HALEY ALDRICH

www.haleyaldrich.com

2018 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
FLUE GAS DESULFURIZATION LANDFILL
JEFFREY ENERGY CENTER
ST. MARYS, KANSAS

by Haley & Aldrich, Inc.
Cleveland, Ohio

for Westar Energy, Inc.
Topeka, Kansas

File No. 129778-018
January 2019

Table of Contents

Page

Revision No.	Date	Notes

List of Tables

List of Figures

This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring system for the Jeffrey Energy Center Flue Gas Desulfurization (FGD) 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 United States Environmental Protection Agency Coal Combustion Residual Rule. I certify that the 2018 Annual Groundwater Monitoring and Corrective Action Report for the FGD 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.

Mark Nicholls

Digitally signed by Mark Nicholls
Date: 2019.01.31 13:53:14 -07'00'

1. Introduction

This 2018 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the Flue Gas Desulfurization (FGD) Landfill at the Jeffrey Energy Center (JEC), operated by Westar Energy, Inc. (Westar). This Annual Report was developed in accordance with the United States Environmental Protection Agency Coal Combustion Residual (CCR) Rule effective 19 October 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 FGD 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.

Westar has installed and certified a groundwater monitoring system at the JEC FGD Landfill. The FGD 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 FGD Landfill as required by the Rule. Groundwater sampling and analysis was conducted per the requirements described in § 257.93, and the status of the groundwater monitoring program described in § 257.94 and §257.95 is also provided in this report. This Annual Report documents the applicable groundwater-related activities completed in the calendar year 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 Westar 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 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 at the FGD Landfill in 2018.

2.2.4 Actions to Resolve Problems

No problems were encountered at the FGD 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 FGD 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 in 2018 for the certified well network.

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.

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 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 Alterative 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 was 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 FGD 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
WESTAR ENERGY, INC.
JEFFREY ENERGY CENTER
FLUE GAS DESULFURIZATION LANDFILL
ST. MARYS, KANSAS

Location	Upgradient	Downgradient		
	MW-FGD-1	MW-FGD-2	MW-FGD-3	MW-FGD-4
Measure Point (TOC)	1239.05	1184.20	1186.26	1188.43
Sample Name	FGD-1-031218	FGD-2-031218	FGD-3-031218	FGD-4-031218
Sample Date	3/12/2018	3/12/2018	3/12/2018	3/12/2018
Lab Data Reviewed and Accepted	4/16/2018	4/16/2018	4/16/2018	4/16/2018
Depth to Water (ft btoc)	75.05	25.46	26.89	35.22
Temperature (Deg C)	56.8	55.5	56.8	55.4
Conductivity (µS/cm)	780.1	813.9	1007	1388
Turbidity (NTU)	0.06	0.29	0.32	0.80
Boron, Total (mg/L)	<0.10	**0.23**	**0.15**	**0.27**
Calcium, Total (mg/L)	**93.5**	**118**	**146**	**195**
Chloride (mg/L)	**63.5**	**35.1**	**52.4**	**96.7**
Fluoride (mg/L)	**0.36**	**0.41**	**0.31**	**0.36**
Sulfate (mg/L)	**86.2**	**171**	**257**	**434**
pH (su)	**7.4**	**7.3**	**7.3**	**7.1**
TDS (mg/L)	**491**	**566**	**760**	**1130**

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.

µ*S/cm = micro Siemens per centimeter*

ft btoc = feet 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

Bold value: Detection above laboratory reporting limit

TABLE II

SUMMARY OF ANALYTICAL RESULTS - ASSESSMENT MONITORING

WESTAR ENERGY, INC.

JEFFREY ENERGY CENTER

FLUE GAS DESULFURIZATION LANDFILL

ST. MARYS, KANSAS

Location	Upgradient		Downgradient					
	MW-FGD-1		MW-FGD-2		MW-FGD-3		MW-FGD-4	
Measure Point (TOC)	1239.05		1184.20		1186.26		1188.43	
Sample Name	FGD-1-060418	FGD-1-091018	FDG-2-060518	FGD-2-091118	FGD-3-060518	FGD-3-091118	FGD-4-060518	FGD-4-091118
Sample Date	6/4/2018	9/10/2018	6/7/2018	9/11/2018	6/5/2018	9/11/2018	6/7/2018	9/11/2018
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)	72.84	75.22	23.22	23.88	24.47	25.03	32.08	32.33
Temperature (Deg C)	14.48	15.53	15.44	18.12	16.73	18.05	17.18	17.27
Conductivity (µS/cm)	818	799	1109	1087	924	1238	1440	1475
Turbidity (NTU)	0.02	0.02	0.02	0.06	0.04	1.16	0.01	0.20
Boron, Total (mg/L)	--	<0.1	--	**0.251**	--	**0.154**	--	**0.265**
Calcium, Total (mg/L)	--	**96.1**	--	**160**	--	**171**	--	**191**
Chloride (mg/L)	--	**68.1**	--	**40.2**	--	**71.0**	--	**113**
Fluoride (mg/L)	--	**0.44**	--	**0.40**	--	**0.53**	--	**0.39**
Sulfate (mg/L)	--	**90.4**	--	**387**	--	**432**	--	**540**
pH (su)	--	**7.0**	--	**7.1**	--	**7.0**	--	**7.0**
TDS (mg/L)	--	**523.00**	--	**783**	--	**941.00**	--	**1160**
Antimony, Total (mg/L)	<0.0010	--	<0.0010	--	<0.0010	--	<0.0010	--
Arsenic (mg/L)	<0.0010	--	<0.0010	--	<0.0010	--	<0.0010	--
Barium, Total (mg/L)	**0.27**	**0.28**	**0.076**	**0.070**	**0.10**	**0.099**	**0.047**	**0.047**
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	**0.0020**	**0.0016**	<0.0010	<0.0010	<0.0010	<0.0010
Lead, Total (mg/L)	<0.010	--	<0.010	--	<0.010	--	<0.010	--
Lithium, Total (mg/L)	**0.014**	**0.015**	**0.011**	<0.010	**0.013**	**0.013**	**0.014**	**0.014**
Molybdenum, Total (mg/L)	**0.0014**	**0.0014**	**0.0041**	**0.0042**	**0.0056**	**0.0053**	**0.0036**	**0.0037**
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)	<0.0020	--	<0.0020	--	<0.0020	--	<0.0020	--
Fluoride (mg/L)	**0.36**	**0.44**	**0.36**	**0.40**	**0.32**	**0.53**	**0.36**	**0.39**
Radium-226 & 228 Combined (pCi/L)	**0.0632**	**1.61**	**0.442**	**0.412**	**0.840**	**0.967**	**0.958**	**1.19**

