%
Status vs Numerical Indicator:	N/A
Status vs Recovery:	Pass
Upper % Recovery Limits:	135%
Lower % Recovery Limits:	60%

Duplicate Sample Assessment	
Sample I.D.:	Enter Duplicate sample IDs if other than LCS/LCSD in the space below.
Duplicate Sample I.D.:	
Sample Result (pCi/L, g, F):	
Sample Duplicate Result (pCi/L, g, F):	
Sample Result 2 Sigma CSU (pCi/L, g, F):	
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):	
Are sample and/or duplicate results below RL?	See Below ##
Duplicate Numerical Performance Indicator:	
Duplicate RPD:	
Duplicate Status vs Numerical Indicator:	
Duplicate Status vs RPD:	
% RPD Limit:	

Sample Matrix Spike Control Assessment	
Sample Collection Date:	MS/MSD 1 10/14/2019
Sample I.D.:	50238593002
Sample MS I.D.:	50238593010
Sample MSD I.D.:	50238593009
Spike I.D.:	19-026
MS/MSD Decay Corrected Spike Concentration (pCi/ml):	35.075
Spike Volume Used in MS (mL):	0.20
Spike Volume Used in MSD (mL):	0.20
MS Aliquot (L, g, F):	0.808
MS Target Conc. (pCi/L, g, F):	8.687
MS Aliquot (L, g, F):	0.801
MSD Target Conc. (pCi/L, g, F):	8.755
MSD Spike Uncertainty (calculated):	0.426
MSD Spike Uncertainty (calculated):	0.429
Sample Result:	-0.005
Sample Result 2 Sigma CSU (pCi/L, g, F):	2.483
Sample Matrix Spike Result:	0.284
Sample Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):	7.900
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):	1.712
Sample Matrix Spike Duplicate Result:	8.070
Sample Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):	1.762
MS Numerical Performance Indicator:	-0.858
MSD Numerical Performance Indicator:	-0.726
MS Percent Recovery:	91.00%
MSD Percent Recovery:	92.24%
MS Status vs Numerical Indicator:	Pass
MSD Status vs Numerical Indicator:	Pass
MS Status vs Recovery:	Pass
MSD Status vs Recovery:	Pass
MS/MSD Upper % Recovery Limits:	135%
MS/MSD Lower % Recovery Limits:	60%

Matrix Spike/Matrix Spike Duplicate Sample Assessment	
Sample I.D.:	50238593002
Sample MS I.D.:	50238593010
Sample MSD I.D.:	50238593009
Spike I.D.:	7.900
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):	1.712
Sample Matrix Spike Duplicate Result:	8.070
Sample Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):	1.762
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):	-0.136
Duplicate Numerical Performance Indicator:	1.35%
Duplicate Numerical Performance Indicator (Based on the Percent Recoveries) MS/MSD Duplicate RPD:	Pass
MS/MSD Duplicate Status vs Numerical Indicator:	Pass
MS/MSD Duplicate Status vs RPD:	Pass
% RPD Limit:	36%

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

Comments:

Handwritten signature/initials

Handwritten signature/initials

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,



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

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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

REPORT OF LABORATORY ANALYSIS

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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	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
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	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

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC CCR

Pace Project No.: 60323643

Method: EPA 200.7

Description: 200.7 Metals, Total

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC CCR
Pace Project No.: 60323643

Method: EPA 200.8
Description: 200.8 MET ICPMS
Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC CCR

Pace Project No.: 60323643

Method: EPA 245.1

Description: 245.1 Mercury

Client: 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:

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PROJECT NARRATIVE

Project: TEC CCR

Pace Project No.: 60323643

Method: SM 2540C

Description: 2540C Total Dissolved Solids

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC CCR

Pace Project No.: 60323643

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC CCR

Pace Project No.: 60323643

Method: EPA 300.0

Description: 300.0 IC Anions 28 Days

Client: 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.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC CCR

Pace Project No.: 60323643

Sample: MW-08-120519	Lab ID: 60323643001	Collected: 12/05/19 09:15	Received: 12/09/19 16:10	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: SM 2540C						
Total Dissolved Solids	1330	mg/L	13.3	1		12/12/19 06:24		
4500H+ pH, Electrometric		Analytical Method: 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 Method: EPA 300.0						
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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC CCR

Pace Project No.: 60323643

Sample: MW-10-120519		Lab ID: 60323643002	Collected: 12/05/19 11:10	Received: 12/09/19 16:10	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: SM 2540C						
Total Dissolved Solids	1250	mg/L	13.3	1		12/12/19 06:24		
4500H+ pH, Electrometric		Analytical Method: SM 4500-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 Method: 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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC CCR

