

2018 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
322 LANDFILL  
TECUMSEH ENERGY CENTER  
TECUMSEH, KANSAS

by Haley & Aldrich, Inc.  
Cleveland, Ohio

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

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Revision No.	Date	Notes
0	January 2019	Original
1	March 2021	Revised to include groundwater potentiometric contour maps for 2018

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**2018 Annual Groundwater Monitoring  
and Corrective Action Report**

This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring system for the Tecumseh Energy Center (TEC) 322 Landfill consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2018) and documents compliance with the U.S. Environmental Protection Agency Coal Combustion Residual Rule. I certify that the 2018 Annual Groundwater Monitoring and Corrective Action Report for the TEC 322 Landfill 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 2018 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the 322 Landfill 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 effective October 19, 2015 (Rule), specifically Code of Federal Regulations Title 40 (40 CFR), subsection § 257.90(e). The Annual Report documents the groundwater monitoring system for the TEC 322 Landfill consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2018) 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)

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

Evergy has installed and certified a groundwater monitoring system at the TEC 322 Landfill. The TEC 322 Landfill 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) (Rule).

### 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 322 Landfill as required by the Rule. Groundwater sampling and analysis was conducted in accordance with 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 2018.

#### 2.2.1 Status of the Groundwater Monitoring Program

Results of the detection monitoring statistical analyses completed in January 2018 identified statistically significant increased (SSI) concentration of Appendix III constituents in downgradient monitoring wells relative to concentrations observed in upgradient monitoring wells. No alternative source was identified. Accordingly, the groundwater monitoring program moved to and is currently implementing an assessment monitoring program.

### 2.2.2 Key Actions Completed

The 2017 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2018. Statistical analysis was completed in January 2018 on analytical data from the initial detection monitoring sampling event. Appendix III SSIs were determined in January 2018, and Evergy pursued an alternative source demonstration, which was not successful. Sampling for the first semi-annual detection monitoring event was completed in March 2018; however, due to the determination of SSIs and transition to an assessment monitoring program, no statistical analyses were completed on this data. An assessment monitoring program was established and the initial assessment monitoring sampling event was completed in June 2018. A second assessment monitoring sampling event including detected Appendix IV constituents from the initial assessment monitoring sampling event, as well as all Appendix III constituents, was completed in September 2018. Groundwater protection standards for detected Appendix IV constituents were established. Statistical analysis of the results from the second assessment monitoring sampling event are due to be completed in January 2019 and will be reported in the next annual report.

### 2.2.3 Problems Encountered

No noteworthy problems (i.e., problems could include damaged wells, issues with sample collection or lack of sampling, and problems with analytical analysis) were encountered for the TEC 322 Landfill groundwater monitoring program in 2018.

### 2.2.4 Actions to Resolve Problems

No problems were encountered at the TEC 322 Landfill in 2018, therefore, no actions to resolve problems were required.

### 2.2.5 Project Key Activities for Upcoming Year

Key activities planned for 2019 include the 2018 Annual Groundwater Monitoring and Corrective Action Report, statistical analysis of assessment monitoring analytical data collected in September 2018, and semi-annual assessment monitoring and subsequent statistical analysis.

## 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 322 Landfill 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 2018.

**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 § 257.94(b), three independent samples (one detection monitoring sample, and two assessment monitoring samples) from each background and downgradient monitoring well were collected in 2018. Detection monitoring samples are summarized in Table I, and assessment monitoring samples are summarized in Table II. Both summary tables include the sample names, dates of sample collection, and monitoring data obtained for the groundwater monitoring program. Groundwater potentiometric elevation contour maps associated with each groundwater monitoring sampling event in 2018 are provided in Figures 2 through 4.

**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***

Initial detection monitoring statistical analyses were completed in January 2018 in accordance with § 257.94(b). The analyte concentrations from the downgradient wells for each of the Appendix III constituents from the 2017 detection monitoring sampling event from each location were compared to their respective prediction limit (PL). Once data is validated, a sample concentration greater than the PL is considered to represent a SSI. A SSI over background levels for one or more constituents listed in Appendix III were identified. A summary of the Appendix III SSIs identified in January 2018 is provided in Table III.

A successful demonstration that a source other than the CCR unit caused the SSI over background levels was not completed within 90 days of the SSI determination in accordance with 40 CFR §257.94(e)(2), and the assessment monitoring program was established by July 2018. The assessment monitoring program has been established to meet the requirements of 40 CFR §257.95.

### 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 to information 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 2018.

#### 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.***

An alternative source demonstration for detection monitoring SSIs was not successfully completed within 90 days for this unit, therefore, no 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 is currently being implemented at the CCR unit. Two rounds of assessment monitoring sampling were completed in 2018. Analytical results for both downgradient and upgradient wells are provided in Table II. The groundwater protection standards established for the TEC 322 Landfill are included in Table IV.

**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.*

Assessment monitoring statistical analyses were not completed in 2018. Therefore, this criterion is not applicable.

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.***

Assessment monitoring statistical analyses were not completed in 2018. Therefore, this criterion is not applicable.

## **TABLES**



**TABLE I**  
**SUMMARY OF ANALYTICAL RESULTS - DETECTION MONITORING**

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

Location	Upgradient	Downgradient		
	MW-4	MW-1	MW-5	MW-6
Measure Point (TOC)	936.48	904.65	916.18	911.28
Sample Name	MW-4-030818	MW-1-030818	MW-5-030818	MW-6-030818
Sample Date	3/8/2018	3/8/2018	3/8/2018	3/8/2018
Lab Data Reviewed and Accepted	4/16/2018	4/16/2018	4/16/2018	4/16/2018
Depth to Water (ft btoc)	4.87	4.62	6.50	8.41
Temperature (Deg C)	48.3	51.6	51.1	52.5
Conductivity (µS/cm)	1489	1299	2028	2049
Turbidity (NTU)	0.42	8.99	0.37	13.6
Boron, Total (mg/L)	<0.10	<b>0.37</b>	<b>1.0</b>	<b>0.83</b>
Calcium, Total (mg/L)	<b>182</b>	<b>185</b>	<b>345</b>	<b>324</b>
Chloride (mg/L)	<b>252</b>	<b>34.8</b>	<b>42.5</b>	<b>57.0</b>
Fluoride (mg/L)	<b>0.22</b>	<b>0.40</b>	<b>0.27</b>	<b>0.34</b>
Sulfate (mg/L)	<b>163</b>	<b>453</b>	<b>1090</b>	<b>1180</b>
pH (su)	<b>7.2</b>	<b>7.0</b>	<b>7.0</b>	<b>7.1</b>
TDS (mg/L)	<b>952</b>	<b>976</b>	<b>1760</b>	<b>1750</b>

**Notes:**

*This detection monitoring sample was collected prior to the establishment of an assessment monitoring program. The program subsequently transitioned into assessment monitoring, and consequently statistical analyses were not conducted on these data.*

*µS/cm = micro Siemens per centimeter*

*btoc = below top of casing*

*Deg C = degrees Celsius*

*mg/L = milligrams per liter*

*NTU = Nephelometric Turbidity Unit*

*su = standard unit*

*TDS = total dissolved solids*

*TOC = top of casing*

***Detection above laboratory reporting limit***

**TABLE II**  
**SUMMARY OF ANALYTICAL RESULTS - ASSESSMENT MONITORING**

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

Location	Upgradient		Downgradient					
	MW-4		MW-1		MW-5		MW-6	
Measure Point (TOC)	936.48		904.65		916.18		911.28	
Sample Name	MW-4-060718	MW-4-090518	MW-1-060718	MW-1-090518	MW-5-060718	MW-5-090518	MW-6-060718	MW-6-090518
Sample Date	6/7/2018	9/5/2018	6/7/2018	9/5/2018	6/7/2018	9/5/2018	6/7/2018	9/5/2018
Lab Data Reviewed and Accepted	7/16/2018	10/15/2018	7/16/2018	10/15/2018	7/16/2018	10/15/2018	7/16/2018	10/15/2018
Depth to Water (ft btoc)	5.91	7.63	5.28	5.62	6.73	8.58	8.91	10.92
Temperature (Deg C)	14.80	19.16	14.68	16.49	14.72	18.10	14.57	17.35
Conductivity (µS/cm)	1600	1530	1241	1144	1900	1510	2160	2050
Turbidity (NTU)	0.19	0.69	12.18	2.45	0.75	0.10	21.0	11.10
Boron, Total (mg/L)	--	<0.1	--	<b>0.126</b>	--	<b>0.326</b>	--	<b>0.84</b>
Calcium, Total (mg/L)	--	<b>168</b>	--	<b>151</b>	--	<b>201</b>	--	<b>312</b>
Chloride (mg/L)	--	<b>269</b>	--	<b>50.0</b>	--	<b>52.7</b>	--	<b>61.6</b>
Fluoride (mg/L)	--	<b>0.35</b>	--	<b>0.39</b>	--	<b>0.35</b>	--	<b>0.41</b>
Sulfate (mg/L)	--	<b>159</b>	--	<b>355</b>	--	<b>516</b>	--	<b>1000</b>
pH (su)	--	<b>7.0</b>	--	<b>6.9</b>	--	<b>6.8</b>	--	<b>7.0</b>
TDS (mg/L)	--	<b>1030</b>	--	<b>912</b>	--	<b>1210</b>	--	<b>1680</b>
Antimony, Total (mg/L)	<0.0010	--	<0.0010	--	<0.0010	--	<0.0010	--
Arsenic, Total (mg/L)	<0.0010	--	<0.0010	--	<0.0010	--	<0.0010	--
Barium, Total (mg/L)	<b>0.10</b>	<b>0.12</b>	<b>0.087</b>	<b>0.079</b>	<b>0.024</b>	<b>0.033</b>	<b>0.020</b>	<b>0.019</b>
Beryllium, Total (mg/L)	<0.0010	--	<0.0010	--	<0.0010	--	<0.0010	--
Cadmium, Total (mg/L)	<0.00050	--	<0.00050	--	<0.00050	--	<0.00050	--
Chromium, Total (mg/L)	<0.0050	--	<0.0050	--	<0.0050	--	<0.0050	--
Cobalt, Total (mg/L)	<0.0010	<0.0010	<b>0.0019</b>	<b>0.0028</b>	<b>0.0017</b>	<b>0.0013</b>	<b>0.0021</b>	<b>0.0017</b>
Lead, Total (mg/L)	<0.010	--	<0.010	--	<0.010	--	<0.010	--
Lithium, Total (mg/L)	<0.010	<0.010	<b>0.01</b>	<0.010	<b>0.021</b>	<b>0.014</b>	<b>0.022</b>	<0.010
Molybdenum, Total (mg/L)	<0.0010	--	<0.0010	--	<0.0010	--	<0.0010	--
Selenium, Total (mg/L)	<0.0010	--	<0.0010	--	<0.0010	--	<0.0010	--
Thallium, Total (mg/L)	<0.0010	--	<0.0010	--	<0.0010	--	<0.0010	--
Mercury, Total (mg/L)	<0.00020	--	<0.00020	--	<0.00020	--	<0.00020	--
Fluoride (mg/L)	<b>0.25</b>	<b>0.35</b>	<b>0.37</b>	<b>0.39</b>	<b>0.36</b>	<b>0.35</b>	<b>0.39</b>	<b>0.41</b>
Radium-226 & 228 Combined (pCi/L)	<b>1.22</b>	<b>2.60</b>	<b>0.711</b>	<b>0.855</b>	<b>0.686</b>	<b>0.530</b>	<b>1.26</b>	<b>1.95</b>

**Note:**

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

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

**Bold value: Detection above laboratory reporting limit**

**TABLE III**  
**SUMMARY OF APPENDIX III SSIs**  
 EVERGY KANSAS CENTRAL, INC.  
 TECUMSEH ENERGY CENTER  
 322 LANDFILL  
 TECUMSEH, KANSAS

Well ID	Statistical Analysis Completed	Constituent
MW-1	January 2018	Boron
	January 2018	Fluoride
	January 2018	Sulfate
MW-5	January 2018	Boron
	January 2018	Calcium
	January 2018	Fluoride
	January 2018	Sulfate
	January 2018	TDS
MW-6	January 2018	Boron
	January 2018	Calcium
	January 2018	Fluoride
	January 2018	Sulfate
	January 2018	TDS

**Notes:**

*SSIs = statistically significant increases*

*TDS = total dissolved solids*

**TABLE IV**  
**GROUNDWATER PROTECTION STANDARDS**

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

Constituent	Groundwater Protection Standard (mg/L)
Barium	2*
Cobalt	0.006**
Fluoride	4.0*
Lithium	0.040**
Radium 226 & 228	5 pCi/L*

**Notes:**

\* Value set equal to the maximum contaminant level.