Notes:

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

µS/cm = micro Siemens per centimeter

ft btoc = feet below top of casing

Deg C = degrees Celsius

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
WESTAR ENERGY, INC.
JEFFREY ENERGY CENTER
FLUE GAS DESULFURIZATION LANDFILL
ST. MARYS, KANSAS

Well ID	Statistical Analysis Completed	Constituent
MW-FGD-2	January 2018	Boron
	January 2018	Calcium
	January 2018	Sulfate
	January 2018	TDS
MW-FGD-3	January 2018	Boron
	January 2018	Calcium
	January 2018	Sulfate
	January 2018	TDS
MW-FGD-4	January 2018	Boron
	January 2018	Calcium
	January 2018	Chloride
	January 2018	Sulfate
	January 2018	TDS

Notes:

SSIs = statistically significant increases

TDS = total dissolved solids

TABLE IV
GROUNDWATER PROTECTION STANDARDS
WESTAR ENERGY, INC.
JEFFREY ENERGY CENTER
FLUE GAS DESULFURIZATION LANDFILL
ST. MARYS, KANSAS

Constituent	Groundwater Protection Standard (mg/L)
Barium	2*
Cobalt	0.006**
Fluoride	4.0*
Lithium	0.040**
Molybdenum	0.100**
Radium 226 & 228	5 pCi/L*

Notes:

** Value set equal to the Maximum Contaminant Level.*

*** Value set based on Regional Screening Levels.*

mg/L = milligrams per liter

pCi/L = picoCuries per liter

FIGURE

LEGEND

- MONITORING WELL
- PIEZOMETRIC OBSERVATION ONLY
- FGD LANDFILL ACTIVE AREA
- FGD LANDFILL LIMITS OF DISPOSAL AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

N

0 400 800

SCALE IN FEET

HALEY ALDRICH

WESTAR ENERGY
JEFFREY ENERGY CENTER
ST. MARY'S, KANSAS

FGD LANDFILL
MONITORING WELL LOCATION MAP

JANUARY 2019

FIGURE 1

GIS FILE PATH: G:\Projects\Westar\Jeffrey Energy Center (JEC)\GIS\MXDs\2018_01\JEC_FGD LANDFILL_MW_LOCATION_MAP_REV2.mxd — USER: DZinsmaster — LAST SAVED: 1/16/2019 8:18:01 AM

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

November 10, 2022
File No. 129778

TO: Evergy Kansas Central, 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

Mark Nicholls
Digitally signed by Mark Nicholls
Date: 2022.11.10 11:56:42 -07'00'

SUBJECT: 2018 Annual Groundwater Monitoring and Corrective Action Report Addendum
Evergy Kansas Central, Inc.
Jeffrey Energy Center
Flue Gas Desulfurization Landfill

The Evergy Kansas Central, Inc. (Evergy) Flue Gas Desulfurization (FGD) Landfill at the Jeffrey Energy Center (JEC) 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 FGD 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. For each of the 2018 sampling events, the measured groundwater elevations, with calculated groundwater flow rates and directions, have been included in Attachment 3.

The Attachments to this addendum are described below:

- Attachment 1 – Laboratory Analytical Reports: Includes laboratory data packages with supporting information such as case narrative, sample and method summary, analytical results, quality control, and chain-of-custody documentation. The laboratory data packages for the 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:
  - Overview of the January 2018 statistical analyses for data obtained in the August 2016 through June 2017 background sampling events.
    - The fluoride value collected from monitoring well MW-FGD-4 on June 30, 2017 was identified as a statistically significant outlier and was subsequently removed from the dataset.
  - Explanation of statistical analysis related to the March 2018 sampling event.
- Attachment 3 – 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

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

March 28, 2018

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

RE: Project: JEC FGD CCR
Pace Project No.: 60266066

Dear Brandon Griffin:
Enclosed are the analytical results for sample(s) received by the laboratory on March 16, 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

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

CERTIFICATIONS

Project: JEC FGD CCR
Pace Project No.: 60266066

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

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

SAMPLE SUMMARY

Project: JEC FGD CCR
Pace Project No.: 60266066

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60266066001	**FGD-1-031218**	Water	03/12/18 12:42	03/16/18 06:20
60266066002	**FGD-2-031218**	Water	03/12/18 13:42	03/16/18 06:20
60266066003	**FGD-3-031218**	Water	03/12/18 14:28	03/16/18 06:20
60266066004	**FGD-4-031218**	Water	03/12/18 15:37	03/16/18 06:20
60266066005	**DUP-031218**	Water	03/12/18 06:00	03/16/18 06:20

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

SAMPLE ANALYTE COUNT

Project: JEC FGD CCR
Pace Project No.: 60266066

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60266066001	**FGD-1-031218**	EPA 200.7	TDS	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60266066002	**FGD-2-031218**	EPA 200.7	TDS	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60266066003	**FGD-3-031218**	EPA 200.7	TDS	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60266066004	**FGD-4-031218**	EPA 200.7	TDS	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K
60266066005	**DUP-031218**	EPA 200.7	TDS	2	PASI-K
		SM 2540C	OL	1	PASI-K
		SM 4500-H+B	MJK	1	PASI-K
		EPA 300.0	AGO	3	PASI-K

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60266066

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: March 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.

QC Batch: 518080

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60265826001,60265958001

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

- MS (Lab ID: 2120634)
  - Calcium

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60266066

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: WESTAR ENERGY
Date: March 28, 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:

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60266066

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: March 28, 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-031218 (Lab ID: 60266066005)
- FGD-1-031218 (Lab ID: 60266066001)
- FGD-2-031218 (Lab ID: 60266066002)
- FGD-3-031218 (Lab ID: 60266066003)
- FGD-4-031218 (Lab ID: 60266066004)

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:

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60266066

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: March 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.