Pace Project No.: 60323643

Sample: MW-07-120519		Lab ID: 60323643003		Collected: 12/05/19 13:40		Received: 12/09/19 16:10		Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual	
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: SM 2540C							
Total Dissolved Solids	1080	mg/L	13.3	1		12/12/19 06:25			
4500H+ pH, Electrometric		Analytical Method: 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 Method: EPA 300.0							
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		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: TEC CCR

Pace Project No.: 60323643

Sample: DUP-120519		Lab ID: 60323643004	Collected: 12/05/19 13:45	Received: 12/09/19 16:10	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 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 Method: EPA 200.8 Preparation Method: EPA 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 Method: EPA 245.1 Preparation Method: EPA 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 Method: SM 2540C						
Total Dissolved Solids	1100	mg/L	13.3	1		12/12/19 06:25		
4500H+ pH, Electrometric		Analytical Method: SM 4500-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 Method: EPA 300.0						
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	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC CCR
Pace Project No.: 60323643

QC Batch: 627969 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

METHOD BLANK: 2559568 Matrix: Water
Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.20	0.20	12/16/19 11:50	

LABORATORY CONTROL SAMPLE: 2559569

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.7	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2559570 2559571

Parameter	Units	60323643002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.20	5	5	2.5	2.5	51	49	70-130	2	20	M1

MATRIX SPIKE SAMPLE: 2559572

Parameter	Units	60323644007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	<0.20	5	4.8	96	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

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 Matrix: Water
 Associated Lab Samples: 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
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

Parameter	Units	60323643001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
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 M1	
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 SPIKE DUPLICATE: 2558039 2558040

Parameter	Units	60323009001 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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QUALITY CONTROL DATA

Project: TEC CCR

Pace Project No.: 60323643

Parameter	Units	60323009001		2558039		2558040		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec							
Calcium	mg/L	438000	10	10	466	448	290	105	70-130	4	20	M1		
		ug/L												
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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QUALITY CONTROL DATA

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 Samples: 60323643001, 60323643002, 60323643003, 60323643004

METHOD BLANK: 2558261 Matrix: Water
 Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

Parameter	Units	Blank Result	Reporting 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

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% 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: 2558263 2558264

Parameter	Units	60323643002		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	Result	MSD Result	% Rec	% Rec				
Antimony	mg/L	<0.0010	0.04	0.04	0.038	0.038	96	96	70-130	0	20	
Arsenic	mg/L	0.026	0.04	0.04	0.066	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	1	20	
Molybdenum	mg/L	0.0043	0.04	0.04	0.048	0.048	108	109	70-130	1	20	
Selenium	mg/L	<0.0010	0.04	0.04	0.038	0.039	94	95	70-130	1	20	
Thallium	mg/L	<0.0010	0.04	0.04	0.036	0.036	90	90	70-130	0	20	

MATRIX SPIKE SAMPLE: 2558265

Parameter	Units	60323644007 Result	Spike Conc.	MS Result	MS % Rec	% 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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QUALITY CONTROL DATA

Project: TEC CCR

Pace Project No.: 60323643

MATRIX SPIKE SAMPLE:		2558265					
Parameter	Units	60323644007 Result	Spike Conc.	MS Result	MS % Rec	% 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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QUALITY CONTROL DATA

Project: TEC CCR
Pace Project No.: 60323643

QC Batch: 627752 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

METHOD BLANK: 2558642 Matrix: Water
Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	12/12/19 06:24	

LABORATORY CONTROL SAMPLE: 2558643

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 2558644

Parameter	Units	60323643001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1330	1330	1	10	

SAMPLE DUPLICATE: 2558645

Parameter	Units	60323673004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1010	1060	4	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: TEC CCR

Pace Project No.: 60323643

QC Batch: 627173 Analysis Method: SM 4500-H+B

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

Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

SAMPLE DUPLICATE: 2556513

Parameter	Units	60322862003 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.8	0	5	H6

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QUALITY CONTROL DATA

Project: TEC CCR

Pace Project No.: 60323643

QC Batch: 627689

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

METHOD BLANK: 2558364

Matrix: Water

Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	12/12/19 13:46	
Fluoride	mg/L	<0.20	0.20	12/12/19 13:46	
Sulfate	mg/L	<1.0	1.0	12/12/19 13:46	

METHOD BLANK: 2560357

Matrix: Water

Associated Lab Samples: 60323643001, 60323643002, 60323643003, 60323643004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	12/13/19 09:25	
Fluoride	mg/L	<0.20	0.20	12/13/19 09:25	
Sulfate	mg/L	<1.0	1.0	12/13/19 09:25	