\*\* Value set based on statistical analysis of concentrations detected in background groundwater samples.

mg/L = milligrams per liter

pCi/L = picoCuries per liter



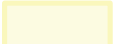

## FIGURES



GIS FILE PATH: G:\Projects\Wester\Tecumseh Energy Center (TEC)\GIS\MXDs\2018\_01\TEC\_PROPOSED\_MW\_LOC\_LANDFILL.mxd — USER: DZismaster — LAST SAVED: 3/16/2018 10:23:34 AM

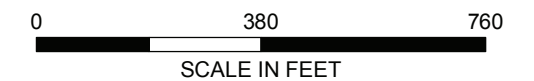


**LEGEND**

-  MONITORING WELL
-  PIEZOMETRIC OBSERVATION ONLY
-  322 Landfill
-  PROPERTY BOUNDARY

**NOTE**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI, 7 NOVEMBER 2015.



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

**322 LANDFILL MONITORING  
WELL LOCATION MAP**

MARCH 2021  
SCALE: AS SHOWN



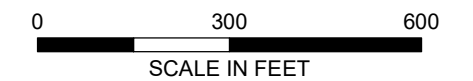


**LEGEND**

- MW-1  
900.47 WELL NAME AND GROUNDWATER ELEVATION (MARCH 8, 2018)
- MONITORING WELL
- PIEZOMETER OBSERVATION ONLY
- GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION,  
2-FT INTERVAL (AMSL)
- ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION  
CONTOUR
- GROUNDWATER FLOW DIRECTION
- 322 LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 08 MARCH 2018.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, 7 NOVEMBER 2019



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

322 LANDFILL  
GROUNDWATER POTENTIOMETRIC  
ELEVATION CONTOUR MAP  
MARCH 08, 2018



MARCH 2021



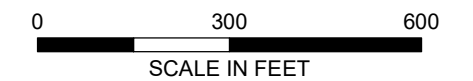


**LEGEND**

- MW-1  
900.47 WELL NAME AND GROUNDWATER ELEVATION (JUNE 7, 2018)
- MONITORING WELL
- PIEZOMETER OBSERVATION ONLY
- GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION, 2-FT INTERVAL (AMSL)
- ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- 322 LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 07 JUNE 2018.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, 7 NOVEMBER 2019



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

**322 LANDFILL  
GROUNDWATER POTENTIOMETRIC  
ELEVATION CONTOUR MAP  
JUNE 07, 2018**



MARCH 2021



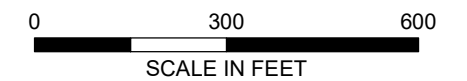


**LEGEND**

- MW-1 900.47 WELL NAME AND GROUNDWATER ELEVATION (SEPTEMBER 5, 2018)
- MONITORING WELL
- PIEZOMETER OBSERVATION ONLY
- GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION, 2-FT INTERVAL (AMSL)
- ESTIMATED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- 322 LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 05 SEPTEMBER 2018. MW-2 GROUNDWATER ELEVATION WAS NOT MEASURED IN SEPTEMBER 2018.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, 7 NOVEMBER 2019



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

322 LANDFILL  
GROUNDWATER POTENTIOMETRIC  
ELEVATION CONTOUR MAP  
SEPTEMBER 05, 2018



MARCH 2021





March 22, 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:** 2018 Annual Groundwater Monitoring and Corrective Action Report Addendum  
Evergy Kansas Central, Inc. (Evergy)  
322 Landfill  
Tecumseh Energy Center – Tecumseh, Kansas

The 322 Landfill 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 2018 for the 322 Landfill was completed and placed in the facility's operating record on January 31, 2019, 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 Report, 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 2018 sampling events are included in Attachment 1, and a discussion of the applicable statistical analyses completed in 2018 are included in Attachment 2 of this addendum. Revision 1 of the 2018 GWMCA Report does include a "Groundwater Potentiometric Elevation Contour Map" for each of the 2018 sampling events as

Figures 2, 3, and 4. 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, and September 2018 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 2018. Statistical analyses completed in 2018 included:
  - January 2018 statistical analyses for data obtained in the August 2016 through June 2017 background sampling events; and
  - Explanation of statistical analysis related to the March 2018 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, and September 2018 are provided.

**ATTACHMENT 1**

**Laboratory Analytical Reports**

**ATTACHMENT 1-1**

**March 2018 Sampling Event Laboratory Analytical Report**

March 20, 2018

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

RE: Project: TEC LF CCR  
Pace Project No.: 60265653

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on March 09, 2018. 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  
Adam Kneeling, Haley & Aldrich, Inc.  
JARED MORRISON, WESTAR ENERGY  
Melissa Michels, Westar Energy



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: TEC LF CCR

Pace Project No.: 60265653

---

### **Kansas Certification IDs**

9608 Loiret Boulevard, Lenexa, KS 66219

WY STR Certification #: 2456.01

Arkansas Certification #: 17-016-0

Illinois Certification #: 200030

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: TEC LF CCR

Pace Project No.: 60265653

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60265653001	MW-4-030818	Water	03/08/18 12:05	03/09/18 15:10
60265653002	MW-5-030818	Water	03/08/18 13:09	03/09/18 15:10
60265653003	MW-6-030818	Water	03/08/18 14:37	03/09/18 15:10
60265653004	MW-1-030818	Water	03/08/18 15:46	03/09/18 15:10
60265653005	DUP-030818	Water	03/08/18 06:00	03/09/18 15:10

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: TEC LF CCR

Pace Project No.: 60265653

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60265653001	MW-4-030818	EPA 200.7	SMW	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60265653002	MW-5-030818	EPA 200.7	SMW	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60265653003	MW-6-030818	EPA 200.7	SMW	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60265653004	MW-1-030818	EPA 200.7	SMW	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60265653005	DUP-030818	EPA 200.7	SMW	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
		EPA 200.7	SMW	2	PASI-K

### REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60265653

---

**Method:** EPA 200.7

**Description:** 200.7 Metals, Total

**Client:** WESTAR ENERGY

**Date:** March 20, 2018

**General Information:**

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

**Hold Time:**

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

**Sample Preparation:**

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

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

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

**Continuing Calibration:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60265653

---

**Method:** SM 2540C

**Description:** 2540C Total Dissolved Solids

**Client:** WESTAR ENERGY

**Date:** March 20, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Duplicate Sample:**

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

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60265653

---

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

**Description:** 4500H+ pH, Electrometric

**Client:** WESTAR ENERGY

**Date:** March 20, 2018

### General Information:

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

### Hold Time:

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

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

- DUP-030818 (Lab ID: 60265653005)
- MW-1-030818 (Lab ID: 60265653004)
- MW-4-030818 (Lab ID: 60265653001)
- MW-5-030818 (Lab ID: 60265653002)
- MW-6-030818 (Lab ID: 60265653003)

### 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 LF CCR

Pace Project No.: 60265653

---

**Method:** EPA 300.0

**Description:** 300.0 IC Anions 28 Days

**Client:** WESTAR ENERGY

**Date:** March 20, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

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

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60265653

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-4-030818</b>								
<b>Lab ID: 60265653001</b>								
Collected: 03/08/18 12:05 Received: 03/09/18 15:10 Matrix: Water								
<b>200.7 Metals, Total</b>								
Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron, Total Recoverable	<b>&lt;0.10</b>	mg/L	0.10	1	03/13/18 10:15	03/13/18 17:43	7440-42-8	
Calcium, Total Recoverable	<b>182</b>	mg/L	0.20	1	03/13/18 10:15	03/13/18 17:43	7440-70-2	
<b>2540C Total Dissolved Solids</b>								
Analytical Method: SM 2540C								
Total Dissolved Solids	<b>952</b>	mg/L	5.0	1		03/14/18 12:15		
<b>4500H+ pH, Electrometric</b>								
Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	<b>7.2</b>	Std. Units	0.10	1		03/15/18 11:14		H6
<b>300.0 IC Anions 28 Days</b>								
Analytical Method: EPA 300.0								
Chloride	<b>252</b>	mg/L	25.0	25		03/16/18 23:27	16887-00-6	
Fluoride	<b>0.22</b>	mg/L	0.20	1		03/16/18 07:26	16984-48-8	
Sulfate	<b>163</b>	mg/L	25.0	25		03/16/18 23:27	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60265653

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-5-030818</b>								
<b>Lab ID: 60265653002</b>								
Collected: 03/08/18 13:09 Received: 03/09/18 15:10 Matrix: Water								
<b>200.7 Metals, Total</b>								
Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron, Total Recoverable	<b>1.0</b>	mg/L	0.10	1	03/13/18 10:15	03/13/18 17:45	7440-42-8	
Calcium, Total Recoverable	<b>345</b>	mg/L	0.20	1	03/13/18 10:15	03/13/18 17:45	7440-70-2	
<b>2540C Total Dissolved Solids</b>								
Analytical Method: SM 2540C								
Total Dissolved Solids	<b>1760</b>	mg/L	5.0	1		03/14/18 12:15		
<b>4500H+ pH, Electrometric</b>								
Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	<b>7.0</b>	Std. Units	0.10	1		03/15/18 11:15		H6
<b>300.0 IC Anions 28 Days</b>								
Analytical Method: EPA 300.0								
Chloride	<b>42.5</b>	mg/L	5.0	5		03/16/18 23:41	16887-00-6	
Fluoride	<b>0.27</b>	mg/L	0.20	1		03/16/18 07:40	16984-48-8	
Sulfate	<b>1090</b>	mg/L	200	200		03/16/18 23:55	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60265653

<b>Sample: MW-6-030818</b>		<b>Lab ID: 60265653003</b>		Collected: 03/08/18 14:37	Received: 03/09/18 15:10	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Boron, Total Recoverable	<b>0.83</b>	mg/L	0.10	1	03/13/18 10:15	03/13/18 17:48	7440-42-8	
Calcium, Total Recoverable	<b>324</b>	mg/L	0.20	1	03/13/18 10:15	03/13/18 17:48	7440-70-2	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	<b>1750</b>	mg/L	5.0	1		03/14/18 12:15		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	<b>7.1</b>	Std. Units	0.10	1		03/15/18 11:18		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Chloride	<b>57.0</b>	mg/L	5.0	5		03/17/18 00:09	16887-00-6	
Fluoride	<b>0.34</b>	mg/L	0.20	1		03/16/18 08:08	16984-48-8	
Sulfate	<b>1180</b>	mg/L	200	200		03/17/18 00:23	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60265653

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-1-030818</b>								
<b>Lab ID: 60265653004</b>								
Collected: 03/08/18 15:46 Received: 03/09/18 15:10 Matrix: Water								
<b>200.7 Metals, Total</b> Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron, Total Recoverable	<b>0.37</b>	mg/L	0.10	1	03/13/18 10:15	03/13/18 17:50	7440-42-8	
Calcium, Total Recoverable	<b>185</b>	mg/L	0.20	1	03/13/18 10:15	03/13/18 17:50	7440-70-2	
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C								
Total Dissolved Solids	<b>976</b>	mg/L	5.0	1		03/14/18 12:16		
<b>4500H+ pH, Electrometric</b> Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	<b>7.0</b>	Std. Units	0.10	1		03/15/18 11:19		H6
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0								
Chloride	<b>34.8</b>	mg/L	5.0	5		03/17/18 00:36	16887-00-6	
Fluoride	<b>0.40</b>	mg/L	0.20	1		03/16/18 08:22	16984-48-8	
Sulfate	<b>453</b>	mg/L	50.0	50		03/17/18 00:50	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60265653

<b>Sample: DUP-030818</b>		<b>Lab ID: 60265653005</b>		Collected: 03/08/18 06:00	Received: 03/09/18 15:10	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Boron, Total Recoverable	<b>0.87</b>	mg/L	0.10	1	03/13/18 10:15	03/13/18 17:53	7440-42-8	
Calcium, Total Recoverable	<b>320</b>	mg/L	0.20	1	03/13/18 10:15	03/13/18 17:53	7440-70-2	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	<b>1640</b>	mg/L	5.0	1		03/14/18 12:16		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	<b>7.0</b>	Std. Units	0.10	1		03/15/18 11:07		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Chloride	<b>44.7</b>	mg/L	5.0	5		03/17/18 01:04	16887-00-6	
Fluoride	<b>0.27</b>	mg/L	0.20	1		03/16/18 08:36	16984-48-8	
Sulfate	<b>1080</b>	mg/L	100	100		03/17/18 01:18	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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**QUALITY CONTROL DATA**

Project: TEC LF CCR

Pace Project No.: 60265653

QC Batch: 517370 Analysis Method: EPA 200.7  
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total  
 Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

METHOD BLANK: 2117482 Matrix: Water  
 Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	mg/L	<0.10	0.10	03/13/18 17:10	
Calcium	mg/L	<0.20	0.20	03/13/18 17:10	

LABORATORY CONTROL SAMPLE: 2117483

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1	0.98	98	85-115	
Calcium	mg/L	10	9.9	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2117484 2117485

Parameter	Units	60265366001		MS		MSD		MS		MSD		% Rec		Max		Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD				
Boron	mg/L	319 ug/L	1	1	1.3	1.3	102	101	70-130	0	20					
Calcium	mg/L	84900 ug/L	10	10	95.7	95.0	108	101	70-130	1	20					

MATRIX SPIKE SAMPLE: 2117486

Parameter	Units	60265366003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	ND	1	1.0	100	70-130	
Calcium	mg/L	46800 ug/L	10	56.0	91	70-130	

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

**REPORT OF LABORATORY ANALYSIS**

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### QUALITY CONTROL DATA

Project: TEC LF CCR

Pace Project No.: 60265653

QC Batch: 517482

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

METHOD BLANK: 2117943

Matrix: Water

Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	03/14/18 12:08	

LABORATORY CONTROL SAMPLE: 2117944

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	966	97	80-120	

SAMPLE DUPLICATE: 2117945

Parameter	Units	60265641004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	493	476	4	10	

SAMPLE DUPLICATE: 2117946

Parameter	Units	60265552005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	998	1010	2	10	

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

### REPORT OF LABORATORY ANALYSIS

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**QUALITY CONTROL DATA**

Project: TEC LF CCR

Pace Project No.: 60265653

QC Batch: 517657 Analysis Method: SM 4500-H+B

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

Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

SAMPLE DUPLICATE: 2118756

Parameter	Units	60265364002 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 LF CCR

Pace Project No.: 60265653

QC Batch: 517729 Analysis Method: EPA 300.0  
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
 Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

METHOD BLANK: 2119018 Matrix: Water  
 Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	<0.20	0.20	03/15/18 22:38	

LABORATORY CONTROL SAMPLE: 2119019

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.5	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2119020 2119021

Parameter	Units	60265623001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	1.5	2.5	2.5	3.7	3.7	91	90	80-120	1	15	

MATRIX SPIKE SAMPLE: 2119022

Parameter	Units	60265653002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.27	2.5	2.9	106	80-120	

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

**REPORT OF LABORATORY ANALYSIS**

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### QUALITY CONTROL DATA

Project: TEC LF CCR

Pace Project No.: 60265653

QC Batch: 517966

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

METHOD BLANK: 2119906

Matrix: Water

Associated Lab Samples: 60265653001, 60265653002, 60265653003, 60265653004, 60265653005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	03/16/18 18:49	
Sulfate	mg/L	<1.0	1.0	03/16/18 18:49	

LABORATORY CONTROL SAMPLE: 2119907

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	95	90-110	
Sulfate	mg/L	5	5.1	103	90-110	

MATRIX SPIKE SAMPLE: 2119910

Parameter	Units	60265623008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	394	1000	1390	99	80-120	
Sulfate	mg/L	1750	1000	2870	112	80-120	

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### REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: TEC LF CCR

Pace Project No.: 60265653

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### DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: TEC LF CCR