QC Batch: 518522

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60265991001,60266090001

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

- MS (Lab ID: 2122436)
  - Fluoride

Additional Comments:

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

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60266066

Sample: FGD-1-031218 **Lab ID: 60266066001** Collected: 03/12/18 12:42 Received: 03/16/18 06:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Boron, Total Recoverable	**<0.10**	mg/L	0.10	1	03/19/18 12:55	03/21/18 16:18	7440-42-8	
Calcium, Total Recoverable	**93.5**	mg/L	0.20	1	03/19/18 12:55	03/21/18 16:18	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**491**	mg/L	5.0	1		03/17/18 12:12		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.4**	Std. Units	0.10	1		03/20/18 10:35		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**63.5**	mg/L	10.0	10		03/22/18 15:40	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	1		03/21/18 17:06	16984-48-8	
Sulfate	**86.2**	mg/L	10.0	10		03/22/18 15:40	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60266066

Sample: FGD-2-031218 **Lab ID: 60266066002** Collected: 03/12/18 13:42 Received: 03/16/18 06:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Boron, Total Recoverable	**0.23**	mg/L	0.10	1	03/19/18 12:55	03/21/18 16:20	7440-42-8	
Calcium, Total Recoverable	**118**	mg/L	0.20	1	03/19/18 12:55	03/21/18 16:20	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**566**	mg/L	5.0	1		03/17/18 12:12		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.3**	Std. Units	0.10	1		03/20/18 10:36		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**35.1**	mg/L	5.0	5		03/22/18 16:11	16887-00-6	
Fluoride	**0.41**	mg/L	0.20	1		03/21/18 17:20	16984-48-8	
Sulfate	**171**	mg/L	20.0	20		03/22/18 16:26	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60266066

Sample: FGD-3-031218 **Lab ID: 60266066003** Collected: 03/12/18 14:28 Received: 03/16/18 06:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Boron, Total Recoverable	**0.15**	mg/L	0.10	1	03/19/18 12:55	03/21/18 16:22	7440-42-8	
Calcium, Total Recoverable	**146**	mg/L	0.20	1	03/19/18 12:55	03/21/18 16:22	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**760**	mg/L	5.0	1		03/17/18 12:13		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.3**	Std. Units	0.10	1		03/20/18 10:38		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**52.4**	mg/L	10.0	10		03/22/18 16:41	16887-00-6	
Fluoride	**0.31**	mg/L	0.20	1		03/21/18 17:34	16984-48-8	
Sulfate	**257**	mg/L	50.0	50		03/22/18 16:57	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60266066

Sample: FGD-4-031218 **Lab ID: 60266066004** Collected: 03/12/18 15:37 Received: 03/16/18 06:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Boron, Total Recoverable	**0.27**	mg/L	0.10	1	03/19/18 12:55	03/21/18 16:29	7440-42-8	
Calcium, Total Recoverable	**195**	mg/L	0.20	1	03/19/18 12:55	03/21/18 16:29	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1130**	mg/L	5.0	1		03/17/18 12:14		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.1**	Std. Units	0.10	1		03/20/18 10:39		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**96.7**	mg/L	10.0	10		03/22/18 17:43	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	1		03/21/18 17:48	16984-48-8	
Sulfate	**434**	mg/L	50.0	50		03/22/18 17:59	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60266066

Sample: DUP-031218 **Lab ID: 60266066005** Collected: 03/12/18 06:00 Received: 03/16/18 06:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Boron, Total Recoverable	**<0.10**	mg/L	0.10	1	03/19/18 12:55	03/21/18 16:31	7440-42-8	
Calcium, Total Recoverable	**92.5**	mg/L	0.20	1	03/19/18 12:55	03/21/18 16:31	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**507**	mg/L	5.0	1		03/17/18 12:14		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.4**	Std. Units	0.10	1		03/19/18 12:09		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**62.5**	mg/L	10.0	10		03/22/18 18:14	16887-00-6	
Fluoride	**0.36**	mg/L	0.20	1		03/21/18 18:01	16984-48-8	
Sulfate	**85.4**	mg/L	10.0	10		03/22/18 18:14	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60266066

QC Batch: 518080 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004, 60266066005

METHOD BLANK: 2120630 Matrix: Water
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004, 60266066005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	mg/L	<0.10	0.10	03/21/18 15:34	
Calcium	mg/L	<0.20	0.20	03/21/18 15:34	

LABORATORY CONTROL SAMPLE: 2120631

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1	0.93	93	85-115	
Calcium	mg/L	10	9.8	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2120632 2120633

Parameter	Units	60265826001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	mg/L	ND	1	1	0.95	0.97	94	95	70-130	2	20	
Calcium	mg/L	35300 ug/L	10	10	44.2	45.8	88	105	70-130	4	20	

MATRIX SPIKE SAMPLE: 2120634

Parameter	Units	60265958001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	367 ug/L	1	1.4	99	70-130	
Calcium	mg/L	139000 ug/L	10	153	135	70-130	M1

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60266066

QC Batch: 518013 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004, 60266066005

METHOD BLANK: 2120266 Matrix: Water
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004, 60266066005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	03/17/18 12:10	

LABORATORY CONTROL SAMPLE: 2120267

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	976	98	80-120	

SAMPLE DUPLICATE: 2120268

Parameter	Units	60265785007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	320	302	6	10	

SAMPLE DUPLICATE: 2120269

Parameter	Units	60266066001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	491	520	6	10	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60266066

QC Batch: 518078
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Associated Lab Samples: 60266066005

SAMPLE DUPLICATE: 2120629

Parameter	Units	60265654001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.0	7.0	0	5	H6

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60266066

QC Batch: 518259 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004

SAMPLE DUPLICATE: 2121548

Parameter	Units	60265693002 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.4	8.4	1	5	H6

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60266066

QC Batch: 518522 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004, 60266066005

METHOD BLANK: 2122432 Matrix: Water
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004, 60266066005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	<0.20	0.20	03/21/18 14:22	

LABORATORY CONTROL SAMPLE: 2122433

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.5	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2122434 2122435

Parameter	Units	60265991001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.41J	12.5	12.5	13.0	13.0	100	101	80-120	1	15	