LABORATORY CONTROL SAMPLE: 2558365

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	93	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	4.7	95	90-110	

LABORATORY CONTROL SAMPLE: 2560358

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2558366 2558367

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60323643001 Result	Spike Conc.	Spike Conc.	MS Result						
Chloride	mg/L	220	250	250	473	463	101	97	80-120	2	15
Fluoride	mg/L	<0.20	2.5	2.5	2.8	2.9	110	112	80-120	2	15
Sulfate	mg/L	654	250	250	922	900	107	98	80-120	2	15

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QUALITY CONTROL DATA

Project: TEC CCR

Pace Project No.: 60323643

MATRIX SPIKE SAMPLE:		2558368					
Parameter	Units	60323644006 Result	Spike Conc.	MS Result	MS % Rec	% 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.

REPORT OF LABORATORY ANALYSIS

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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		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO# : 60323643

60323643

Client Name: Westar Energy

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-298 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 3.7 Corr. Factor 0.0 Corrected 3.7

Date and initials of person examining contents:
pv/12/19/19

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State: _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/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: _____



CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: _____ of _____

Section A
 Required Client Information:
 Company: WESTAR ENERGY
 Address: 818 Kansas Ave
 Topeka, KS 66612
 Email To: ~~brandon.griffin@westarenergy.com~~
 Phone: (785) 575-8135 Fax:
 Requested Due Date/TAT: 7 DAY

Section B
 Required Project Information:
 Report To: Brandon Griffin Adam Kneeling
 Copy To: Jared Morrison, Heath Horny
 Purchase Order No.: 10TEC_0000007956
 Project Name:
 Project Number:

Section C
 Invoice Information:
 Attention: Jared Morrison
 Company Name: WESTAR ENERGY
 Address: SEE SECTION A
 Pace Quote Reference:
 Pace Project Manager: Heather Wilson, 913-563-1407
 Pace Profile #: 9656, 1

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER _____
 Site Location: KS
 STATE: KS

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WT WASTE WATER PRODUCT P SOIL/SOLID SL OIL OL WIPE WIP AIR AR OTHER OT TISSUE TS	MATRIX CODE (see valid codes to left)	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ O ₃ Methanol Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N)				Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.	
			COMPOSITE START	COMPOSITE END/GRAB						DATE	TIME	200.7 Total Metals*	200.8 Total Metals*			245.1 Total Mercury
1	MW-08-120519	WT	12/5	915	3		X	X	X	X	X	X	X	X	60523643	
2	MW-10-120519	WT	12/5	110	3		X	X	X	X	X	X	X	X	III & IV	
3	MW-07-120519	WT	12/5	1340	3		X	X	X	X	X	X	X	X	605	
4	Dup=120519	WT	12/5	1345	3		X	X	X	X	X	X	X	X	604	
5																
6																
7																
8																
9																
10																
11																
12																
200.7 Total Metals*: B, Ca, Ba, Be, Cr, Pb, Li																
200.8 Total Metals*: Sb, As, Cd, Co, Mo, Se, Tl																
ADDITIONAL COMMENTS																
RELINQUISHED BY / AFFILIATION		Eli F. H&A	DATE	12-9	TIME	8:45	ACCEPTED BY / AFFILIATION	gopher	DATE	12-9	TIME	8:45	DATE	12-9	TIME	8:45
SAMPLE CONDITIONS																
Temp in °C																
Received on Ice (Y/N)																
Custody Sealed (Y/N)																
Cooler (Y/N)																
Samples Intact (Y/N)																

*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.

Pace Container Order #569725

Order By :	Ship To :	Return To:
Company <u>Energy Kansas Central, Inc.</u>	Company <u>Haley & Aldrich</u>	Company <u>Pace Analytical Kansas</u>
Contact <u>Kneeling, Adam</u>	Contact <u>Misha Miller-Gilmore</u>	Contact <u>Wilson, Heather</u>
Email <u>akneeling@haleyaldrich.com</u>	Email _____	Email <u>heather.wilson@pacelabs.com</u>
Address <u>400 E. Van Buren St</u>	Address <u>11020 King St</u>	Address <u>9608 Loiret Blvd.</u>
Address 2 <u>Suite 545</u>	Address 2 <u>Suite 450</u>	Address 2 _____
City <u>Phoenix</u>	City <u>Overland Park</u>	City <u>Lenexa</u>
State <u>AZ</u> Zip <u>85004</u>	State <u>KS</u> Zip <u>66210</u>	State <u>KS</u> Zip <u>66219</u>
Phone <u>(602)760-2424</u>	Phone <u>(913) 242-5491</u>	Phone <u>1(913)563-1407</u>