Pace Project No.: 60265653

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60265653001	MW-4-030818	EPA 200.7	517370	EPA 200.7	517417
60265653002	MW-5-030818	EPA 200.7	517370	EPA 200.7	517417
60265653003	MW-6-030818	EPA 200.7	517370	EPA 200.7	517417
60265653004	MW-1-030818	EPA 200.7	517370	EPA 200.7	517417
60265653005	DUP-030818	EPA 200.7	517370	EPA 200.7	517417
60265653001	MW-4-030818	SM 2540C	517482		
60265653002	MW-5-030818	SM 2540C	517482		
60265653003	MW-6-030818	SM 2540C	517482		
60265653004	MW-1-030818	SM 2540C	517482		
60265653005	DUP-030818	SM 2540C	517482		
60265653001	MW-4-030818	SM 4500-H+B	517657		
60265653002	MW-5-030818	SM 4500-H+B	517657		
60265653003	MW-6-030818	SM 4500-H+B	517657		
60265653004	MW-1-030818	SM 4500-H+B	517657		
60265653005	DUP-030818	SM 4500-H+B	517657		
60265653001	MW-4-030818	EPA 300.0	517729		
60265653001	MW-4-030818	EPA 300.0	517966		
60265653002	MW-5-030818	EPA 300.0	517729		
60265653002	MW-5-030818	EPA 300.0	517966		
60265653003	MW-6-030818	EPA 300.0	517729		
60265653003	MW-6-030818	EPA 300.0	517966		
60265653004	MW-1-030818	EPA 300.0	517729		
60265653004	MW-1-030818	EPA 300.0	517966		
60265653005	DUP-030818	EPA 300.0	517729		
60265653005	DUP-030818	EPA 300.0	517966		

### REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60265653



Client Name: Wester

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-266 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 0.8/0.0 Corr. Factor +0.2 Corrected 1.0/0.2

AM  
3/9/18  
Date and initials of person examining contents:

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	<u>7 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>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<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. <u>MW-4 (2) BP3N 3/8 @ 1205</u> <u>MW-5 (2) BP3N 3/8 @ 1309</u> <u>MW-6 (2) BP3N 3/8 @ 1437</u> <u>MW-1 (2) BP3N 3/8 @ 1546</u>
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 checked="" type="checkbox"/> No <input 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:

**REVIEWED**  
By hwilson at 1:50 pm, 3/12/18

Date: \_\_\_\_\_

# CHAIN-OF-CUSTODY / Analytical Request Document

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



**Section A** Required Client Information: **Section B** Required Project Information: **Section C** Invoice Information:

Company: WESTAR ENERGY Report To: Brandon Griffin  
 Address: 818 Kansas Ave Copy To: Jared Morrison  
 Topeka, KS 66612  
 Email To: brandon.l.griffin@westarenergy.com Purchase Order No.:  
 Phone: 785-575-8135 Fax: Project Name: TEC LF CCR Jenalee Converse 913-563-1401  
 Requested Due Date/TAT: 7 day Project Number: Pace Project Manager: Pace Profile #: 9656

**REGULATORY AGENCY**  
 NPDES  GROUND WATER  DRINKING WATER  
 UST  RCRA  OTHER

Site Location: KS  
 STATE: KS

Page: 1 of 1

ITEM #	Valid Matrix Codes MATRIX CODE DW WT WW F SL CL WP AR CT TS	Required Client Information SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE	COLLECTED		DATE	TIME	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
			COMPOSITE START	COMPOSITE END/SPAS												
1		MW-4-030818	WTG		3/8/18	1205										
2		MW-5-030818	WTG		3/8/18	1309										
3		MW-6-030818	WTG		3/8/18	1437										
4		MW-1-030818	WTG		3/8/18	1546										
5																
6																
7																
8																
9																
10		DUP-030818	WTG		3/8/18	0600										
11																
12																
ADDITIONAL COMMENTS 200.7 Total Metals: B, Ca MTF / westar 3/9/18 1100 Allen PACE 3/9 1500 10 Y Y Y BPIV(2) BPIV(2)																
Section D Required Client Information MATRIX CODE DRINKING WATER WASTE WATER PRODUCT SOIL/SOLID OIL WIPE AIR OTHER TISSUE																
Section E Required Analysis Filtered (Y/N)																
Section F Preservatives H <sub>2</sub> SO <sub>4</sub> HNO <sub>3</sub> HCl NaOH Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> Methanol Other																
Section G # OF CONTAINERS Unpreserved H <sub>2</sub> SO <sub>4</sub> HNO <sub>3</sub> HCl NaOH Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> Methanol Other																
Section H Analysis Test 200.7 Total Metals* 300: Cl, F, SO <sub>4</sub> 2540C TDS 4500 H+B																
Section I Residual Chlorine (Y/N)																
Section J Pace Project No./ Lab I.D. BPIV (2) BPIV(2)																

**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: Brandon Griffin  
 SIGNATURE of SAMPLER: [Signature]  
 DATE Signed (MM/DD/YYYY): 03/08/18

**ATTACHMENT 1-2**

**June 2018 Sampling Event Laboratory Analytical Report**

June 28, 2018

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

RE: Project: TEC LF CCR  
Pace Project No.: 60272126

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on June 07, 2018. 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: 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 LF CCR

Pace Project No.: 60272126

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### **Kansas Certification IDs**

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Certification Number: 10090

WY STR Certification #: 2456.01

Arkansas Certification #: 17-016-0

Illinois Certification #: 200030

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070

Missouri Certification Number: 10090

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: TEC LF CCR

Pace Project No.: 60272126

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60272126001	MW-4-060718	Water	06/07/18 08:10	06/07/18 15:35
60272126002	MW-5-060718	Water	06/07/18 09:28	06/07/18 15:35
60272126003	MW-6-060718	Water	06/07/18 11:14	06/07/18 15:35
60272126004	MW-1-060718	Water	06/07/18 13:08	06/07/18 15:35
60272126005	DUP-060718	Water	06/07/18 06:00	06/07/18 15:35

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: TEC LF CCR

Pace Project No.: 60272126

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60272126001	MW-4-060718	EPA 200.7	AGO	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	CRN	1	PASI-K
		EPA 300.0	WNM	1	PASI-K
60272126002	MW-5-060718	EPA 200.7	AGO	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	CRN	1	PASI-K
		EPA 300.0	WNM	1	PASI-K
60272126003	MW-6-060718	EPA 200.7	AGO	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	CRN	1	PASI-K
		EPA 300.0	WNM	1	PASI-K
60272126004	MW-1-060718	EPA 200.7	AGO	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	CRN	1	PASI-K
		EPA 300.0	WNM	1	PASI-K
60272126005	DUP-060718	EPA 200.7	AGO	5	PASI-K
		EPA 200.8	JGP	7	PASI-K
		EPA 245.1	CRN	1	PASI-K
		EPA 300.0	WNM	1	PASI-K

### REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60272126

---

**Method:** EPA 200.7

**Description:** 200.7 Metals, Total

**Client:** WESTAR ENERGY

**Date:** June 28, 2018

**General Information:**

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

**Hold Time:**

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

**Sample Preparation:**

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

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

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

**Continuing Calibration:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60272126

---

**Method:** EPA 200.8

**Description:** 200.8 MET ICPMS

**Client:** WESTAR ENERGY

**Date:** June 28, 2018

**General Information:**

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

**Hold Time:**

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

**Sample Preparation:**

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

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

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

**Continuing Calibration:**

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

**Internal Standards:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

QC Batch: 529359

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60272216001,60272216002

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

- MS (Lab ID: 2168829)
  - Selenium
- MS (Lab ID: 2168831)
  - Selenium
- MSD (Lab ID: 2168830)
  - Selenium

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60272126

---

**Method:** EPA 245.1

**Description:** 245.1 Mercury

**Client:** WESTAR ENERGY

**Date:** June 28, 2018

**General Information:**

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

**Hold Time:**

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

**Sample Preparation:**

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

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

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

**Continuing Calibration:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60272126

---

**Method:** EPA 300.0

**Description:** 300.0 IC Anions 28 Days

**Client:** WESTAR ENERGY

**Date:** June 28, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

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

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60272126

<b>Sample: MW-4-060718</b>		<b>Lab ID: 60272126001</b>	Collected: 06/07/18 08:10	Received: 06/07/18 15:35	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.10</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 19:54	7440-39-3	
Beryllium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/12/18 19:54	7440-41-7	
Chromium, Total Recoverable	<b>&lt;0.0050</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 19:54	7440-47-3	
Lead, Total Recoverable	<b>&lt;0.010</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 19:54	7439-92-1	
Lithium	<b>&lt;0.010</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 19:54	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:32	7440-36-0	
Arsenic, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:32	7440-38-2	
Cadmium, Total Recoverable	<b>&lt;0.00050</b>	mg/L	0.00050	1	06/11/18 10:25	06/19/18 17:32	7440-43-9	
Cobalt, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:32	7440-48-4	
Molybdenum, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:32	7439-98-7	
Selenium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:32	7782-49-2	
Thallium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:32	7440-28-0	
<b>245.1 Mercury</b>		Analytical Method: EPA 245.1 Preparation Method: EPA 245.1						
Mercury	<b>&lt;0.00020</b>	mg/L	0.00020	1	06/14/18 10:50	06/14/18 15:02	7439-97-6	
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Fluoride	<b>0.25</b>	mg/L	0.20	1		06/12/18 11:22	16984-48-8	

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60272126

<b>Sample: MW-5-060718</b>		<b>Lab ID: 60272126002</b>	Collected: 06/07/18 09:28	Received: 06/07/18 15:35	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.024</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:03	7440-39-3	
Beryllium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:03	7440-41-7	
Chromium, Total Recoverable	<b>&lt;0.0050</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:03	7440-47-3	
Lead, Total Recoverable	<b>&lt;0.010</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:03	7439-92-1	
Lithium	<b>0.021</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:03	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:35	7440-36-0	
Arsenic, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:35	7440-38-2	
Cadmium, Total Recoverable	<b>&lt;0.00050</b>	mg/L	0.00050	1	06/11/18 10:25	06/19/18 17:35	7440-43-9	
Cobalt, Total Recoverable	<b>0.0017</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:35	7440-48-4	
Molybdenum, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:35	7439-98-7	
Selenium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:35	7782-49-2	
Thallium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:35	7440-28-0	
<b>245.1 Mercury</b>		Analytical Method: EPA 245.1 Preparation Method: EPA 245.1						
Mercury	<b>&lt;0.00020</b>	mg/L	0.00020	1	06/14/18 10:50	06/14/18 15:04	7439-97-6	
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Fluoride	<b>0.36</b>	mg/L	0.20	1		06/12/18 12:03	16984-48-8	

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60272126

Sample: MW-6-060718		Lab ID: 60272126003	Collected: 06/07/18 11:14	Received: 06/07/18 15:35	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.020</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:06	7440-39-3	
Beryllium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:06	7440-41-7	
Chromium, Total Recoverable	<b>&lt;0.0050</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:06	7440-47-3	
Lead, Total Recoverable	<b>&lt;0.010</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:06	7439-92-1	
Lithium	<b>0.022</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:06	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:37	7440-36-0	
Arsenic, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:37	7440-38-2	
Cadmium, Total Recoverable	<b>&lt;0.00050</b>	mg/L	0.00050	1	06/11/18 10:25	06/19/18 17:37	7440-43-9	
Cobalt, Total Recoverable	<b>0.0021</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:37	7440-48-4	
Molybdenum, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:37	7439-98-7	
Selenium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:37	7782-49-2	
Thallium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:37	7440-28-0	
<b>245.1 Mercury</b>		Analytical Method: EPA 245.1 Preparation Method: EPA 245.1						
Mercury	<b>&lt;0.00020</b>	mg/L	0.00020	1	06/14/18 10:50	06/14/18 15:06	7439-97-6	
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Fluoride	<b>0.39</b>	mg/L	0.20	1		06/12/18 12:58	16984-48-8	

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60272126

Sample: MW-1-060718		Lab ID: 60272126004	Collected: 06/07/18 13:08	Received: 06/07/18 15:35	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.087</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:16	7440-39-3	
Beryllium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:16	7440-41-7	
Chromium, Total Recoverable	<b>&lt;0.0050</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:16	7440-47-3	
Lead, Total Recoverable	<b>&lt;0.010</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:16	7439-92-1	
Lithium	<b>0.010</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:16	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:39	7440-36-0	
Arsenic, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:39	7440-38-2	
Cadmium, Total Recoverable	<b>&lt;0.00050</b>	mg/L	0.00050	1	06/11/18 10:25	06/19/18 17:39	7440-43-9	
Cobalt, Total Recoverable	<b>0.0019</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:39	7440-48-4	
Molybdenum, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:39	7439-98-7	
Selenium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:39	7782-49-2	
Thallium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:39	7440-28-0	
<b>245.1 Mercury</b>		Analytical Method: EPA 245.1 Preparation Method: EPA 245.1						
Mercury	<b>&lt;0.00020</b>	mg/L	0.00020	1	06/14/18 10:50	06/14/18 15:08	7439-97-6	
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Fluoride	<b>0.37</b>	mg/L	0.20	1		06/12/18 13:11	16984-48-8	

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60272126

<b>Sample: DUP-060718</b>		<b>Lab ID: 60272126005</b>	Collected: 06/07/18 06:00	Received: 06/07/18 15:35	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.019</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:19	7440-39-3	
Beryllium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:19	7440-41-7	
Chromium, Total Recoverable	<b>&lt;0.0050</b>	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:19	7440-47-3	
Lead, Total Recoverable	<b>&lt;0.010</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:19	7439-92-1	
Lithium	<b>0.022</b>	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:19	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:41	7440-36-0	
Arsenic, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:41	7440-38-2	
Cadmium, Total Recoverable	<b>&lt;0.00050</b>	mg/L	0.00050	1	06/11/18 10:25	06/19/18 17:41	7440-43-9	
Cobalt, Total Recoverable	<b>0.0020</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:41	7440-48-4	
Molybdenum, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:41	7439-98-7	
Selenium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:41	7782-49-2	
Thallium, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:41	7440-28-0	
<b>245.1 Mercury</b>		Analytical Method: EPA 245.1 Preparation Method: EPA 245.1						
Mercury	<b>&lt;0.00020</b>	mg/L	0.00020	1	06/14/18 10:50	06/14/18 15:11	7439-97-6	
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Fluoride	<b>0.41</b>	mg/L	0.20	1		06/12/18 13:25	16984-48-8	