MATRIX SPIKE SAMPLE: 2122436

Parameter	Units	60266090001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	9.3	25	28.5	77	80-120	M1

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60266066

QC Batch: 518691 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004, 60266066005

METHOD BLANK: 2123039 Matrix: Water
Associated Lab Samples: 60266066001, 60266066002, 60266066003, 60266066004, 60266066005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	03/22/18 12:05	
Sulfate	mg/L	<1.0	1.0	03/22/18 12:05	

LABORATORY CONTROL SAMPLE: 2123040

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2123041 2123042

Parameter	Units	60266360001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	580	250	250	870	854	116	110	80-120	2	15	
Sulfate	mg/L	66.8	250	250	319	316	101	100	80-120	1	15	

MATRIX SPIKE SAMPLE: 2123043

Parameter	Units	60266066001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	63.5	50	119	111	80-120	
Sulfate	mg/L	86.2	50	141	110	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

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

QUALIFIERS

Project: JEC FGD CCR
Pace Project No.: 60266066

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JEC FGD CCR
Pace Project No.: 60266066

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60266066001	**FGD-1-031218**	EPA 200.7	518080	EPA 200.7	518152
60266066002	**FGD-2-031218**	EPA 200.7	518080	EPA 200.7	518152
60266066003	**FGD-3-031218**	EPA 200.7	518080	EPA 200.7	518152
60266066004	**FGD-4-031218**	EPA 200.7	518080	EPA 200.7	518152
60266066005	**DUP-031218**	EPA 200.7	518080	EPA 200.7	518152
60266066001	**FGD-1-031218**	SM 2540C	518013		
60266066002	**FGD-2-031218**	SM 2540C	518013		
60266066003	**FGD-3-031218**	SM 2540C	518013		
60266066004	**FGD-4-031218**	SM 2540C	518013		
60266066005	**DUP-031218**	SM 2540C	518013		
60266066001	**FGD-1-031218**	SM 4500-H+B	518259		
60266066002	**FGD-2-031218**	SM 4500-H+B	518259		
60266066003	**FGD-3-031218**	SM 4500-H+B	518259		
60266066004	**FGD-4-031218**	SM 4500-H+B	518259		
60266066005	**DUP-031218**	SM 4500-H+B	518078		
60266066001	**FGD-1-031218**	EPA 300.0	518522		
60266066001	**FGD-1-031218**	EPA 300.0	518691		
60266066002	**FGD-2-031218**	EPA 300.0	518522		
60266066002	**FGD-2-031218**	EPA 300.0	518691		
60266066003	**FGD-3-031218**	EPA 300.0	518522		
60266066003	**FGD-3-031218**	EPA 300.0	518691		
60266066004	**FGD-4-031218**	EPA 300.0	518522		
60266066004	**FGD-4-031218**	EPA 300.0	518691		
60266066005	**DUP-031218**	EPA 300.0	518522		
60266066005	**DUP-031218**	EPA 300.0	518691		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60266066

60266066

Client Name: Westar Energy

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

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

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

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other ☑ Zplc

Thermometer Used: _____ **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 3.3 **Corr. Factor** +0.2 **Corrected** 3.5

Date and initials of person examining contents: 5/16/18

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	pH
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☑Yes ☐No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

REVIEWED
By hwilson at 4:57 pm, 3/16/18

Pace Analytical
www.pacelabs.com

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
Purchase Order No.:	
Project Name:	JEC FDG CCR
Project Number:	

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jenalee Converse 913-563-1401
Pace Profile #:	9657

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: KS

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	200.7 Total Metals*	300: Cl, F, SO4	2540C TDS	4500 H+B	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	FGD-1-031218	WT	G			3/12/18	1242		3	1		2							BP1U, 2BP3N					60266066 01
2	FGD-2-031218	WT	G			3/12/18	1342		3	1		2												02
3	FGD-3-031218	WT	G			3/12/18	1428		3	1		2												03
4	FGD-4-031218	WT	G			3/12/18	1537		3	1		2												04
5																								
6																								
7																								
8																								
9																								
10	DUP-031218	WT	G			3/12/18	0600		3	1		2							BP1U, 2BP3N					05
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 Cooler (Y/N)	Samples Intact (Y/N)
200.7 Total Metals*: B, Ca	BJG / Westar	3/14/18	1600	E Brockett / Pasi	3/16/18	0620	3.3	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brandon Griffin

SIGNATURE of SAMPLER: BJG DATE Signed (MM/DD/YY): 03/12/18

*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.

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

ATTACHMENT 1-2
June 2018 Sampling Event
Laboratory Analytical Report

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

June 28, 2018

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

RE: Project: JEC FGD CCR
Pace Project No.: 60272148

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

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

CERTIFICATIONS

Project: JEC FGD CCR
Pace Project No.: 60272148

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

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

SAMPLE SUMMARY

Project: JEC FGD CCR
Pace Project No.: 60272148

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60272148001	**FDG-1-060418**	Water	06/04/18 09:53	06/07/18 06:40
60272148002	**FDG-2-060518**	Water	06/05/18 08:22	06/07/18 06:40
60272148003	**FDG-3-060518**	Water	06/05/18 09:55	06/07/18 06:40
60272148004	**FDG-4-060518**	Water	06/05/18 11:27	06/07/18 06:40
60272148005	**DUP-060518**	Water	06/05/18 06:00	06/07/18 06:40

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: JEC FGD CCR
Pace Project No.: 60272148

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60272148001	**FDG-1-060418**	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
60272148002	**FDG-2-060518**	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
60272148003	**FDG-3-060518**	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
60272148004	**FDG-4-060518**	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
60272148005	**DUP-060518**	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

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60272148

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:

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60272148

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

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60272148

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:

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60272148

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.