Info			
Project Name <u>TEC CCR- App III & IV (Lenexa)</u>	Due Date <u>12/02/2019</u>	Profile <u>0000</u>	Quote _____
Project <u>Wilson, Heather</u>	Return _____	Carrier <u>Most Economical</u>	Locatio <u>KS</u>

Trip Blanks

Include Trip Blanks

Bottle Labels

Blank

Pre-Printed No Sample IDs

Pre-Printed With Sample IDs

Bottles

Boxed Cases

Individually Wrapped

Grouped By Sample

Return Shipping Labels

No Shipper

With Shipper

Misc

Sampling Instructions

Custody Seal

Temp. Blanks _____

Coolers _____

Syringes _____

Extra Bubble Wrap

Short Hold/Rush

DI

USDA Regulated Soils

COC Options

Number of Blanks

Pre-Printed

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
5	WT	Metals	1-1L plastic w/HNO3	5	0	100719-2EIZ	
5	WT	300.0 Anions/pH	1L plastic unpreserved	5	0	102819-2AED	
5	WT	TDS	1 L plastic unpreserved	5	0	102819-2AED	
1	OT	FEDEX Prepaid Return-Lenexa lab	None	0	0		

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 :	<u>12/02/2019</u>
Prepared By:	<u>Skylar</u>
Verified By:	_____

Sample

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 USE (Optional):

Date Rec'd:	_____
Received By:	_____
Verified By:	_____

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,



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

Enclosures



REPORT OF LABORATORY ANALYSIS

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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



REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60323759001	MW-08_120519	EPA 903.1	MK1	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

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Method: EPA 903.1

Description: 903.1 Radium 226

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Method: EPA 904.0

Description: 904.0 Radium 228

Client: 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:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Method: Total Radium Calculation

Description: Total Radium 228+226

Client: 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.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Sample: MW-08_120519 **Lab ID: 60323759001** Collected: 12/05/19 09:15 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	-0.191 ± 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	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Sample: MW-10_120519 **Lab ID: 60323759002** 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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Sample: MW-07_120519 **Lab ID: 60323759003** Collected: 12/05/19 13:40 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	0.0619 ± 0.438 (0.873) C:NA T:92%	pCi/L	12/24/19 12:05	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	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

Sample: DUP_120519 **Lab ID: 60323759004** 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	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	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: TEC CCR GROUNDWATER

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 Samples: 60323759001, 60323759002, 60323759003, 60323759004

METHOD BLANK: 1822419 Matrix: Water

Associated Lab Samples: 60323759001, 60323759002, 60323759003, 60323759004

Parameter	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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: TEC CCR GROUNDWATER

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 Samples: 60323759001, 60323759002, 60323759003, 60323759004

METHOD BLANK: 1822420

Matrix: Water

Associated Lab Samples: 60323759001, 60323759002, 60323759003, 60323759004

Parameter	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.

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: TEC CCR GROUNDWATER

Pace Project No.: 60323759

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		

REPORT OF LABORATORY ANALYSIS

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Pittsburgh Lab Sample Condition Upon Receipt



Client Name: Westar Energy Project # _____

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: 1219 29834027

Label _____
LIMS Login _____

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Thermometer Used NA Type of Ice: Wet Blue None

Cooler Temperature Observed Temp _____ °C Correction Factor: _____ °C Final Temp: _____ °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot#	Date and Initials of person examining contents:
				<u>102391</u>	<u>12/10/15 OB</u>
Chain of Custody Present:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.	
Chain of Custody Filled Out:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.	
Chain of Custody Relinquished:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.	
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.	
Sample Labels match COC:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5.	
-Includes date/time/ID Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.	
Short Hold Time Analysis (<72hr remaining):	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7.	
Rush Turn Around Time Requested:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8.	
Sufficient Volume:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9.	
Correct Containers Used:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10.	
-Pace Containers Used:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Containers Intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11.	
Orthophosphate field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12.	
Hex Cr Aqueous sample field filtered	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	13.	
Organic Samples checked for dechlorination:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	14.	
Filtered volume received for Dissolved tests	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	15.	
All containers have been checked for preservation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16.	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix					<u>PHL2</u>
All containers meet method preservation requirements.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Initial when completed <u>OB</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>8mm):	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.	
Trip Blank Present:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18.	
Trip Blank Custody Seals Present	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Rad Samples Screened < 0.5 mrem/hr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Initial when completed: <u>OB</u>	Date: <u>12/10/15</u>

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

A check in this box indicates that additional information has been stored in ereports.