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### QUALITY CONTROL DATA

Project: TEC LF CCR  
Pace Project No.: 60272126

QC Batch: 529996 Analysis Method: EPA 245.1  
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury  
Associated Lab Samples: 60272126001, 60272126002, 60272126003, 60272126004, 60272126005

METHOD BLANK: 2170883 Matrix: Water  
Associated Lab Samples: 60272126001, 60272126002, 60272126003, 60272126004, 60272126005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	<0.00020	0.00020	06/14/18 16:05	

LABORATORY CONTROL SAMPLE: 2170884

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.005	0.0050	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2170885 2170886

Parameter	Units	60272489001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	<0.20 ug/L	.005	.005	0.0044	0.0045	88	91	70-130	2	20	

MATRIX SPIKE SAMPLE: 2170887

Parameter	Units	60272453001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0041	83	70-130	

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### QUALITY CONTROL DATA

Project: TEC LF CCR  
Pace Project No.: 60272126

QC Batch: 529365 Analysis Method: EPA 200.7  
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total  
Associated Lab Samples: 60272126001, 60272126002, 60272126003, 60272126004, 60272126005

METHOD BLANK: 2168846 Matrix: Water  
Associated Lab Samples: 60272126001, 60272126002, 60272126003, 60272126004, 60272126005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	06/12/18 19:50	
Beryllium	mg/L	<0.0010	0.0010	06/12/18 19:50	
Chromium	mg/L	<0.0050	0.0050	06/12/18 19:50	
Lead	mg/L	<0.010	0.010	06/12/18 19:50	
Lithium	mg/L	<0.010	0.010	06/12/18 19:50	

LABORATORY CONTROL SAMPLE: 2168847

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	1	0.93	93	85-115	
Beryllium	mg/L	1	1.0	101	85-115	
Chromium	mg/L	1	0.94	94	85-115	
Lead	mg/L	1	0.99	99	85-115	
Lithium	mg/L	1	0.93	93	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2168848 2168849

Parameter	Units	60272126001		60272126002		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Spike Conc.	MSD Spike Conc.								
Barium	mg/L	0.10	1	1	1	1.0	1.0	93	92	70-130	0	20	
Beryllium	mg/L	<0.0010	1	1	1	1.0	1.0	101	101	70-130	0	20	
Chromium	mg/L	<0.0050	1	1	1	0.92	0.93	92	93	70-130	1	20	
Lead	mg/L	<0.010	1	1	1	0.95	0.95	95	95	70-130	0	20	
Lithium	mg/L	<0.010	1	1	1	0.96	0.96	95	95	70-130	1	20	

MATRIX SPIKE SAMPLE: 2168850

Parameter	Units	60272126002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	0.024	1	0.95	93	70-130	
Beryllium	mg/L	<0.0010	1	0.99	99	70-130	
Chromium	mg/L	<0.0050	1	0.93	93	70-130	
Lead	mg/L	<0.010	1	0.95	95	70-130	
Lithium	mg/L	0.021	1	0.97	95	70-130	

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### QUALITY CONTROL DATA

Project: TEC LF CCR  
Pace Project No.: 60272126

QC Batch: 529359 Analysis Method: EPA 200.8  
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET  
Associated Lab Samples: 60272126001, 60272126002, 60272126003, 60272126004, 60272126005

METHOD BLANK: 2168827 Matrix: Water  
Associated Lab Samples: 60272126001, 60272126002, 60272126003, 60272126004, 60272126005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/L	<0.0010	0.0010	06/19/18 17:28	
Arsenic	mg/L	<0.0010	0.0010	06/19/18 17:28	
Cadmium	mg/L	<0.00050	0.00050	06/19/18 17:28	
Cobalt	mg/L	<0.0010	0.0010	06/19/18 17:28	
Molybdenum	mg/L	<0.0010	0.0010	06/19/18 17:28	
Selenium	mg/L	<0.0010	0.0010	06/19/18 17:28	
Thallium	mg/L	<0.0010	0.0010	06/19/18 17:28	

LABORATORY CONTROL SAMPLE: 2168828

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	.04	0.041	102	85-115	
Arsenic	mg/L	.04	0.041	104	85-115	
Cadmium	mg/L	.04	0.040	100	85-115	
Cobalt	mg/L	.04	0.040	100	85-115	
Molybdenum	mg/L	.04	0.039	97	85-115	
Selenium	mg/L	.04	0.043	108	85-115	
Thallium	mg/L	.04	0.039	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2168829 2168830

Parameter	Units	60272216001		60272216002		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		MS Result	MSD Spike Conc.	MS Result	MSD Spike Conc.	MS % Rec	MSD % Rec						
Antimony	mg/L	3.0 ug/L	.04	.04	0.039	0.040	91	94	70-130	2	20		
Arsenic	mg/L	6.2 ug/L	.04	.04	0.047	0.048	102	104	70-130	1	20		
Cadmium	mg/L	1.1 ug/L	.04	.04	0.038	0.039	93	95	70-130	2	20		
Cobalt	mg/L	3.2 ug/L	.04	.04	0.041	0.042	95	97	70-130	2	20		
Molybdenum	mg/L	22.4 ug/L	.04	.04	0.063	0.062	100	100	70-130	0	20		
Selenium	mg/L	8.2 ug/L	.04	.04	0.032	0.035	59	66	70-130	9	20 M1		
Thallium	mg/L	ND	.04	.04	0.036	0.037	90	92	70-130	2	20		

MATRIX SPIKE SAMPLE: 2168831

Parameter	Units	60272216002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	mg/L	2.9 ug/L	.04	0.037	86	70-130	
Arsenic	mg/L	11.7 ug/L	.04	0.053	103	70-130	
Cadmium	mg/L	2.5 ug/L	.04	0.040	93	70-130	

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### QUALITY CONTROL DATA

Project: TEC LF CCR

Pace Project No.: 60272126

MATRIX SPIKE SAMPLE:		2168831					
Parameter	Units	60272216002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/L	6.3 ug/L	.04	0.045	96	70-130	
Molybdenum	mg/L	30.2 ug/L	.04	0.069	98	70-130	
Selenium	mg/L	20.9 ug/L	.04	0.046	62	70-130	M1
Thallium	mg/L	ND	.04	0.037	92	70-130	

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### QUALITY CONTROL DATA

Project: TEC LF CCR  
Pace Project No.: 60272126

QC Batch: 529337 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Associated Lab Samples: 60272126001, 60272126002, 60272126003, 60272126004, 60272126005

METHOD BLANK: 2168767 Matrix: Water  
Associated Lab Samples: 60272126001, 60272126002, 60272126003, 60272126004, 60272126005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	<0.20	0.20	06/12/18 10:54	

LABORATORY CONTROL SAMPLE: 2168768

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.5	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2168769 2168770

Parameter	Units	60272126001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.25	2.5	2.5	2.8	2.8	102	103	90-110	1	15	

MATRIX SPIKE SAMPLE: 2168771

Parameter	Units	60272126002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.36	2.5	2.9	101	90-110	

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

### REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: TEC LF CCR

Pace Project No.: 60272126

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### 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

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 LF CCR

Pace Project No.: 60272126

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60272126001	MW-4-060718	EPA 200.7	529365	EPA 200.7	529483
60272126002	MW-5-060718	EPA 200.7	529365	EPA 200.7	529483
60272126003	MW-6-060718	EPA 200.7	529365	EPA 200.7	529483
60272126004	MW-1-060718	EPA 200.7	529365	EPA 200.7	529483
60272126005	DUP-060718	EPA 200.7	529365	EPA 200.7	529483
60272126001	MW-4-060718	EPA 200.8	529359	EPA 200.8	529479
60272126002	MW-5-060718	EPA 200.8	529359	EPA 200.8	529479
60272126003	MW-6-060718	EPA 200.8	529359	EPA 200.8	529479
60272126004	MW-1-060718	EPA 200.8	529359	EPA 200.8	529479
60272126005	DUP-060718	EPA 200.8	529359	EPA 200.8	529479
60272126001	MW-4-060718	EPA 245.1	529996	EPA 245.1	530027
60272126002	MW-5-060718	EPA 245.1	529996	EPA 245.1	530027
60272126003	MW-6-060718	EPA 245.1	529996	EPA 245.1	530027
60272126004	MW-1-060718	EPA 245.1	529996	EPA 245.1	530027
60272126005	DUP-060718	EPA 245.1	529996	EPA 245.1	530027
60272126001	MW-4-060718	EPA 300.0	529337		
60272126002	MW-5-060718	EPA 300.0	529337		
60272126003	MW-6-060718	EPA 300.0	529337		
60272126004	MW-1-060718	EPA 300.0	529337		
60272126005	DUP-060718	EPA 300.0	529337		

### REPORT OF LABORATORY ANALYSIS

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**Sample Condition Upon Receipt**

**WO# : 60272126**  
  
**60272126**

Client Name: WPstar 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 0.8 Corr. Factor 7.1 Corrected 1.9

Date and initials of person examining contents:

Temperature should be above freezing to 6°C

Chain of Custody present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input 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 type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input 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 type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input 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 type="checkbox"/> N/A	

*HMW*

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

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

Project Manager Review:

**REVIEWED**  
By Nolie Wood at 10:35 am, 6/8/18

Date: \_\_\_\_\_



# CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

<b>Section A</b> Required Client Information:		<b>Section B</b> Required Project Information:		<b>Section C</b> Invoice Information:	
Company: WESTAR ENERGY	Report To: Brandon Griffin	Copy To: Jared Morrison, Heath Hornya	Attention: Jared Morrison	Company Name: WESTAR ENERGY	REGULATORY AGENCY
Address: 818 Kansas Ave		Topeka, KS 66612		Address: SEE SECTION A	<input checked="" type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER
Email To: brandon.l.griffin@westarenergy.com	Purchase Order No.: 10TEC-0000007599			Pace Quote Reference:	<input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER
Phone: (785) 575-8135 Fax:	Project Name: TEC LF CCR			Pace Project Manager: Heather Wilson, 913-563-1407	Site Location: KS
Requested Due Date/TAT: 7 DAY	Project Number:			Pace Profile #: 9656, 2	STATE: KS

ITEM #	Section D Required Client Information	Valid Matrix Codes	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Analysis Test ↑	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Temp in °C	Received on	Custody Sealed	Samples In tact
					COMPOSITE START	COMPOSITE END/GRAB										
1	MW-4-060718	DRINKING WATER	WT 6		6/7	0810		2	Unpreserved	200.7 Total Metals*						
2	MW-5-060718	WASTE WATER	WT 6		6/7	0928		2	H <sub>2</sub> SO <sub>4</sub>	200.8 Total Metals*						
3	MW-6-060718	WASTE WATER PRODUCT	WT 6		6/7	1114		2	HNO <sub>3</sub>	245.1 Total Mercury						
4	MW-1-060718	WASTE WATER PRODUCT	WT 6		6/7	1308		2	NaOH	300.0 Fluoride						
5		WASTE WATER PRODUCT							HCl							
6		WASTE WATER PRODUCT							Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>							
7		WASTE WATER PRODUCT							Methanol							
8		WASTE WATER PRODUCT							Other							
9	DUP-060718	OTHER	WT 6		6/7	0600		2		X X X X						
10		OTHER														
11		OTHER														
12		OTHER														

<b>ADDITIONAL COMMENTS</b>	<b>RELINQUISHED BY / AFFILIATION</b>	<b>DATE</b>	<b>TIME</b>	<b>ACCEPTED BY / AFFILIATION</b>	<b>DATE</b>	<b>TIME</b>	<b>SAMPLE CONDITIONS</b>
*200.7 Total Metals: Ba, Be, Cr, Pb, Li	gry/westar	1345	6/7/18	Brandon Griffin	6/7	1345	
**200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl				Brandon Griffin	6/7	1535	
<b>SAMPLER NAME AND SIGNATURE</b>				<b>DATE Signed (MM/DD/YYYY):</b>			
PRINT Name of SAMPLER: Brandon Griffin				06/07/18			
SIGNATURE of SAMPLER: <i>[Signature]</i>							

July 02, 2018

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

RE: Project: TEC LF CCR  
Pace Project No.: 60272383

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on June 08, 2018. 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: 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 LF CCR

Pace Project No.: 60272383

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### 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

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: TEC LF CCR

Pace Project No.: 60272383

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60272383001	MW-4-060718	Water	06/07/18 08:10	06/08/18 10:20
60272383002	MW-5-060718	Water	06/07/18 09:28	06/08/18 10:20
60272383003	MW-6-060718	Water	06/07/18 11:14	06/08/18 10:20
60272383004	MW-1-060718	Water	06/07/18 13:08	06/08/18 10:20
60272383005	DUP-060718	Water	06/07/18 16:00	06/08/18 10:20

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: TEC LF CCR

Pace Project No.: 60272383

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60272383001	MW-4-060718	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272383002	MW-5-060718	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272383003	MW-6-060718	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272383004	MW-1-060718	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272383005	DUP-060718	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

### REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60272383

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**Method:** EPA 903.1

**Description:** 903.1 Radium 226

**Client:** WESTAR ENERGY

**Date:** July 02, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60272383

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**Method:** EPA 904.0

**Description:** 904.0 Radium 228

**Client:** WESTAR ENERGY

**Date:** July 02, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60272383

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**Method:** Total Radium Calculation

**Description:** Total Radium 228+226

**Client:** WESTAR ENERGY

**Date:** July 02, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

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 LF CCR

Pace Project No.: 60272383

**Sample: MW-4-060718**      **Lab ID: 60272383001**      Collected: 06/07/18 08:10      Received: 06/08/18 10:20      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.579 ± 0.455 (0.632)</b> C:NA T:97%	pCi/L	06/28/18 11:56	13982-63-3	
Radium-228	EPA 904.0	<b>0.644 ± 0.406 (0.747)</b> C:76% T:79%	pCi/L	06/28/18 21:06	15262-20-1	
Total Radium	Total Radium Calculation	<b>1.22 ± 0.861 (1.38)</b>	pCi/L	07/02/18 10:53	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60272383