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60272148

Sample: FDG-1-060418 **Lab ID: 60272148001** Collected: 06/04/18 09:53 Received: 06/07/18 06:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.27**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:38	7440-39-3	
Beryllium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:38	7440-41-7	
Chromium, Total Recoverable	**<0.0050**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:38	7440-47-3	
Lead, Total Recoverable	**<0.010**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:38	7439-92-1	
Lithium	**0.014**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:38	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:57	7440-36-0	
Arsenic, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:57	7440-38-2	
Cadmium, Total Recoverable	**<0.00050**	mg/L	0.00050	1	06/11/18 10:25	06/19/18 17:57	7440-43-9	
Cobalt, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:57	7440-48-4	
Molybdenum, Total Recoverable	**0.0014**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:57	7439-98-7	
Selenium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:57	7782-49-2	
Thallium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:57	7440-28-0	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1							
Mercury	**<0.00020**	mg/L	0.00020	1	06/15/18 15:25	06/18/18 09:43	7439-97-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**0.36**	mg/L	0.20	1		06/12/18 14:34	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60272148

Sample: FDG-2-060518 **Lab ID: 60272148002** Collected: 06/05/18 08:22 Received: 06/07/18 06:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.076**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:41	7440-39-3	
Beryllium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:41	7440-41-7	
Chromium, Total Recoverable	**<0.0050**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:41	7440-47-3	
Lead, Total Recoverable	**<0.010**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:41	7439-92-1	
Lithium	**0.011**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:41	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:59	7440-36-0	
Arsenic, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:59	7440-38-2	
Cadmium, Total Recoverable	**<0.00050**	mg/L	0.00050	1	06/11/18 10:25	06/19/18 17:59	7440-43-9	
Cobalt, Total Recoverable	**0.0020**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:59	7440-48-4	
Molybdenum, Total Recoverable	**0.0041**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:59	7439-98-7	
Selenium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:59	7782-49-2	
Thallium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 17:59	7440-28-0	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1							
Mercury	**<0.00020**	mg/L	0.00020	1	06/15/18 15:25	06/18/18 09:45	7439-97-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**0.36**	mg/L	0.20	1		06/12/18 14:47	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60272148

Sample: FDG-3-060518 **Lab ID: 60272148003** Collected: 06/05/18 09:55 Received: 06/07/18 06:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.10**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:44	7440-39-3	
Beryllium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:44	7440-41-7	
Chromium, Total Recoverable	**<0.0050**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:44	7440-47-3	
Lead, Total Recoverable	**<0.010**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:44	7439-92-1	
Lithium	**0.013**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:44	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:01	7440-36-0	
Arsenic, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:01	7440-38-2	
Cadmium, Total Recoverable	**<0.00050**	mg/L	0.00050	1	06/11/18 10:25	06/19/18 18:01	7440-43-9	
Cobalt, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:01	7440-48-4	
Molybdenum, Total Recoverable	**0.0056**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:01	7439-98-7	
Selenium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:01	7782-49-2	
Thallium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:01	7440-28-0	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1							
Mercury	**<0.00020**	mg/L	0.00020	1	06/15/18 15:25	06/18/18 09:48	7439-97-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**0.32**	mg/L	0.20	1		06/12/18 15:01	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60272148

Sample: FDG-4-060518 **Lab ID: 60272148004** Collected: 06/05/18 11:27 Received: 06/07/18 06:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.047**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:54	7440-39-3	
Beryllium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:54	7440-41-7	
Chromium, Total Recoverable	**<0.0050**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:54	7440-47-3	
Lead, Total Recoverable	**<0.010**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:54	7439-92-1	
Lithium	**0.014**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:54	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:03	7440-36-0	
Arsenic, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:03	7440-38-2	
Cadmium, Total Recoverable	**<0.00050**	mg/L	0.00050	1	06/11/18 10:25	06/19/18 18:03	7440-43-9	
Cobalt, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:03	7440-48-4	
Molybdenum, Total Recoverable	**0.0036**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:03	7439-98-7	
Selenium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:03	7782-49-2	
Thallium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:03	7440-28-0	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1							
Mercury	**<0.00020**	mg/L	0.00020	1	06/15/18 15:25	06/18/18 09:50	7439-97-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**0.36**	mg/L	0.20	1		06/12/18 15:42	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD CCR
Pace Project No.: 60272148

Sample: DUP-060518 **Lab ID: 60272148005** Collected: 06/05/18 06:00 Received: 06/07/18 06:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.078**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:57	7440-39-3	
Beryllium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/12/18 20:57	7440-41-7	
Chromium, Total Recoverable	**<0.0050**	mg/L	0.0050	1	06/11/18 10:25	06/12/18 20:57	7440-47-3	
Lead, Total Recoverable	**<0.010**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:57	7439-92-1	
Lithium	**<0.010**	mg/L	0.010	1	06/11/18 10:25	06/12/18 20:57	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:06	7440-36-0	
Arsenic, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:06	7440-38-2	
Cadmium, Total Recoverable	**<0.00050**	mg/L	0.00050	1	06/11/18 10:25	06/19/18 18:06	7440-43-9	
Cobalt, Total Recoverable	**0.0020**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:06	7440-48-4	
Molybdenum, Total Recoverable	**0.0042**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:06	7439-98-7	
Selenium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:06	7782-49-2	
Thallium, Total Recoverable	**<0.0010**	mg/L	0.0010	1	06/11/18 10:25	06/19/18 18:06	7440-28-0	
245.1 Mercury	Analytical Method: EPA 245.1 Preparation Method: EPA 245.1							
Mercury	**<0.00020**	mg/L	0.00020	1	06/15/18 15:25	06/18/18 09:52	7439-97-6	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**0.36**	mg/L	0.20	1		06/12/18 15:56	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60272148

QC Batch: 530236 Analysis Method: EPA 245.1
QC Batch Method: EPA 245.1 Analysis Description: 245.1 Mercury
Associated Lab Samples: 60272148001, 60272148002, 60272148003, 60272148004, 60272148005

METHOD BLANK: 2172147 Matrix: Water
Associated Lab Samples: 60272148001, 60272148002, 60272148003, 60272148004, 60272148005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	<0.00020	0.00020	06/18/18 09:15	

LABORATORY CONTROL SAMPLE: 2172148

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: 2172149 2172150

Parameter	Units	60272147001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	<0.00020	.005	.005	0.0048	0.0048	97	96	70-130	1	20	

MATRIX SPIKE SAMPLE: 2172151

Parameter	Units	60272634001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	ND	.005	0.0057	112	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

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60272148

QC Batch: 529365 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60272148001, 60272148002, 60272148003, 60272148004, 60272148005