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

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

Quality Control Sample Performance Assessment



Analyst **Must Manually Enter All Fields Highlighted in Yellow**

Test: Ra-228
Analyst: VAL
Date: 12/19/2019
Worklist: 51476
Matrix: WT

Method Blank Assessment	
MB Sample ID	1822420
MB concentration:	0.727
M/B 2 Sigma CSU:	0.373
MB MDC:	0.642
MB Numerical Performance Indicator:	3.82
MB Status vs Numerical Indicator:	Fail*
MB Status vs MDC:	See Comment*

Laboratory Control Sample Assessment	
LCSID (Y or N)?	N
LCS51476	LCS51476
Count Date:	12/24/2019
Spike I.D.:	19-057
Decay Corrected Spike Concentration (pCi/mL):	35.792
Volume Used (mL):	0.10
Aliquot Volume (L, g, F):	0.803
Target Conc. (pCi/L, g, F):	4.455
Uncertainty (Calculated):	0.321
Result (pCi/L, g, F):	4.003
LCS/LCSD 2 Sigma CSU (pCi/L, g, F):	0.917
Numerical Performance Indicator:	-0.91
Percent Recovery:	89.86%
Status vs Numerical Indicator:	N/A
Status vs Recovery:	Pass
Upper % Recovery Limits:	135%
Lower % Recovery Limits:	60%

Duplicate Sample Assessment	
Sample I.D.:	30339965002
Duplicate Sample I.D.:	30339965002DUP
Sample Result (pCi/L, g, F):	2.216
Sample Result 2 Sigma CSU (pCi/L, g, F):	0.596
Sample Duplicate Result (pCi/L, g, F):	1.845
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):	0.529
Are sample and/or duplicate results below RL?	See Below #
Duplicate Numerical Performance Indicator:	0.912
Duplicate RPD:	18.26%
Duplicate Status vs Numerical Indicator:	Pass
Duplicate Status vs RPD:	Pass
% RPD Limit:	36%

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.

Sample Matrix Spike Control Assessment		MS/MSD 1	MS/MSD 2
Sample Collection Date:		12/5/2019	
Sample I.D.:		30339967001	
Sample MS I.D.:		30339967001MS	
Spike I.D.:		19-057	
MS/MSD Decay Corrected Spike Concentration (pCi/mL):		36.019	
Spike Volume Used in MS (mL):		0.20	
MS Aliquot (L, g, F):		0.802	
MS Target Conc. (pCi/L, g, F):		8.986	
MSD Aliquot (L, g, F):			
MSD Target Conc. (pCi/L, g, F):			
MS Spike Uncertainty (calculated):			
MSD Spike Uncertainty (calculated):		0.647	
Sample Result:		0.637	
Sample Result 2 Sigma CSU (pCi/L, g, F):		0.399	
Sample Matrix Spike Result:		9.366	
Matrix Spike Result 2 Sigma CSU (pCi/L, g, F):		1.896	
Sample Matrix Spike Duplicate Result:			
Sample Duplicate Result 2 Sigma CSU (pCi/L, g, F):			
MS Numerical Performance Indicator:		-0.247	
MS Percent Recovery:		97.13%	
MSD Percent Recovery:			
MS Status vs Numerical Indicator:		Pass	
MS Status vs Recovery:		Pass	
MS/MSD Upper % Recovery Limits:		135%	
MS/MSD Lower % Recovery Limits:		60%	

Matrix Spike/Matrix Spike Duplicate Sample Assessment	
Sample I.D.:	
Sample MS I.D.:	
Sample Matrix Spike Result:	
Sample Matrix Spike Duplicate Result:	
Matrix Spike Duplicate Result 2 Sigma CSU (pCi/L, g, F):	
Duplicate Numerical Performance Indicator:	
Duplicate Numerical Performance Indicator:	
(Based on the Percent Recoveries) MS/MSD Duplicate RPD:	
MS/MSD Duplicate Status vs Numerical Indicator:	
MS/MSD Duplicate Status vs RPD:	
% RPD Limit:	

51-86-19
12-26-19
06 12-26-19

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.

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.