**Sample: MW-5-060718**      **Lab ID: 60272383002**      Collected: 06/07/18 09:28      Received: 06/08/18 10:20      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.379 ± 0.431 (0.680)</b> C:NA T:84%	pCi/L	06/28/18 11:56	13982-63-3	
Radium-228	EPA 904.0	<b>0.307 ± 0.391 (0.797)</b> C:73% T:76%	pCi/L	06/28/18 21:06	15262-20-1	
Total Radium	Total Radium Calculation	<b>0.686 ± 0.822 (1.48)</b>	pCi/L	07/02/18 10:53	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60272383

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**Sample: MW-6-060718**      **Lab ID: 60272383003**      Collected: 06/07/18 11:14      Received: 06/08/18 10:20      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.523 ± 0.448 (0.607)</b> C:NA T:86%	pCi/L	06/28/18 12:04	13982-63-3	
Radium-228	EPA 904.0	<b>0.733 ± 0.439 (0.805)</b> C:80% T:76%	pCi/L	06/28/18 21:10	15262-20-1	
Total Radium	Total Radium Calculation	<b>1.26 ± 0.887 (1.41)</b>	pCi/L	07/02/18 10:53	7440-14-4	

## REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60272383

**Sample: MW-1-060718**      **Lab ID: 60272383004**      Collected: 06/07/18 13:08      Received: 06/08/18 10:20      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.173 ± 0.407 (0.754)</b> C:NA T:96%	pCi/L	06/28/18 11:56	13982-63-3	
Radium-228	EPA 904.0	<b>0.538 ± 0.342 (0.631)</b> C:77% T:92%	pCi/L	06/28/18 21:10	15262-20-1	
Total Radium	Total Radium Calculation	<b>0.711 ± 0.749 (1.39)</b>	pCi/L	07/02/18 10:53	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60272383

**Sample: DUP-060718**      **Lab ID: 60272383005**      Collected: 06/07/18 16:00      Received: 06/08/18 10:20      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.354 ± 0.464 (0.773)</b> C:NA T:85%	pCi/L	06/28/18 11:56	13982-63-3	
Radium-228	EPA 904.0	<b>0.796 ± 0.455 (0.825)</b> C:76% T:77%	pCi/L	06/28/18 21:10	15262-20-1	
Total Radium	Total Radium Calculation	<b>1.15 ± 0.919 (1.60)</b>	pCi/L	07/02/18 10:53	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60272383

QC Batch: 302403

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60272383001, 60272383002, 60272383003, 60272383004, 60272383005

METHOD BLANK: 1479708

Matrix: Water

Associated Lab Samples: 60272383001, 60272383002, 60272383003, 60272383004, 60272383005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.000 ± 0.271 (0.552) C:NA T:87%	pCi/L	06/28/18 11:39	

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 - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60272383

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QC Batch:	302391	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	60272383001, 60272383002, 60272383003, 60272383004, 60272383005		

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METHOD BLANK:	1479694	Matrix:	Water
Associated Lab Samples:	60272383001, 60272383002, 60272383003, 60272383004, 60272383005		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.388 ± 0.396 (0.792) C:80% T:78%	pCi/L	06/28/18 21:06	

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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## QUALIFIERS

Project: TEC LF CCR

Pace Project No.: 60272383

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### 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 LF CCR

Pace Project No.: 60272383

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60272383001	MW-4-060718	EPA 903.1	302403		
60272383002	MW-5-060718	EPA 903.1	302403		
60272383003	MW-6-060718	EPA 903.1	302403		
60272383004	MW-1-060718	EPA 903.1	302403		
60272383005	DUP-060718	EPA 903.1	302403		
60272383001	MW-4-060718	EPA 904.0	302391		
60272383002	MW-5-060718	EPA 904.0	302391		
60272383003	MW-6-060718	EPA 904.0	302391		
60272383004	MW-1-060718	EPA 904.0	302391		
60272383005	DUP-060718	EPA 904.0	302391		
60272383001	MW-4-060718	Total Radium Calculation	304349		
60272383002	MW-5-060718	Total Radium Calculation	304349		
60272383003	MW-6-060718	Total Radium Calculation	304349		
60272383004	MW-1-060718	Total Radium Calculation	304349		
60272383005	DUP-060718	Total Radium Calculation	304349		

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# CHAIN-OF-CUSTODY / Analytical Request Document

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



<b>Section A</b> Required Client Information: Company: WESTAR ENERGY Address: 818 Kansas Ave Topeka, KS 66612 Email To: brandon.l.griffin@westarenergy.com Phone: (785) 575-8135 Fax Requested Due Date/TAT: 15 Day		<b>Section B</b> Required Project Information: Report To: Brandon Griffin Copy To: Jared Morrison, Heath Hornya Purchase Order No.: 10TEC-0000007599 Project Name: TEC LF OCR Project Number:		<b>Section C</b> Invoice Information: Attention: Jared Morrison Company Name: WESTAR ENERGY Address: SEE SECTION A Site Location: Heather Wilson, 913-563-1407 State: KS Regulatory Agency: NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/>	
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Page: 1 of 1

ITEM #	Section D Required Client Information	Valid Matrix Codes	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (O=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Race Project No / Lab ID.
					COMPOSITE START	COMPOSITE END/GRAB						
1	MW-4-060718	DRINKING WATER DW	WT 6	O	6/7	0810		2	Unpreserved	Y		
2	MW-5-060718	WASTE WATER WW	WT 6	O	6/7	0928		2	H <sub>2</sub> SO <sub>4</sub>	Y		
3	MW-6-060718	PRODUCT SOLID P	WT 6	O	6/7	1114		2	HNO <sub>3</sub>	Y		
4	MW-1-060718	WASTE WATER WW	WT 6	O	6/7	1308		2	HCl	Y		
5									NaOH			
6									H <sub>2</sub> O <sub>2</sub>			
7									Other			
8									Methanol			
9	DUP-060718		WT 6	O	6/7	0600		2				
10												
11												
12												

ADDITIONAL COMMENTS MW-4 / westar MW-5 / westar MW-6 / westar MW-1 / westar DUP-060718	RELINQUISHED BY / AFFILIATION Jared Morrison / Westar	DATE 6/7/18	TIME 1345	ACCEPTED BY / AFFILIATION Robert [Signature] / Pace	DATE 6-8-18	TIME 1020	SAMPLE CONDITIONS N 175 6-11-18	Temp in °C	Received on Ice (Y/N)	Custody Sealed (Y/N)	Samples Intact (Y/N)
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Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.06, 12-Oct-2007

Pittsburgh Lab Sample Condition Upon Receipt



Client Name: Westar Energy Project # \_\_\_\_\_

Courier:  Fed Ex  UPS  USPS  Client  Commercial  Pace Other \_\_\_\_\_

Tracking #: 4368 7275 7074

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:				pH paper Lot#	Date and Initials of person examining contents:
	Yes	No	N/A	<u>10024671</u>	<u>DS 6-11-18</u>
Chain of Custody Present:	/				
Chain of Custody Filled Out:	/				
Chain of Custody Relinquished:	/				
Sampler Name & Signature on COC:	/				
Sample Labels match COC: -Includes date/time/ID Matrix: <u>WT</u>	/				
Samples Arrived within Hold Time:	/				
Short Hold Time Analysis (<72hr remaining):		/			
Rush Turn Around Time Requested:		/			
Sufficient Volume:	/				
Correct Containers Used: -Pace Containers Used:	/				
Containers Intact:	/				
Orthophosphate field filtered			/		
Hex Cr Aqueous Compliance/NPDES sample field filtered			/		
Organic Samples checked for dechlorination:			/		
Filtered volume received for Dissolved tests			/		
All containers have been checked for preservation. All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenolics	/			<u>phcr</u>	
				Initial when completed: <u>DS</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			/		
Trip Blank Present:			/		
Trip Blank Custody Seals Present			/		
Rad Aqueous Samples Screened > 0.5 mrem/hr		/		Initial when completed: <u>DS</u>	Date: <u>6-11-18</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 1-3**

**September 2018 Sampling Event Laboratory Analytical Report**

September 17, 2018

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

RE: Project: TEC LF CCR  
Pace Project No.: 60279828

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on September 06, 2018. 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 LF CCR

Pace Project No.: 60279828

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### **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

Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407

Utah Certification #: KS00021

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070

Missouri Certification Number: 10090

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: TEC LF CCR

Pace Project No.: 60279828

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60279828001	MW-4-090518	Water	09/05/18 09:36	09/06/18 15:30
60279828002	MW-5-090518	Water	09/05/18 11:20	09/06/18 15:30
60279828003	MW-6-090518	Water	09/05/18 14:10	09/06/18 15:30
60279828004	MW-1-090518	Water	09/05/18 15:17	09/06/18 15:30
60279828005	DUP-090518	Water	09/05/18 06:00	09/06/18 15:30

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: TEC LF CCR

Pace Project No.: 60279828

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60279828001	MW-4-090518	EPA 200.7	TDS	4	PASI-K
		EPA 200.8	JGP	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60279828002	MW-5-090518	EPA 200.7	TDS	4	PASI-K
		EPA 200.8	JGP	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60279828003	MW-6-090518	EPA 200.7	TDS	4	PASI-K
		EPA 200.8	JGP	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60279828004	MW-1-090518	EPA 200.7	TDS	4	PASI-K
		EPA 200.8	JGP	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	OL	3	PASI-K
60279828005	DUP-090518	EPA 200.7	TDS	4	PASI-K
		EPA 200.8	JGP	1	PASI-K
		SM 2540C	JDA	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	OL	3	PASI-K

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60279828

Sample: MW-4-090518	Lab ID: 60279828001	Collected: 09/05/18 09:36	Received: 09/06/18 15:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.12</b>	mg/L	0.0050	1	09/07/18 14:15	09/10/18 20:26	7440-39-3	
Boron, Total Recoverable	<b>&lt;100</b>	ug/L	100	1	09/07/18 14:15	09/10/18 20:26	7440-42-8	
Calcium, Total Recoverable	<b>168000</b>	ug/L	200	1	09/07/18 14:15	09/10/18 20:26	7440-70-2	
Lithium	<b>&lt;0.010</b>	mg/L	0.010	1	09/07/18 14:15	09/10/18 20:26	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Cobalt, Total Recoverable	<b>&lt;0.0010</b>	mg/L	0.0010	1	09/07/18 15:45	09/14/18 15:09	7440-48-4	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	<b>1030</b>	mg/L	5.0	1		09/10/18 21:25		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	<b>7.0</b>	Std. Units	0.10	1		09/10/18 09:47		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Chloride	<b>269</b>	mg/L	20.0	20		09/09/18 18:10	16887-00-6	
Fluoride	<b>0.35</b>	mg/L	0.20	1		09/08/18 18:19	16984-48-8	
Sulfate	<b>159</b>	mg/L	20.0	20		09/09/18 18:10	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60279828

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-5-090518      Lab ID: 60279828002      Collected: 09/05/18 11:20      Received: 09/06/18 15:30      Matrix: Water</b>								
<b>200.7 Metals, Total</b> Analytical Method: EPA 200.7      Preparation Method: EPA 200.7								
Barium, Total Recoverable	<b>0.033</b>	mg/L	0.0050	1	09/07/18 14:15	09/10/18 20:28	7440-39-3	
Boron, Total Recoverable	<b>326</b>	ug/L	100	1	09/07/18 14:15	09/10/18 20:28	7440-42-8	
Calcium, Total Recoverable	<b>201000</b>	ug/L	200	1	09/07/18 14:15	09/10/18 20:28	7440-70-2	
Lithium	<b>0.014</b>	mg/L	0.010	1	09/07/18 14:15	09/10/18 20:28	7439-93-2	
<b>200.8 MET ICPMS</b> Analytical Method: EPA 200.8      Preparation Method: EPA 200.8								
Cobalt, Total Recoverable	<b>0.0013</b>	mg/L	0.0010	1	09/07/18 15:45	09/14/18 15:11	7440-48-4	
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C								
Total Dissolved Solids	<b>1210</b>	mg/L	5.0	1		09/10/18 21:25		
<b>4500H+ pH, Electrometric</b> Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	<b>6.8</b>	Std. Units	0.10	1		09/10/18 09:51		H6
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0								
Chloride	<b>52.7</b>	mg/L	5.0	5		09/09/18 18:24	16887-00-6	
Fluoride	<b>0.35</b>	mg/L	0.20	1		09/08/18 18:33	16984-48-8	
Sulfate	<b>516</b>	mg/L	50.0	50		09/09/18 18:38	14808-79-8	

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60279828

<b>Sample: MW-6-090518</b>		<b>Lab ID: 60279828003</b>	Collected: 09/05/18 14:10	Received: 09/06/18 15:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.019</b>	mg/L	0.0050	1	09/07/18 14:15	09/10/18 20:30	7440-39-3	
Boron, Total Recoverable	<b>840</b>	ug/L	100	1	09/07/18 14:15	09/10/18 20:30	7440-42-8	
Calcium, Total Recoverable	<b>312000</b>	ug/L	200	1	09/07/18 14:15	09/10/18 20:30	7440-70-2	
Lithium	<b>&lt;0.010</b>	mg/L	0.010	1	09/07/18 14:15	09/10/18 20:30	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Cobalt, Total Recoverable	<b>0.0017</b>	mg/L	0.0010	1	09/07/18 15:45	09/14/18 15:13	7440-48-4	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	<b>1680</b>	mg/L	5.0	1		09/10/18 21:25		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	<b>7.0</b>	Std. Units	0.10	1		09/10/18 14:15		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Chloride	<b>61.6</b>	mg/L	5.0	5		09/09/18 18:52	16887-00-6	
Fluoride	<b>0.41</b>	mg/L	0.20	1		09/08/18 18:48	16984-48-8	
Sulfate	<b>1000</b>	mg/L	100	100		09/09/18 19:06	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60279828