METHOD BLANK: 2168846 Matrix: Water
Associated Lab Samples: 60272148001, 60272148002, 60272148003, 60272148004, 60272148005

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

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

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60272148

QC Batch: 529359 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60272148001, 60272148002, 60272148003, 60272148004, 60272148005

METHOD BLANK: 2168827 Matrix: Water
Associated Lab Samples: 60272148001, 60272148002, 60272148003, 60272148004, 60272148005

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

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

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60272148

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	

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

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

QUALITY CONTROL DATA

Project: JEC FGD CCR
Pace Project No.: 60272148

QC Batch: 529337 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60272148001, 60272148002, 60272148003, 60272148004, 60272148005

METHOD BLANK: 2168767 Matrix: Water
Associated Lab Samples: 60272148001, 60272148002, 60272148003, 60272148004, 60272148005

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

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

QUALIFIERS

Project: JEC FGD CCR
Pace Project No.: 60272148

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.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JEC FGD CCR
Pace Project No.: 60272148

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60272148001	**FDG-1-060418**	EPA 200.7	529365	EPA 200.7	529483
60272148002	**FDG-2-060518**	EPA 200.7	529365	EPA 200.7	529483
60272148003	**FDG-3-060518**	EPA 200.7	529365	EPA 200.7	529483
60272148004	**FDG-4-060518**	EPA 200.7	529365	EPA 200.7	529483
60272148005	**DUP-060518**	EPA 200.7	529365	EPA 200.7	529483
60272148001	**FDG-1-060418**	EPA 200.8	529359	EPA 200.8	529479
60272148002	**FDG-2-060518**	EPA 200.8	529359	EPA 200.8	529479
60272148003	**FDG-3-060518**	EPA 200.8	529359	EPA 200.8	529479
60272148004	**FDG-4-060518**	EPA 200.8	529359	EPA 200.8	529479
60272148005	**DUP-060518**	EPA 200.8	529359	EPA 200.8	529479
60272148001	**FDG-1-060418**	EPA 245.1	530236	EPA 245.1	530265
60272148002	**FDG-2-060518**	EPA 245.1	530236	EPA 245.1	530265
60272148003	**FDG-3-060518**	EPA 245.1	530236	EPA 245.1	530265
60272148004	**FDG-4-060518**	EPA 245.1	530236	EPA 245.1	530265
60272148005	**DUP-060518**	EPA 245.1	530236	EPA 245.1	530265
60272148001	**FDG-1-060418**	EPA 300.0	529337		
60272148002	**FDG-2-060518**	EPA 300.0	529337		
60272148003	**FDG-3-060518**	EPA 300.0	529337		
60272148004	**FDG-4-060518**	EPA 300.0	529337		
60272148005	**DUP-060518**	EPA 300.0	529337		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO#: 60272148

60272148

Client Name: Westar Energy

Courier: FedEx ☐ UPS ☐ VIA ☒ 2 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-297 **Type of Ice:** (Wet) Blue None

HU

Cooler Temperature (°C): **As-read** 0.9 **Corr. Factor** +0.9 **Corrected** 1.8

Date and initials of person examining contents: AC 6/7

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☒No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☒No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

REVIEWED
By Nolie Wood at 11:11 am, 6/8/18

Pace Analytical
www.pacelabs.com

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:	16 DAY

Section B — Required Project Information:

Report To:	Brandon Griffin
Copy To:	Jared Morrison, Heath Hornya
Purchase Order No.:	10JEC-0000033150
Project Name:	JEC FGD 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 #:	9657, 2

REGULATORY AGENCY

☑ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: KS

Section D — Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	200.7 Total Metals*	200.8 Total Metals**	245.1 Total Mercury	300.0 Fluoride					Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																										60272148
1	FGD-1-060418	WT	G			6/4	0953		2	1		1										BPIU	BPIN			001
2	FGD-2-060518	WT	G			6/5	0822		2	1		1														002
3	FGD-3-060518	WT	G			6/5	0955		2	1		1														003
4	FGD-4-060518	WT	G			6/5	1127		2	1		1														004
5																										
6																										
7																										
8																										
9																										
10	DUP-060518	WT	G			6/5	0600		2	1		1								X	X	X	BPIU	BPIN			005
11																										
12																										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*200.7 Total Metals: Ba, Be, Cr, Pb, Li	/westar	6/6/18	1100		6/7/18	0610	1.3	Y	Y	Y
**200.8 Total Metals: Co, As, Se, Mo, Cd, Sb, Tl										

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brandon Griffin

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 06/05/18

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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

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

June 28, 2018

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

RE: Project: JEC FGD CCR
Pace Project No.: 60272183

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

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

CERTIFICATIONS

Project: JEC FGD CCR
Pace Project No.: 60272183

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

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

SAMPLE SUMMARY

Project: JEC FGD CCR
Pace Project No.: 60272183

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60272183001	**FGD-1-060418**	Water	06/04/18 09:53	06/07/18 10:10
60272183002	**FGD-2-060518**	Water	06/05/18 08:22	06/07/18 10:10
60272183003	**FGD-3-060518**	Water	06/05/18 09:55	06/07/18 10:10
60272183004	**FGD-4-060518**	Water	06/05/18 11:27	06/07/18 10:10
60272183005	**DUP-060518**	Water	06/05/18 06:00	06/07/18 10:10

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

SAMPLE ANALYTE COUNT

Project: JEC FGD CCR
Pace Project No.: 60272183

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60272183001	**FGD-1-060418**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272183002	**FGD-2-060518**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272183003	**FGD-3-060518**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272183004	**FGD-4-060518**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
60272183005	**DUP-060518**	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60272183

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: WESTAR ENERGY
Date: June 28, 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:

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60272183

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: WESTAR ENERGY
Date: June 28, 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:

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60272183

Method: **Total Radium Calculation**
Description: Total Radium 228+226
Client: WESTAR ENERGY
Date: June 28, 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.