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

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)	MCL Comparison		Outlier Presence	Outlier Removed	Trend	Distribution Well*	September 2018 Concentration (mg/L)	Detect?	Inter-well Analysis		Groundwater Protection Standard		
											Number of Detection Exceedances	Number of Non-Detection Exceedances							Upper Tolerance Limit (mg/L) ¹	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 Appendix-IV: Arsenic, Total (mg/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
MW-9	10/10	0%	-	0.14	0.0002754	0.0166	0.1521	0.010	mg/L	Y	10	0	No	No	Stable	Normal	0.099	Y		Yes		Y	Yes
MW-10	10/10	0%	-	0.077	0.0001534	0.01239	0.2068	0.010	mg/L	Y	10	0	No	No	Stable	Normal	0.040	Y		Yes		Y	Yes
CCR Appendix-IV: Barium, Total (mg/L)																							
MW-7 (upgradient)	10/10	0%	-	0.10	0.00008988	0.00948	0.123	2.0	mg/L	N	0	0	No	No	Stable	Normal	0.079	Y	0.0953		2.0		
MW-8	10/10	0%	-	0.063	0.00007122	0.002669	0.04578	2.0	mg/L	N	0	0	No	No	Stable	Normal	0.057	Y		No		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	Y		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	Y		Yes		N	No
CCR Appendix-IV: Cobalt, Total (mg/L)																							
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		N	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	0.00003451	0.001858	0.4863	0.006	mg/L	Y	2	0	No	No	Stable	Normal	0.0010	N		No		N	No
CCR Appendix-IV: Fluoride, Total (mg/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
CCR Appendix-IV: Lithium, Total (mg/L)																							
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		N	No
CCR Appendix-IV: Molybdenum, Total (mg/L)																							
MW-7 (upgradient)	10/10	0%	-	0.013	0.000003	0.001732	0.1646	0.100	mg/L	N	0	0	No	No	Stable	Normal	0.0082	Y	0.0138		0.100		
MW-8	10/10	0%	-	0.044	0.00001218	0.00349	0.08902	0.100	mg/L	N	0	0	No	No	Stable	Normal	0.037	Y		Yes		N	No
MW-9	9/10	10%	0.001-0.001	0.0079	0.000004839	0.0022	0.5774	0.100	mg/L	N	0	0	No	No	Stable	Normal	0.0010	N		No		N	No
MW-10	10/10	0%	-	0.0049	7.566E-07	0.0008698	0.2492	0.100	mg/L	N	0	0	No	No	Stable	Normal	0.0027	Y		No		N	No
CCR Appendix-IV: Radium-226 & 228, Total (pCi/L)																							
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:

- ¹ 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
Completed July 15, 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 March 2019 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 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.

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.

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) ¹	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 Appendix-IV: Arsenic, 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 Appendix-IV: Barium, 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	0.00008091	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	N	0	0	No	No	Stable	Normal	0.36	Y		Yes		N	No
CCR Appendix-IV: Cadmium, 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	N		No		N	No
CCR Appendix-IV: Cobalt, Total (mg/L)																							
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
CCR Appendix-IV: Fluoride, Total (mg/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		
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
CCR Appendix-IV: Lithium, Total (mg/L)																							
MW-7 (upgradient)	11/11	0%	-	0.029	0.00009218	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	Y		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	Normal	0.021	Y		No		N	No
MW-10	3/11	73%	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
CCR Appendix-IV: Molybdenum, Total (mg/L)																							
MW-7 (upgradient)	11/11	0%	-	0.013	0.00000547	0.002339	0.2334	0.10	mg/L	N	0	0	No	No	Stable	Normal	0.0050	Y	0.014		0.100		
MW-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
MW-9	10/11	9%	0.001-0.001	0.0079	0.00004874	0.002208	0.5482	0.10	mg/L	N	0	0	No	No	Stable	Normal	0.0062	Y		No		N	No
MW-10	11/11	0%	-	0.0049	7.125E-07	0.0008441	0.2456	0.10	mg/L	N	0	0	No	No	Stable	Normal	0.0029	Y		No		N	No
CCR Appendix-IV: Radium-226 & 228, Total (pCi/L)																							
MW-7 (upgradient)	11/11	0%	-	5.88	2.57	1.603	1.398	5.0	pCi/L	Y	1	0	Yes	No	Stable	Non-parametric	0.0090	N	5.900		5.900		
MW-8	11/11	0%	-	1.308	0.142	0.3768	0.4327	5.0	pCi/L	N	0	0	No	No	Stable	Normal	0.465	N		No		N	No
MW-9	11/11	0%	-	3.249	0.5045	0.7103	0.4051	5.0	pCi/L	N	0	0	No	No	Stable	Normal	0.663	N		No		N	No
MW-10	11/11	0%	-	3.58	0.4693	0.685	0.3253	5.0	pCi/L	N	0	0	No	No	Stable	Normal	1.57	N		No		N	No