<b>Sample: MW-1-090518</b>		<b>Lab ID: 60279828004</b>		Collected: 09/05/18 15:17	Received: 09/06/18 15:30	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.079</b>	mg/L	0.0050	1	09/07/18 14:15	09/10/18 20:33	7440-39-3	
Boron, Total Recoverable	<b>126</b>	ug/L	100	1	09/07/18 14:15	09/10/18 20:33	7440-42-8	
Calcium, Total Recoverable	<b>151000</b>	ug/L	200	1	09/07/18 14:15	09/10/18 20:33	7440-70-2	
Lithium	<b>&lt;0.010</b>	mg/L	0.010	1	09/07/18 14:15	09/10/18 20:33	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Cobalt, Total Recoverable	<b>0.0028</b>	mg/L	0.0010	1	09/07/18 15:45	09/14/18 15:16	7440-48-4	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	<b>912</b>	mg/L	5.0	1		09/10/18 21:25		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	<b>6.9</b>	Std. Units	0.10	1		09/10/18 14:17		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Chloride	<b>50.0</b>	mg/L	5.0	5		09/09/18 19:20	16887-00-6	
Fluoride	<b>0.39</b>	mg/L	0.20	1		09/08/18 19:02	16984-48-8	
Sulfate	<b>355</b>	mg/L	50.0	50		09/09/18 19:34	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: TEC LF CCR

Pace Project No.: 60279828

<b>Sample: DUP-090518</b>		<b>Lab ID: 60279828005</b>	Collected: 09/05/18 06:00	Received: 09/06/18 15:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7						
Barium, Total Recoverable	<b>0.079</b>	mg/L	0.0050	1	09/07/18 14:15	09/10/18 20:35	7440-39-3	
Boron, Total Recoverable	<b>123</b>	ug/L	100	1	09/07/18 14:15	09/10/18 20:35	7440-42-8	
Calcium, Total Recoverable	<b>149000</b>	ug/L	200	1	09/07/18 14:15	09/10/18 20:35	7440-70-2	
Lithium	<b>&lt;0.010</b>	mg/L	0.010	1	09/07/18 14:15	09/10/18 20:35	7439-93-2	
<b>200.8 MET ICPMS</b>		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Cobalt, Total Recoverable	<b>0.0029</b>	mg/L	0.0010	1	09/07/18 15:45	09/14/18 15:18	7440-48-4	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	<b>888</b>	mg/L	5.0	1		09/12/18 14:37		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	<b>7.0</b>	Std. Units	0.10	1		09/10/18 09:41		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Chloride	<b>47.2</b>	mg/L	5.0	5		09/09/18 19:48	16887-00-6	
Fluoride	<b>0.39</b>	mg/L	0.20	1		09/08/18 19:16	16984-48-8	
Sulfate	<b>374</b>	mg/L	50.0	50		09/09/18 20:02	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: TEC LF CCR  
Pace Project No.: 60279828

QC Batch: 543435 Analysis Method: EPA 200.7  
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total  
Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004, 60279828005

METHOD BLANK: 2226779 Matrix: Water  
Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004, 60279828005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	09/10/18 20:15	
Boron	ug/L	<100	100	09/10/18 20:15	
Calcium	ug/L	<200	200	09/10/18 20:15	
Lithium	mg/L	<0.010	0.010	09/10/18 20:15	

LABORATORY CONTROL SAMPLE: 2226780

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	1	0.98	98	85-115	
Boron	ug/L	1000	955	95	85-115	
Calcium	ug/L	10000	9530	95	85-115	
Lithium	mg/L	1	0.98	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2226782 2226783

Parameter	Units	60279796001		60279701002		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	Result	Result	% Rec	% Rec					
Barium	mg/L	92.0 ug/L	1	1	1.1	1.1	96	96	70-130	0	20		
Boron	ug/L	105	1000	1000	1070	1060	96	95	70-130	1	20		
Calcium	ug/L	32600	10000	10000	42000	41600	94	90	70-130	1	20		
Lithium	mg/L	15.7 ug/L	1	1	1.0	1.0	98	98	70-130	0	20		

MATRIX SPIKE SAMPLE: 2226784

Parameter	Units	60279701002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	62.4 ug/L	1	1.0	96	70-130	
Boron	ug/L	ND	1000	1020	96	70-130	
Calcium	ug/L	25700	10000	34500	87	70-130	
Lithium	mg/L	ND	1	0.98	98	70-130	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: TEC LF CCR

Pace Project No.: 60279828

QC Batch: 543497 Analysis Method: EPA 200.8  
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET  
 Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004, 60279828005

METHOD BLANK: 2227167 Matrix: Water  
 Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004, 60279828005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cobalt	mg/L	<0.0010	0.0010	09/14/18 15:04	

LABORATORY CONTROL SAMPLE: 2227169

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/L	.04	0.036	91	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2227170 2227171

Parameter	Units	60279690002		2227170		2227171		% Rec Limits	RPD	Max RPD	Qual	
		MS Result	MSD Spike Conc.	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result					MS % Rec
Cobalt	mg/L	ND	.04	.04	.04	0.036	0.037	89	91	70-130	3	20

MATRIX SPIKE SAMPLE: 2227172

Parameter	Units	60279866001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/L	ND	.04	0.037	90	70-130	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: TEC LF CCR

Pace Project No.: 60279828

QC Batch: 543785

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004

METHOD BLANK: 2228384

Matrix: Water

Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	09/10/18 21:24	

LABORATORY CONTROL SAMPLE: 2228385

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	988	99	80-120	

SAMPLE DUPLICATE: 2228386

Parameter	Units	60279537001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	332	328	1	10	

SAMPLE DUPLICATE: 2228387

Parameter	Units	60279670006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	27900	31200	11	10 D6	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: TEC LF CCR

Pace Project No.: 60279828

QC Batch: 544091

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60279828005

METHOD BLANK: 2229368

Matrix: Water

Associated Lab Samples: 60279828005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	09/12/18 14:37	

LABORATORY CONTROL SAMPLE: 2229369

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

SAMPLE DUPLICATE: 2229370

Parameter	Units	60279828005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	888	895	1	10	

SAMPLE DUPLICATE: 2229371

Parameter	Units	60279996001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	8780	8580	2	10	

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**QUALITY CONTROL DATA**

Project: TEC LF CCR

Pace Project No.: 60279828

QC Batch: 543605 Analysis Method: SM 4500-H+B

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

Associated Lab Samples: 60279828001, 60279828002, 60279828005

SAMPLE DUPLICATE: 2227860

Parameter	Units	60279670006 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.1	7.2	1	5	H6

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**REPORT OF LABORATORY ANALYSIS**

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**QUALITY CONTROL DATA**

Project: TEC LF CCR

Pace Project No.: 60279828

QC Batch: 543745 Analysis Method: SM 4500-H+B

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

Associated Lab Samples: 60279828003, 60279828004

SAMPLE DUPLICATE: 2228249

Parameter	Units	60279697001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.0	7.0	0	5	H6

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**REPORT OF LABORATORY ANALYSIS**

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### QUALITY CONTROL DATA

Project: TEC LF CCR

Pace Project No.: 60279828

QC Batch: 543545

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004, 60279828005

METHOD BLANK: 2227489

Matrix: Water

Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004, 60279828005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	<0.20	0.20	09/08/18 14:21	

LABORATORY CONTROL SAMPLE: 2227490

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.7	108	90-110	

MATRIX SPIKE SAMPLE: 2227493

Parameter	Units	60279670002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	0.31	2.5	3.0	106	90-110	

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### QUALITY CONTROL DATA

Project: TEC LF CCR  
Pace Project No.: 60279828

QC Batch: 543592 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004, 60279828005

METHOD BLANK: 2227829 Matrix: Water  
Associated Lab Samples: 60279828001, 60279828002, 60279828003, 60279828004, 60279828005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/09/18 09:24	
Sulfate	mg/L	<1.0	1.0	09/09/18 09:24	

LABORATORY CONTROL SAMPLE: 2227830

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	97	90-110	
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2227831 2227832

Parameter	Units	60279698001		2227831		2227832		% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec				
Chloride	mg/L	80.0	25	25	95.5	95.3	62	61	90-110	0	15 M1
Sulfate	mg/L	19.6	25	25	44.3	44.0	99	97	90-110	1	15

MATRIX SPIKE SAMPLE: 2227833

Parameter	Units	60279809001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	116	100	214	98	90-110	
Sulfate	mg/L	173	100	270	97	90-110	

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## QUALIFIERS

Project: TEC LF CCR

Pace Project No.: 60279828

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### 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 LF CCR

Pace Project No.: 60279828

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60279828001	MW-4-090518	EPA 200.7	543435	EPA 200.7	543653
60279828002	MW-5-090518	EPA 200.7	543435	EPA 200.7	543653
60279828003	MW-6-090518	EPA 200.7	543435	EPA 200.7	543653
60279828004	MW-1-090518	EPA 200.7	543435	EPA 200.7	543653
60279828005	DUP-090518	EPA 200.7	543435	EPA 200.7	543653
60279828001	MW-4-090518	EPA 200.8	543497	EPA 200.8	543507
60279828002	MW-5-090518	EPA 200.8	543497	EPA 200.8	543507
60279828003	MW-6-090518	EPA 200.8	543497	EPA 200.8	543507
60279828004	MW-1-090518	EPA 200.8	543497	EPA 200.8	543507
60279828005	DUP-090518	EPA 200.8	543497	EPA 200.8	543507
60279828001	MW-4-090518	SM 2540C	543785		
60279828002	MW-5-090518	SM 2540C	543785		
60279828003	MW-6-090518	SM 2540C	543785		
60279828004	MW-1-090518	SM 2540C	543785		
60279828005	DUP-090518	SM 2540C	544091		
60279828001	MW-4-090518	SM 4500-H+B	543605		
60279828002	MW-5-090518	SM 4500-H+B	543605		
60279828003	MW-6-090518	SM 4500-H+B	543745		
60279828004	MW-1-090518	SM 4500-H+B	543745		
60279828005	DUP-090518	SM 4500-H+B	543605		
60279828001	MW-4-090518	EPA 300.0	543545		
60279828001	MW-4-090518	EPA 300.0	543592		
60279828002	MW-5-090518	EPA 300.0	543545		
60279828002	MW-5-090518	EPA 300.0	543592		
60279828003	MW-6-090518	EPA 300.0	543545		
60279828003	MW-6-090518	EPA 300.0	543592		
60279828004	MW-1-090518	EPA 300.0	543545		
60279828004	MW-1-090518	EPA 300.0	543592		
60279828005	DUP-090518	EPA 300.0	543545		
60279828005	DUP-090518	EPA 300.0	543592		

### REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60279828



Client Name:

Westar Energy

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 [ ] Foam [ ] None [x] Other [ ]

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

Cooler Temperature (°C): As-read 2-8 Corr. Factor 0.0 Corrected 2-8

Date and initials of person examining contents:

2/9/18

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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	PH
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: WT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<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:

REVIEWED  
By hwilson at 9:54 am, 9/7/18

Date: \_\_\_\_\_



# CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

**Section A**  
Required Client Information:  
Company: WESTAR ENERGY

Address: 818 Kansas Ave  
Topeka, KS 66612  
Email To: brandon.l.griffin@westarenergy.com  
Phone: (785) 575-8135 Fax:  
Requested Due Date/TAT: 7 DAY

**Section B**  
Required Project Information:  
Report To: Brandon Griffin

Copy To: Jared Morrison, Bob Beck  
Purchase Order No.: 10TEC-0000007599  
Project Name: **TEC LF CCR**  
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, 2

**REGULATORY AGENCY**  
 NPDES  GROUND WATER  DRINKING WATER  
 UST  RCRA  OTHER

Site Location  
STATE: KS

ITEM #	Section D Required Client Information	Valid Matrix Codes	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Analysis Test	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.										
					COMPOSITE START	COMPOSITE END/GRAB								DATE	TIME	Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	NaOH	Na <sub>2</sub> SO <sub>3</sub>	Methanol	Other
1		DRINKING WATER	DW	WT	09/05/18	0936	2	1		X		X	8PIN BPS BPIN 001										
2		WASTE WATER	WW	WT	09/05/18	1120	2	1		X		X	Purple 001										
3		WASTE WATER PRODUCT	WP	WT	09/05/18	1410	2	1		X		X	005										
4		WASTE WATER PRODUCT	WP	WT	09/05/18	1517	2	1		X		X	004										
5		WASTE WATER PRODUCT	WP	WT	09/05/18	0600	2	1		X		X	005										
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS	Temp In °C	Received on Ice (Y/N)	Custody Sealed (Y/N)	Samples Intact (Y/N)
**200.7 Total Metals: B, Ca, Ba, Li	<i>Brandon Griffin</i>	9/6/18	0930	<i>Brandon Griffin</i>	9/6/18	1530	Y Y Y Y	2-8			
** 200.8 Total Metals: Co											
<b>SAMPLER NAME AND SIGNATURE</b> PRINT Name of SAMPLER: <i>Brandon Griffin</i> SIGNATURE of SAMPLER: <i>Brandon Griffin</i> DATE Signed (MM/DD/YY): 09/05/18											

\*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.