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60272183

Sample: FGD-1-060418 **Lab ID: 60272183001** Collected: 06/04/18 09:53 Received: 06/07/18 10:10 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.0632 ± 0.411 (0.828) C:NA T:81%**	pCi/L	06/27/18 11:22	13982-63-3	
Radium-228	EPA 904.0	**-0.00978 ± 0.383 (0.894) C:70% T:83%**	pCi/L	06/27/18 11:52	15262-20-1	
Total Radium	Total Radium Calculation	**0.0632 ± 0.794 (1.72)**	pCi/L	06/28/18 13:29	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60272183

Sample: FGD-2-060518 **Lab ID: 60272183002** Collected: 06/05/18 08:22 Received: 06/07/18 10:10 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.109 ± 0.262 (0.507) C:NA T:95%**	pCi/L	06/27/18 11:22	13982-63-3	
Radium-228	EPA 904.0	**0.333 ± 0.409 (0.865) C:70% T:83%**	pCi/L	06/27/18 11:52	15262-20-1	
Total Radium	Total Radium Calculation	**0.442 ± 0.671 (1.37)**	pCi/L	06/28/18 13:29	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60272183

Sample: FGD-3-060518 **Lab ID: 60272183003** Collected: 06/05/18 09:55 Received: 06/07/18 10:10 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.462 ± 0.366 (0.476) C:NA T:95%**	pCi/L	06/27/18 11:22	13982-63-3	
Radium-228	EPA 904.0	**0.378 ± 0.369 (0.757) C:69% T:88%**	pCi/L	06/27/18 11:52	15262-20-1	
Total Radium	Total Radium Calculation	**0.840 ± 0.735 (1.23)**	pCi/L	06/28/18 13:29	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60272183

Sample: FGD-4-060518 **Lab ID: 60272183004** Collected: 06/05/18 11:27 Received: 06/07/18 10:10 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.523 ± 0.414 (0.562) C:NA T:95%**	pCi/L	06/27/18 11:22	13982-63-3	
Radium-228	EPA 904.0	**0.435 ± 0.432 (0.889) C:70% T:79%**	pCi/L	06/27/18 11:52	15262-20-1	
Total Radium	Total Radium Calculation	**0.958 ± 0.846 (1.45)**	pCi/L	06/28/18 13:29	7440-14-4	

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60272183

Sample: DUP-060518 **Lab ID: 60272183005** Collected: 06/05/18 06:00 Received: 06/07/18 10:10 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	**0.000 ± 0.352 (0.744) C:NA T:86%**	pCi/L	06/27/18 11:22	13982-63-3	
Radium-228	EPA 904.0	**0.359 ± 0.402 (0.842) C:73% T:83%**	pCi/L	06/27/18 11:51	15262-20-1	
Total Radium	Total Radium Calculation	**0.359 ± 0.754 (1.59)**	pCi/L	06/28/18 13:35	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60272183

QC Batch: 301884 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60272183001, 60272183002, 60272183003, 60272183004, 60272183005

METHOD BLANK: 1477313 Matrix: Water
Associated Lab Samples: 60272183001, 60272183002, 60272183003, 60272183004, 60272183005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.0188 ± 0.358 (0.837) C:76% T:81%	pCi/L	06/27/18 11:50	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60272183

QC Batch: 301855 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60272183001, 60272183002, 60272183003, 60272183004, 60272183005

METHOD BLANK: 1477250 Matrix: Water
Associated Lab Samples: 60272183001, 60272183002, 60272183003, 60272183004, 60272183005

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.106 ± 0.293 (0.568) C:NA T:92%	pCi/L	06/27/18 10:42	

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

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

QUALIFIERS

Project: JEC FGD CCR
Pace Project No.: 60272183

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JEC FGD CCR
Pace Project No.: 60272183

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60272183001	**FGD-1-060418**	EPA 903.1	301855		
60272183002	**FGD-2-060518**	EPA 903.1	301855		
60272183003	**FGD-3-060518**	EPA 903.1	301855		
60272183004	**FGD-4-060518**	EPA 903.1	301855		
60272183005	**DUP-060518**	EPA 903.1	301855		
60272183001	**FGD-1-060418**	EPA 904.0	301884		
60272183002	**FGD-2-060518**	EPA 904.0	301884		
60272183003	**FGD-3-060518**	EPA 904.0	301884		
60272183004	**FGD-4-060518**	EPA 904.0	301884		
60272183005	**DUP-060518**	EPA 904.0	301884		
60272183001	**FGD-1-060418**	Total Radium Calculation	304019		
60272183002	**FGD-2-060518**	Total Radium Calculation	304019		
60272183003	**FGD-3-060518**	Total Radium Calculation	304019		
60272183004	**FGD-4-060518**	Total Radium Calculation	304019		
60272183005	**DUP-060518**	Total Radium Calculation	304020		

Pace Analytical
www.pacelabs.com

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:		Section B Required Project Information:		Section C Invoice Information:	
Company:	WESTAR ENERGY	Report To:	Brandon Griffin	Attention:	Jared Morrison
Address:	818 Kansas Ave	Copy To:	Jared Morrison, Heath Hornya	Company Name:	WESTAR ENERGY
	Topeka, KS 66612			Address:	SEE SECTION A
Email To:	brandon.l.griffin@westarenergy.com	Purchase Order No.:	10JEC-0000033150	Pace Quote Reference:	
Phone:	(785) 575-8135 Fax:	Project Name:	JEC FGD CCR	Pace Project Manager:	Heather Wilson, 913-563-1407
Requested Due Date/TAT:	15 Day	Project Number:		Pace Profile #:	9657, 2

REGULATORY AGENCY

☑ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: KS

Requested Analysis Filtered (Y/N)

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Radium-226	Radium-228	Total Radium	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	FGD-1-060418	WT	G			6/4	0953		2			2						✓	✓	✓	✓		60272183
2	FGD-2-060518	WT	G			6/5	0822		2			2											
3	FGD-3-060518	WT	G			6/5	0955		2			2											
4	FGD-4-060518	WT	G			6/5	1127		2			2											
5																							
6																							
7																							
8																							
9																							
10	DUP-060518	WT	G			6/5	0600		2			2						X	X	X			
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Westar	6/6/18	1100		6.7.18	1010	—	Y	N	Y

SAMPLER NAME AND SIGNATURE					
PRINT Name of SAMPLER:	Brandon Griffin		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
SIGNATURE of SAMPLER:		DATE Signed (MM/DD/YY): 06/05/18				

*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.