Notes:
¹ 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** WELL NAME AND GROUNDWATER ELEVATION (MARCH 2019)
- 849.64**
- 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

NOTES

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



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TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS

**BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
MARCH 20, 2019**



MARCH 2022

FIGURE 2



LEGEND

- MW-8**
849.64 WELL NAME AND GROUNDWATER ELEVATION (JUNE 2019)
-  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

NOTES

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

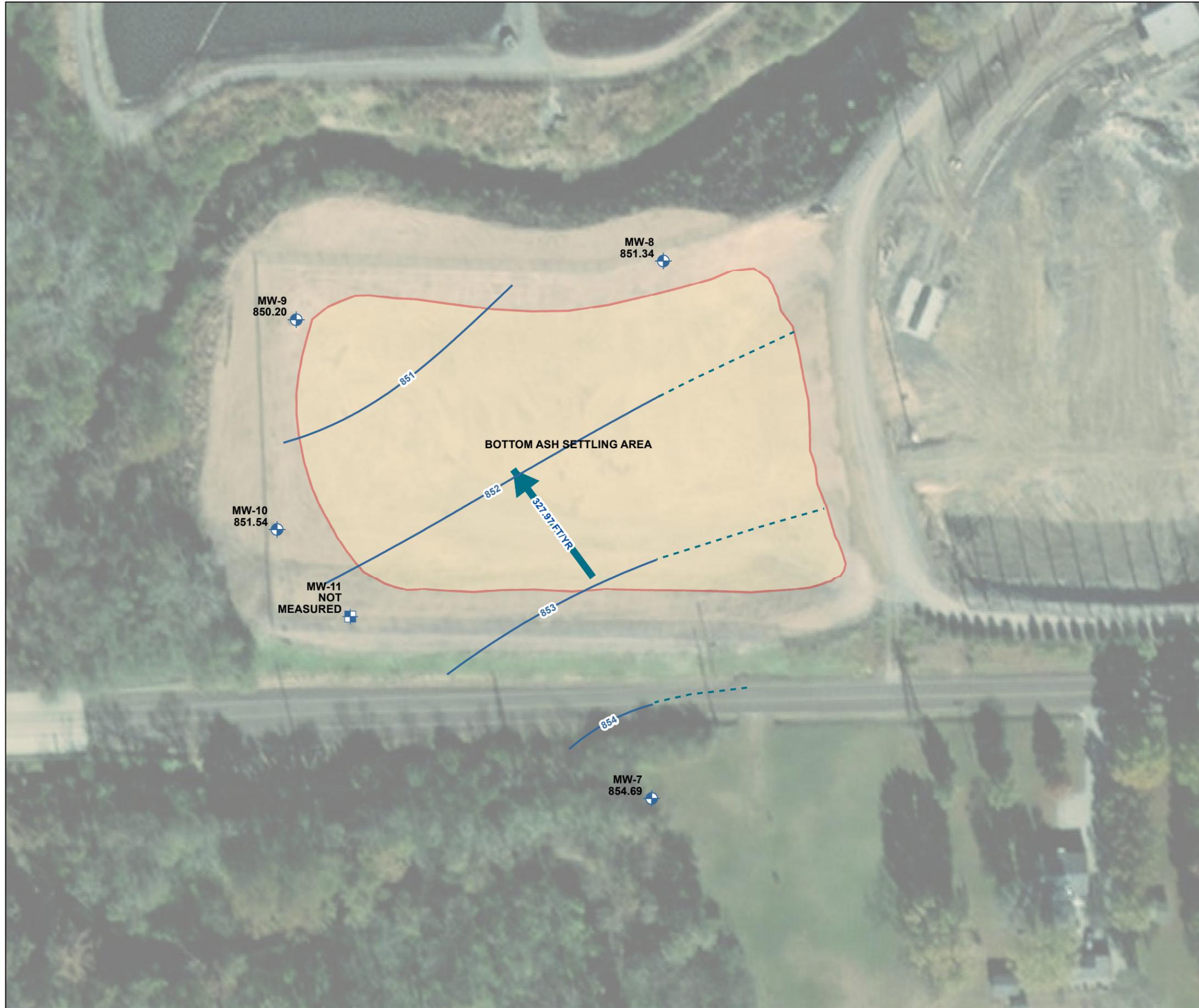


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TECUMSEH, KANSAS

BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
JUNE 25, 2019



MARCH 2022



LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (OCTOBER 2019)
-  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