September 26, 2018

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

RE: Project: TEC LF CCR  
Pace Project No.: 60280649

Dear Brandon Griffin:

Enclosed are the analytical results for sample(s) received by the laboratory on September 13, 2018. 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 LF CCR

Pace Project No.: 60280649

---

### 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

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: TEC LF CCR

Pace Project No.: 60280649

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60280649001	MW-4-090518	Water	09/05/18 09:36	09/13/18 10:00
60280649002	MW-5-090518	Water	09/05/18 11:20	09/13/18 10:00
60280649003	MW-6-090518	Water	09/05/18 14:10	09/13/18 10:00
60280649004	MW-1-090518	Water	09/05/18 15:17	09/13/18 10:00
60280649005	DUP-090518	Water	09/05/18 06:00	09/13/18 10:00

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: TEC LF CCR

Pace Project No.: 60280649

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60280649001	MW-4-090518	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60280649002	MW-5-090518	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60280649003	MW-6-090518	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60280649004	MW-1-090518	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60280649005	DUP-090518	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 LF CCR

Pace Project No.: 60280649

---

**Method:** EPA 903.1

**Description:** 903.1 Radium 226

**Client:** WESTAR ENERGY

**Date:** September 26, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60280649

---

**Method:** EPA 904.0

**Description:** 904.0 Radium 228

**Client:** WESTAR ENERGY

**Date:** September 26, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: TEC LF CCR

Pace Project No.: 60280649

---

**Method:** Total Radium Calculation

**Description:** Total Radium 228+226

**Client:** WESTAR ENERGY

**Date:** September 26, 2018

**General Information:**

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

**Hold Time:**

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

**Method Blank:**

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

**Laboratory Control Spike:**

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

**Matrix Spikes:**

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

**Additional Comments:**

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 LF CCR

Pace Project No.: 60280649

**Sample: MW-4-090518**      **Lab ID: 60280649001**      Collected: 09/05/18 09:36      Received: 09/13/18 10:00      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.224 ± 0.590 (1.05)</b> <b>C:NA T:84%</b>	pCi/L	09/25/18 11:38	13982-63-3	
Radium-228	EPA 904.0	<b>2.38 ± 0.716 (0.979)</b> <b>C:86% T:79%</b>	pCi/L	09/24/18 11:29	15262-20-1	
Total Radium	Total Radium Calculation	<b>2.60 ± 1.31 (2.03)</b>	pCi/L	09/26/18 09:42	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60280649

**Sample: MW-5-090518**      **Lab ID: 60280649002**      Collected: 09/05/18 11:20      Received: 09/13/18 10:00      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.471 ± 0.648 (1.05)</b> <b>C:NA T:88%</b>	pCi/L	09/25/18 11:56	13982-63-3	
Radium-228	EPA 904.0	<b>0.0586 ± 0.482 (1.10)</b> <b>C:69% T:78%</b>	pCi/L	09/24/18 11:29	15262-20-1	
Total Radium	Total Radium Calculation	<b>0.530 ± 1.13 (2.15)</b>	pCi/L	09/26/18 09:42	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60280649

**Sample: MW-6-090518**      **Lab ID: 60280649003**      Collected: 09/05/18 14:10      Received: 09/13/18 10:00      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.112 ± 0.359 (0.693)</b> C:NA T:90%	pCi/L	09/25/18 11:56	13982-63-3	
Radium-228	EPA 904.0	<b>1.84 ± 0.787 (1.35)</b> C:71% T:69%	pCi/L	09/24/18 11:29	15262-20-1	
Total Radium	Total Radium Calculation	<b>1.95 ± 1.15 (2.04)</b>	pCi/L	09/26/18 09:42	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60280649

**Sample: MW-1-090518**      **Lab ID: 60280649004**      Collected: 09/05/18 15:17      Received: 09/13/18 10:00      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.140 ± 0.373 (0.607)</b> C:NA T:81%	pCi/L	09/25/18 11:56	13982-63-3	
Radium-228	EPA 904.0	<b>0.715 ± 0.589 (1.20)</b> C:72% T:81%	pCi/L	09/24/18 11:29	15262-20-1	
Total Radium	Total Radium Calculation	<b>0.855 ± 0.962 (1.81)</b>	pCi/L	09/26/18 09:42	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60280649

**Sample: DUP-090518**      **Lab ID: 60280649005**      Collected: 09/05/18 06:00      Received: 09/13/18 10:00      Matrix: Water  
PWS:      Site ID:      Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	<b>0.303 ± 0.545 (0.931)</b> C:NA T:88%	pCi/L	09/25/18 11:56	13982-63-3	
Radium-228	EPA 904.0	<b>-0.300 ± 0.502 (1.20)</b> C:68% T:78%	pCi/L	09/24/18 11:29	15262-20-1	
Total Radium	Total Radium Calculation	<b>0.303 ± 1.05 (2.13)</b>	pCi/L	09/26/18 09:42	7440-14-4	

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60280649

QC Batch: 313604

Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description: 904.0 Radium 228

Associated Lab Samples: 60280649001, 60280649002, 60280649003, 60280649004, 60280649005

METHOD BLANK: 1531016

Matrix: Water

Associated Lab Samples: 60280649001, 60280649002, 60280649003, 60280649004, 60280649005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.329 ± 0.432 (0.922) C:73% T:77%	pCi/L	09/24/18 11:19	

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

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL - RADIOCHEMISTRY

Project: TEC LF CCR

Pace Project No.: 60280649

QC Batch: 313598

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 60280649001, 60280649002, 60280649003, 60280649004, 60280649005

METHOD BLANK: 1530996

Matrix: Water

Associated Lab Samples: 60280649001, 60280649002, 60280649003, 60280649004, 60280649005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.182 ± 0.478 (0.874) C:NA T:84%	pCi/L	09/25/18 11:38	

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 LF CCR

Pace Project No.: 60280649

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### 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 LF CCR

Pace Project No.: 60280649

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60280649001	MW-4-090518	EPA 903.1	313598		
60280649002	MW-5-090518	EPA 903.1	313598		
60280649003	MW-6-090518	EPA 903.1	313598		
60280649004	MW-1-090518	EPA 903.1	313598		
60280649005	DUP-090518	EPA 903.1	313598		
60280649001	MW-4-090518	EPA 904.0	313604		
60280649002	MW-5-090518	EPA 904.0	313604		
60280649003	MW-6-090518	EPA 904.0	313604		
60280649004	MW-1-090518	EPA 904.0	313604		
60280649005	DUP-090518	EPA 904.0	313604		
60280649001	MW-4-090518	Total Radium Calculation	314418		
60280649002	MW-5-090518	Total Radium Calculation	314418		
60280649003	MW-6-090518	Total Radium Calculation	314418		
60280649004	MW-1-090518	Total Radium Calculation	314418		
60280649005	DUP-090518	Total Radium Calculation	314418		

### REPORT OF LABORATORY ANALYSIS

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Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name: PACEKS

Project # 60280649

Courier:  Fed Ex  UPS  USPS  Client  Commercial  Pace Other \_\_\_\_\_

Tracking #: 454227808040

Label _____
LIMS Login _____

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 5.2 °C Correction Factor: 0 °C Final Temp: 5.2 °C

Temp should be above freezing to 6°C

Comments:	pH paper Lot#			Date and Initials of person examining contents: <u>MDS 9-13-18</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>WA</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>MDS</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 Aqueous Samples Screened > 0.5 mrem/hr		/		Initial when completed: Date:

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.

# CHAIN-OF-CUSTODY / Analytical Request Document

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



Page: 1 of 1

<b>Section A</b> Required Client Information: Company: <b>WESTAR ENERGY</b> Address: <b>818 Kansas Ave</b> City: <b>Topeka, KS 66612</b> Email To: <b>brandon.l.griffin@westarenergy.com</b> Phone: <b>(785) 575-8135</b> Fax: Requested Due Date/TAT: <b>15 Day</b>	<b>Section B</b> Required Project Information: Report To: <b>Brandon Griffin</b> Copy To: <b>Jared Morrison, Heath Horny</b> Purchase Order No.: <b>10TEC-0000007599</b> Project Name: <b>TECLFCCR</b> Project Number: 
<b>Section C</b> Invoice Information: Attention: <b>Jared Morrison</b> Company Name: <b>WESTAR ENERGY</b> Address: <b>SEE SECTION A</b> Pace Quote Reference: Pace Project Manager: <b>Heather Wilson, 913-563-1407</b> Pace Profile #: <b>9656, 2</b> 	
<b>REGULATORY AGENCY</b> <input checked="" type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER Site Location: <b>KS</b> STATE: <b>KS</b>	

ITEM #	Section D Required Client Information			Section E Sample ID			Section F Valid Matrix Codes			Section G COLLECTED		Section H SAMPLE TEMP AT COLLECTION		Section I Requested Analysis Filtered (Y/N)				Section J Pace Project No./ Lab I.D.							
	Matrix Code			Sample ID			Matrix Code			COMPOSITE START		COMPOSITE END/GROSS		SAMPLE TYPE (G=GRAB C=COMP)		Requested Analysis Filtered (Y/N)				Pace Project No./ Lab I.D.					
	MATRIX	DRINKING WATER	WASTE WATER	PRODUCT	SOILSOLID	OIL	WIPE	AIR	OTHER	TISSUE	DATE	TIME	DATE	TIME	MATRIX CODE	SAMPLE TYPE	MATRIX CODE	DATE	TIME	DATE	TIME	Temp In °C	Received on	Cooler (Y/N)	Samples Intact (Y/N)
1	MW-4-090518									9/5	0936			WTG	G	WTG						5.2			
2	MW-5-090518									9/5	1120			WTG	G	WTG									
3	MW-6-090518									9/5	1410			WTG	G	WTG									
4	MW-1-090518									9/5	1517			WTG	G	WTG									
5																									
6																									
7																									
8																									
9																									
10																									
11	DUP-090518									9/5	0600			WTG	G	WTG									
12																									
<b>ADDITIONAL COMMENTS</b> 9/21/18 0900 MW Suda 9/21/18 0900 MW Suda 9/21/18 0900 MW Suda 9/21/18 0900 MW Suda 9/21/18 0900 MW Suda																									
<b>RELINQUISHED BY / AFFILIATION</b>															<b>ACCEPTED BY / AFFILIATION</b>					<b>SAMPLE CONDITIONS</b>					
<i>Branden Griffin</i>															<i>Branden Griffin</i>					9/10/18 1000 Y Y Y					
<b>SAMPLER NAME AND SIGNATURE</b>															<b>DATE SIGNED (M/M/DD/YYYY)</b>										
<i>Branden Griffin</i>															<i>Branden Griffin</i>					09/05/18					



# Chain of Custody



Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: KS  
 Cert. Needed:  Yes  No

Workorder: 60280649    Workorder Name: TEC LF CCR    Results Requested By: 10/4/2018

Report To: Subcontract To: Requested Analysis

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

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

WO#: 30265268

Radium 226 & Total Radium  
 Radium 228

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers		LAB USE ONLY
						Other		
1	MW-4-090518	PS	9/5/2018 09:36	60280649001	Water	2		
2	MW-5-090518	PS	9/5/2018 11:20	60280649002	Water	2		
3	MW-6-090518	PS	9/5/2018 14:10	60280649003	Water	2		
4	MW-1-090518	PS	9/5/2018 15:17	60280649004	Water	2		
5	DUP-090518	PS	9/5/2018 06:00	60280649005	Water	1		

Transfers	Released By	Date/Time	Received By	Date/Time	Received on Ice	Y or N	Samples Intact	Y or N
1			<i>[Signature]</i>	9/13/18 1000		Y	Y	
2						N	N	
3						N	N	

Cooler Temperature on Receipt 5.1 °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.

Comments



# CHAIN-OF-CUSTODY / Analytical Request Document

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

Page:      of     

<b>Section A</b> Required Client Information: Company: WESTAR ENERGY Address: 818 Kansas Ave Topeka, KS 66612 Email To: brandon.l.griffin@westarenergy.com Phone: (785) 575-8135   Fax: Requested Due Date/TAT: 15 Day	<b>Section B</b> Required Project Information: Report To: Brandon Griffin Copy To: Jared Morrison, Heath Horny Purchase Order No.: 10TEC-0000007599 Project Name: TEC LF CCR Project Number:	<b>Section C</b> 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, 2	<b>REGULATORY AGENCY</b> <input checked="" type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER Site Location: KS STATE: KS
---	--	--	--

ITEM #	Section D Required Client Information		Valid Matrix Codes		COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	# OF CONTAINERS		Preservatives		Y/N	Requested Analysis Filtered (Y/N)		Pace Project No./ Lab I.D.			
	SAMPLE ID (A-Z, 0-9 / - / .)	DRINKING WATER WATER WASTE WATER PRODUCT SOIL/SOLID OIL WIFE AIR OTHER TISSUE	DATE	TIME	DATE	TIME			Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl		NaOH	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>		Methanol	Other	Radium-226
1	MW-1-090518		9/5	0936			2		2										
2	MW-5-090518		9/5	1120			2		2										
3	MW-6-090518		9/5	1410			2		2										
4	MW-1-090518		9/5	1517			2		2										
5																			
6																			
7																			
8																			
9																			
10	DUP-090518		9/5	0600			2		2										
11																			
12																			

# 30205268

RELIQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
<i>[Signature]</i>	9/12/18	0900	<i>[Signature]</i>	9/10/18	1000	4 Y 4 Y 4 Y

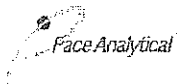
**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: *Brandon Griffin*

SIGNATURE of SAMPLER: *[Signature]*

DATE Signed (MM/DD/YY): 09/05/18

Pittsburgh Lab Sample Condition Upon Receipt



Client Name: PACE KS

Project # # 30265268

Courier:  Fed Ex  UPS  USPS  Client  Commercial  Pace Other \_\_\_\_\_

Tracking #: 4542 2780 8040

Label	<u>MM</u>
LIMS Login	<u>MM</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 5.2 °C      Correction Factor: 0 °C      Final Temp: 5.2 °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>10D4671</u>	<u>MDS 9-13-18</u>
Chain of Custody Present:	/				
Chain of Custody Filled Out:	/				
Chain of Custody Relinquished:	/				
Sampler Name & Signature on COC:	/				
Sample Labels match COC:	/				
-Includes date/time/ID      Matrix: <u>UA</u>					
Samples Arrived within Hold Time:	/				
Short Hold Time Analysis (<72hr remaining):		/			
Rush Turn Around Time Requested:		/			
Sufficient Volume:	/				
Correct Containers Used:	/				
-Pace Containers Used:	/				
Containers Intact:	/				
Orthophosphate field filtered			/		
Hex Cr Aqueous Compliance/NPDES sample field filtered			/		
Organic Samples checked for dechlorination:			/		
Filtered volume received for Dissolved tests			/		
All containers have been checked for preservation.	/				
All containers needing preservation are found to be in compliance with EPA recommendation.	/			<u>PHL2</u>	
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>MDS</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			/		
Trip Blank Present:			/		
Trip Blank Custody Seals Present			/		
Rad Aqueous Samples Screened > 0.5 mrem/hr		/		Initial when completed:	Date:

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 2**

### **Statistical Analyses**

**ATTACHMENT 2-1**

**August 2016 – June 2017 Background Statistical Analyses**



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

## TECHNICAL MEMORANDUM

March 22, 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: Background Groundwater Monitoring Data  
Statistical Evaluation  
**Completed January 15, 2018**  
Tecumseh Energy Center  
322 Landfill

Pursuant to Code of Federal Regulations Title 40 (40 CFR) §257.90 (Rule), this memorandum summarizes the statistical evaluation of analytical results for the background monitoring groundwater sampling events for the Tecumseh Energy Center (TEC) 322 Landfill. These background monitoring groundwater sampling events were completed from August 2016 to June 2017, with laboratory results received and accepted on October 17, 2017.