NOTES

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

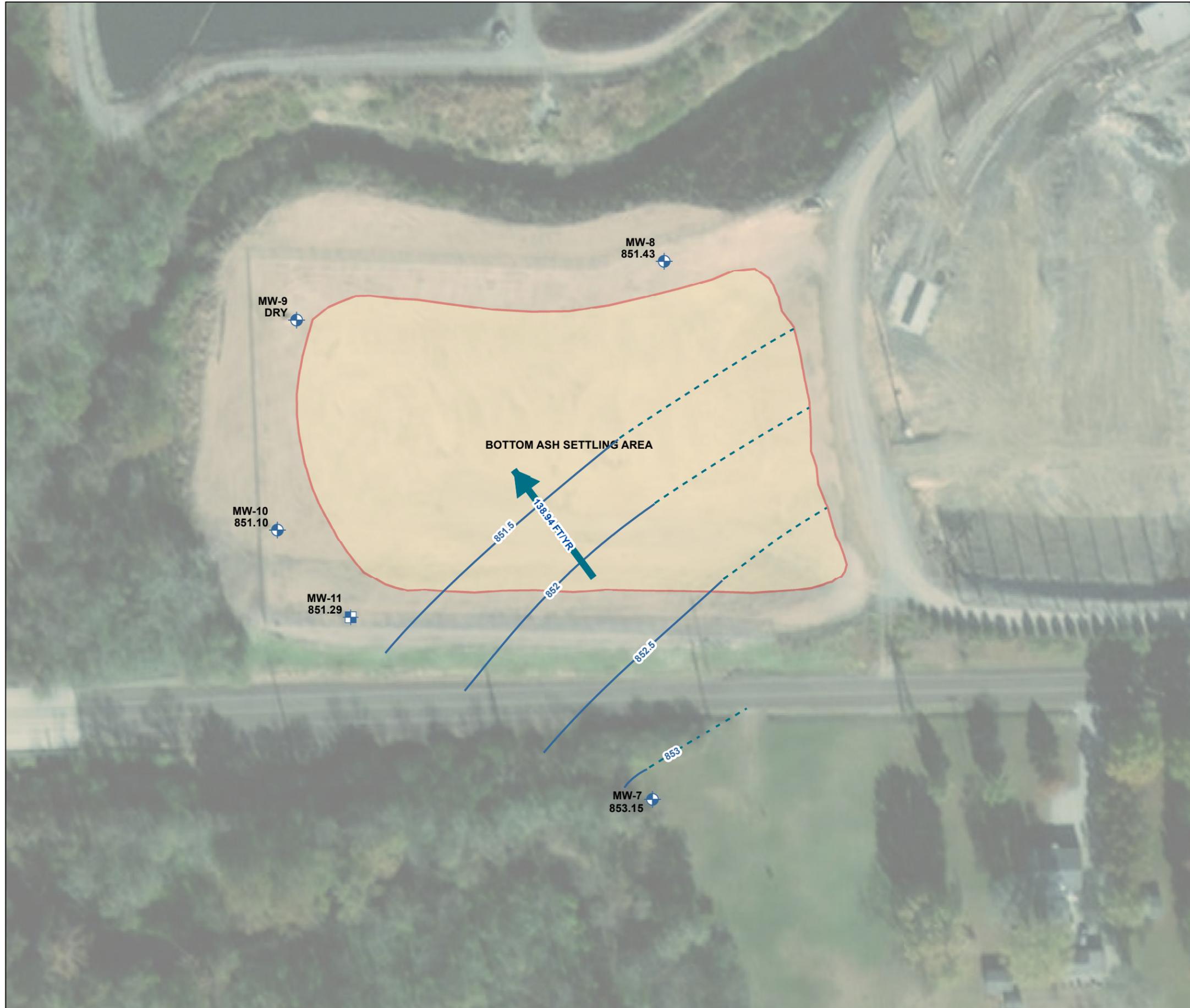


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TECUMSEH, KANSAS

**BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
OCTOBER 10, 2019**



MARCH 2022

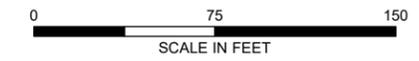


LEGEND

- MW-8** 849.64 WELL NAME AND GROUNDWATER ELEVATION (DECEMBER 5, 2019)
-  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

NOTES

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 USING HYDRAULIC CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES FROM SLUG TESTS COMPLETED IN APRIL 2016.
5. AERIAL IMAGERY SOURCE: ESRI, 07 DECEMBER 2019



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BOTTOM ASH SETTLING AREA
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
DECEMBER 05, 2019



MARCH 2022