The statistical evaluation discussed in this memorandum was conducted to determine if Appendix III groundwater monitoring constituents have been detected in downgradient wells at concentrations that represent a statistically significant increase (SSI) above background or upgradient wells consistent with the requirements in 40 CFR §257.94.

### Statistical Evaluation of Appendix III Constituents

The Rule provides four specific options for statistical evaluation of groundwater quality data collected at a coal combustion residual (CCR) unit (40 CFR §257.93(f)(1-4)). The two statistical methods used for these evaluations, prediction limits (PL) and Parametric Analysis of Variance (ANOVA), were certified by Haley & Aldrich, Inc. on January 15, 2018. The PL method, as determined applicable for this sampling event, was used to evaluate potential SSIs above background. Background levels for each constituent listed in Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids) were computed as upper prediction limits (UPL), considering one future observation, and a minimum 95 percent confidence coefficient. The entire data set for each compliance well was checked for the presence of outliers. If the presence of outliers was confirmed, then the outlier was removed from the data set. After removing confirmed outliers, the entire data set was compared against the interwell

background UPL to check for exceedances. Interwell evaluation compares the data points from downgradient compliance wells against a background data set composed of upgradient well data (MW-4). If all data points were below the background limit, then the well was excluded from further analysis. If more than two data points exceeded the background limit, then the data would be checked for seasonal influences and other significant differences using ANOVA, and SSIs were determined based on the most recent four rounds of the data distribution.

## STATISTICAL EVALUATION

As documented in the statistical method certification, the Parametric ANOVA and PL methods were used to complete the statistical evaluation of the referenced data set. A PL procedure is one in which a concentration limit for each constituent is established from the distribution of the background data, with a specified confidence level (e.g., 95 percent). The upper endpoint of a concentration limit is called the UPL. Depending on the background data distribution, parametric or non-parametric PL procedures are used to evaluate groundwater monitoring data using this method. Parametric PLs 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 PL. If all the background data are non-detect, a maximum reporting limit may serve as an appropriate UPL.

The ANOVA is a statistical procedure for comparing average concentration differences between one or more groups (e.g., wells). Depending on the background data distribution, parametric or non-parametric ANOVA procedures are used to evaluate groundwater monitoring data using this method. Parametric ANOVA assesses differences in means, and the non-parametric ANOVA compares median concentration levels. The method determines whether there are statistically significant differences in mean/median concentrations among a set of down-gradient wells relative to the background wells. In one-way ANOVA, the null hypothesis is that the groups under comparison have equal means and that any differences in the sample means are due to chance. The alternative hypothesis is stated as the means of the groups are not equal. The decision error, level ( $\alpha$ ) value shall comply with the performance criteria set forth in 40 CFR §257.93(g)(2).

The statistical evaluation was conducted using the background data set for all Appendix III constituents. The UPLs were calculated from the background well data set using Chemstat software after testing for outlier sample results that would warrant removal from the data set 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 data set.

## BACKGROUND DISTRIBUTIONS

The groundwater analytical results for each sampling event from the background sample location (MW-4) were combined to calculate the UPL for each Appendix III constituent. The variability and distribution of the pooled data set was evaluated to determine the method for UPL 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 2017.

### RESULTS OF APPENDIX III DOWNGRAIDENT STATISTICAL COMPARISONS

The entire background data set from the downgradient wells for each of the Appendix III constituents was compared to their respective background UPLs (Table I). A sample concentration greater than the background UPL is considered to represent an SSI. The results of the background groundwater monitoring statistical evaluation is provided in Table I. **Based on this statistical evaluation on groundwater sampling data collected from August 2016 to June 2017, SSIs were identified for multiple constituents above background PLs at the TEC 322 Landfill.** Evergy established an assessment monitoring program at the TEC 322 Landfill, with the first annual sampling event completed in June 2018.

Tables:

Table I – Summary of Background Groundwater Monitoring Statistical Evaluation



## TABLE

**TABLE I**  
**SUMMARY OF SEMI-ANNUAL ASSESSMENT GROUNDWATER MONITORING STATISTICAL EVALUATION**  
BACKGROUND SAMPLING EVENTS (AUGUST 2016 - JUNE 2017)  
TECUMSEH ENERGY CENTER  
322 LANDFILL

Location Id	Frequency of Detection		Percent Non-Detects	Range of Non-Detects		Maximum Detect	Variance	Standard Deviation	Coefficient of Variation	Outlier Presence	Outlier Removed	Trend	Distribution of Group*	Distribution of Well*	Interwell Comparison		
															<sup>2</sup> Exceedance above Background at Individual Well		
<b>Appendix III: Boron (mg/L)</b>																	
MW-4 (upgradient)	0	/	8	100%	0.1	:	0.1	N/A	N/A	N/A	No	No	Stable	Non-parametric			
MW-1	7	/	8	13%	0.1	:	0.1	0.88	7.34E-02	0.271	0.619	No	No	Increasing	Parametric	Yes	
MW-5	8	/	8	0%	N/A	:	N/A	1.2	8.01E-02	0.283	0.279	Yes	No	Stable	Non-parametric	Parametric	Yes
MW-6	8	/	8	0%	N/A	:	N/A	1.1	9.03E-03	0.095	0.0932	No	No	Stable	Parametric	Yes	
<b>Appendix III: Calcium (mg/L)</b>																	
MW-4 (upgradient)	8	/	8	0%	N/A	:	N/A	188	2.04E+01	4.518	0.0251	No	No	Stable	Parametric		
MW-1	8	/	8	0%	N/A	:	N/A	184	7.73E+01	8.79	0.0521	No	No	Stable	Non-parametric	Parametric	No
MW-5	8	/	8	0%	N/A	:	N/A	321	6.54E+02	25.57	0.0857	No	No	Stable	Parametric	Yes	
MW-6	8	/	8	0%	N/A	:	N/A	330	4.99E+02	22.33	0.0724	No	No	Increasing	Parametric	Yes	
<b>Appendix III: Chloride (mg/L)</b>																	
MW-4 (upgradient)	8	/	8	0%	N/A	:	N/A	271	4.36E+01	6.606	0.0252	No	No	Stable	Parametric		
MW-1	8	/	8	0%	N/A	:	N/A	42.6	8.57E+01	9.258	0.343	No	No	Stable	Parametric	No	
MW-5	8	/	8	0%	N/A	:	N/A	49.3	1.25E+01	3.529	0.0788	No	No	Stable	Parametric	No	
MW-6	8	/	8	0%	N/A	:	N/A	65.8	5.73E+00	2.393	0.0388	No	No	Stable	Parametric	No	
<b>Appendix III: Fluoride (mg/L)</b>																	
MW-4 (upgradient)	5	/	8	38%	0.2	:	0.2	0.24	3.19E-04	0.0179	0.0802	No	No	Stable	Parametric		
MW-1	8	/	8	0%	N/A	:	N/A	0.46	2.36E-03	0.0485	0.132	No	No	Stable	Parametric	Yes	
MW-5	7	/	8	13%	0.2	:	0.2	0.42	3.69E-03	0.0607	0.203	No	No	Stable	Parametric	Yes	
MW-6	8	/	8	0%	N/A	:	N/A	0.5	5.88E-03	0.0767	0.224	No	No	Stable	Parametric	Yes	
<b>Appendix III: pH (SU)</b>																	
MW-4 (upgradient)	8	/	8	0%	N/A	:	N/A	7.3	8.57E-03	0.0926	0.0129	No	No	Stable	Non-parametric		
MW-1	8	/	8	0%	N/A	:	N/A	7.4	2.00E-02	0.141	0.0198	No	No	Stable	Non-parametric	Parametric	No
MW-5	8	/	8	0%	N/A	:	N/A	7.4	2.55E-02	0.16	0.0227	No	No	Stable	Parametric	No	
MW-6	8	/	8	0%	N/A	:	N/A	7.4	1.70E-02	0.13	0.0182	No	No	Stable	Parametric	No	
<b>Appendix III: Sulfate (mg/L)</b>																	
MW-4 (upgradient)	8	/	8	0%	N/A	:	N/A	143	4.11E+01	6.409	0.0469	No	No	Stable	Parametric		
MW-1	8	/	8	0%	N/A	:	N/A	455	2.48E+03	49.81	0.126	No	No	Stable	Non-parametric	Parametric	Yes
MW-5	8	/	8	0%	N/A	:	N/A	1020	1.10E+04	104.8	0.125	No	No	Stable	Parametric	Yes	
MW-6	8	/	8	0%	N/A	:	N/A	975	4.74E+03	68.86	0.0787	No	No	Stable	Parametric	Yes	
<b>Appendix III: TDS (mg/L)</b>																	
MW-4 (upgradient)	8	/	8	0%	N/A	:	N/A	1080	2.47E+03	49.67	0.0485	No	No	Stable	Parametric		
MW-1	8	/	8	0%	N/A	:	N/A	999	1.49E+03	38.59	0.0407	No	No	Stable	Non-parametric	Parametric	No
MW-5	8	/	8	0%	N/A	:	N/A	1810	1.77E+04	133.1	0.0812	No	No	Stable	Parametric	Yes	
MW-6	8	/	8	0%	N/A	:	N/A	1810	4.74E+03	68.82	0.04	No	No	Stable	Parametric	Yes	

**Notes:**

\* - Determined using the Shapiro-Wilks statistical test at a 1% significance level and a residual probability plot.

1: The interwell group difference is determined by comparing the pooled down-gradient well dataset to the pooled up-gradient background well dataset using a parametric t-test or Wilcoxon rank-sum test.

2: Background exceedance at individual down-gradient well is determined by comparing to pooled up-gradient background well dataset using either Analysis of Variance (ANOVA) with multiple comparison or prediction limit methods at a 1% significance level.

3: Background exceedance at individual down-gradient well is determined by comparing to the historic background from the same well using either a parametric control chart or non-parametric prediction limit methods at a 1% significance level.

4: Exceedance above background is determined by evaluating the appropriate interwell or intrawell comparison exceedance.

% = percent

mg/L = milligrams per liter

N/A = not applicable

NT = not tested

SU = standard unit

**ATTACHMENT 2-2**

**March 2018 Semi-Annual Sampling Event Statistical Analyses**



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

## TECHNICAL MEMORANDUM

March 22, 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., Principal Consultant – Engineering Principal  
Mark Nicholls, P.G., Senior Associate – Senior Hydrogeologist

**SUBJECT:** March 2018 Semi-Annual Groundwater Detection Monitoring Data  
Statistical Analyses Summary  
Tecumseh Energy Center  
322 Landfill

Pursuant to Code of Federal Regulations Title 40 (40 CFR) §257.93 and §257.94 (Rule), this memorandum summarizes the statistical summary of the analytical results for the first semi-annual detection monitoring groundwater sampling event for the Tecumseh Energy Center (TEC) 322 Landfill, which took place in March 2018. This semi-annual detection monitoring groundwater sampling event was completed on March 8, 2018, with laboratory results received and validated in April 2018. Due to the determination of statistically significant increases in the January 2018 statistical analyses, the unit transitioned to an assessment monitoring program; therefore, no statistical analyses were completed on this March 2018 detection monitoring sampling event data.

## **ATTACHMENT 3**

### **Revised Groundwater Potentiometric Maps**



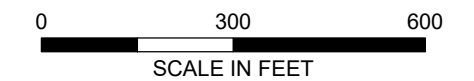


**LEGEND**

- MW-1 WELL NAME AND GROUNDWATER ELEVATION, (FEET AMSL)  
900.47 MARCH 2018
- MONITORING WELL
- PIEZOMETER OBSERVATION ONLY
- GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 2-FT INTERVAL (AMSL)
- INFERRED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
- 322 LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 08 MARCH 2018.
3. AMSL = ABOVE MEAN SEA LEVEL
4. THE APPROXIMATE GROUNDWATER FLOW RATE WAS CALCULATED USING HYDRAULIC CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.
5. AERIAL IMAGERY SOURCE: ESRI, 07 NOVEMBER 2019



**HALEY  
ALDRICH**

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

322 LANDFILL  
GROUNDWATER POTENTIOMETRIC  
ELEVATION CONTOUR MAP  
MARCH 08, 2018

**evergy**

MARCH 2022

FIGURE 2



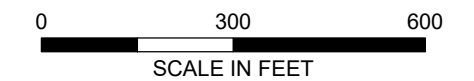


**LEGEND**

- MW-1** WELL NAME AND GROUNDWATER ELEVATION, (FEET AMSL)  
**900.47** JUNE 2018
- MONITORING WELL
- PIEZOMETER OBSERVATION ONLY
- GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 2-FT INTERVAL (AMSL)
- INFERRED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
- 322 LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 07 JUNE 2018.
3. AMSL = ABOVE MEAN SEA LEVEL
4. THE APPROXIMATE GROUNDWATER FLOW RATE WAS CALCULATED USING HYDRAULIC CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.
5. AERIAL IMAGERY SOURCE: ESRI, 07 NOVEMBER 2019



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

**322 LANDFILL**  
**GROUNDWATER POTENTIOMETRIC**  
**ELEVATION CONTOUR MAP**  
**JUNE 07, 2018**









MARCH 2022



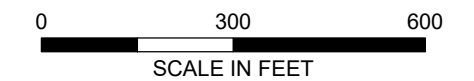


**LEGEND**

- MW-1** WELL NAME AND GROUNDWATER ELEVATION, (FEET AMSL)  
**900.47** SEPTEMBER 2018
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 2-FT INTERVAL (AMSL)
-  INFERRED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
-  GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
-  322 LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 05 SEPTEMBER 2018.
3. AMSL = ABOVE MEAN SEA LEVEL
4. THE APPROXIMATE GROUNDWATER FLOW RATE WAS CALCULATED USING HYDRAULIC CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.
5. AERIAL IMAGERY SOURCE: ESRI, 07 NOVEMBER 2019



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

**322 LANDFILL**  
**GROUNDWATER POTENTIOMETRIC**  
**ELEVATION CONTOUR MAP**  
**SEPTEMBER 05, 2018**



MARCH 2022