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: PACE KS

Project # 60272183

Label

LIMS Login

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 4360 7275 7691 0

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

Thermometer Used N/A 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

pH paper Lot# 10D3607L

Date and Initials of person examining contents: BSH 6-7-18

Comments:	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: -Includes date/time/ID Matrix: WT	✓			5.
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: -Pace Containers Used:	✓			10.
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. All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenolics	✓			16. pH<2
				Initial when completed BSH 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: BSH Date: 6-7-18

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

Pace Analytical®
www.pacelabs.com

☐ Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: KS

Workorder: 60272183 **Workorder Name:** JEC FGD CCR **Owner Received Date:** 6/7/2018 **Results Requested By:** 6/28/2018

Report To	Subcontract To
Heather Wilson Pace Analytical Kansas 9608 Loiret Blvd. Lenexa, KS 66219 Phone 1(913)563-1407	Pace Analytical Pittsburgh 1638 Roseytown Road Suites 2,3, & 4 Greensburg, PA 15601 Phone (724)850-5600

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Other	Requested Analysis: Radium-226 & Total Radium	Requested Analysis: Radium-228	LAB USE ONLY
1	FGD-1-060418	PS	6/4/2018 09:53	60272183001	Water	1	X	X	001
2	FGD-2-060518	PS	6/5/2018 08:22	60272183002	Water	1	X	X	002
3	FGD-3-060518	PS	6/5/2018 09:55	60272183003	Water	1	X	X	003
4	FGD-4-060518	PS	6/5/2018 11:27	60272183004	Water	1	X	X	004
5	DUP-060518	PS	6/5/2018 06:00	60272183005	Water	1	X	X	005

Transfers	Released By	Date/Time	Received By	Date/Time
1			[signature]	6-7-18 1010
2				
3				

Comments

Cooler Temperature on Receipt ~ °C | **Custody Seal** Y or (N) | **Received on Ice** Y or (N) | **Samples Intact** (Y) or N

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

WO# : 30255573

30255573

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

30255573

Page: / of /

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:	15 Day

Section B Required Project Information:

Report To:	Brandon Griffin
Copy To:	Jared Morrison, Heath Hornya
Purchase Order No.:	10JEC-0000033150
Project Name:	JEC FGD 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 #:	9657, 2

REGULATORY AGENCY

☑ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: KS

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Radium-226	Radium-228	Total Radium	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	FGD-1-060418	WT	G			6/4	0953		2			2											
2	FGD-2-060518	WT	G			6/5	0822		2			2											
3	FGD-3-060518	WT	G			6/5	0955		2			2											
4	FGD-4-060518	WT	G			6/5	1127		2			2											
5																							
6																							
7																							
8																							
9																							
10	DUP-060518	WT	G			6/5	0600		2			2								X	X	X		
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	[illegible] / Westar	6/6/18	1100	[illegible]	6-7-18	1010

SAMPLE CONDITIONS

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
—	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brandon Griffin

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 06/05/18

*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.

Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name: PACE KS Project # 30255573

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label BXH
LIMS Login BXH

Tracking #: 4368 7275 7691 2

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

Thermometer Used N/A 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

pH paper Lot# 10D36071 Date and Initials of person examining contents: BXH 6-7-18

Comments:	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: -Includes date/time/ID Matrix: WT	✓			5.
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: -Pace Containers Used:	✓ ✓			10.
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. All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenolics	✓ ✓			16. pH<2
				Initial when completed BXH Date/time of preservation
				Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present: Trip Blank Custody Seals Present		✓	✓	18.
Rad Aqueous Samples Screened > 0.5 mrem/hr		✓		Initial when completed: BXH Date: 6-7-18

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

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

October 31, 2018

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

RE: Project: JEC FGD-CCR
Pace Project No.: 60280352

Dear Brandon Griffin:
Enclosed are the analytical results for sample(s) received by the laboratory on September 12, 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.

Revised Report REV_1

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
JD Schlegel, KCP&L & Westar

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

CERTIFICATIONS

Project: JEC FGD-CCR
Pace Project No.: 60280352

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 #: T104704407-18-11
Utah Certification #: KS000212018-8
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070
Missouri Certification Number: 10090

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

SAMPLE SUMMARY

Project: JEC FGD-CCR
Pace Project No.: 60280352

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60280352001	**FGD-1-091018**	Water	09/10/18 11:53	09/12/18 15:30
60280352002	**FGD-2-091118**	Water	09/11/18 14:08	09/12/18 15:30
60280352003	**FGD-3-091118**	Water	09/11/18 15:26	09/12/18 15:30
60280352004	**FGD-4-091118**	Water	09/11/18 16:47	09/12/18 15:30

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

SAMPLE ANALYTE COUNT

Project: JEC FGD-CCR
Pace Project No.: 60280352

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60280352001	**FGD-1-091018**	EPA 200.7	CTR	4	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2540C	JDA	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
60280352002	**FGD-2-091118**	EPA 200.7	CTR, OL	4	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2540C	JDA	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
60280352003	**FGD-3-091118**	EPA 200.7	CTR, OL	4	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2540C	JDA	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	WNM	3	PASI-K
60280352004	**FGD-4-091118**	EPA 200.7	CTR	4	PASI-K
		EPA 200.8	JGP	2	PASI-K
		SM 2540C	JDA	1	PASI-K
		SM 4500-H+B	ZMH	1	PASI-K
		EPA 300.0	WNM	3	PASI-K

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

PROJECT NARRATIVE

Project: JEC FGD-CCR
Pace Project No.: 60280352

Date: October 31, 2018

Revised report to include all requested analyses

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

PROJECT NARRATIVE

Project: JEC FGD-CCR
Pace Project No.: 60280352

Method: **EPA 200.7**
Description: 200.7 Metals, Total
Client: WESTAR ENERGY
Date: October 31, 2018

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

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

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

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

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

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

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

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

Additional Comments:

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

PROJECT NARRATIVE

Project: JEC FGD-CCR
Pace Project No.: 60280352

Method: **EPA 200.8**
Description: 200.8 MET ICPMS
Client: WESTAR ENERGY
Date: October 31, 2018

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

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

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

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

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

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

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

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

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

Additional Comments:

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

PROJECT NARRATIVE

Project: JEC FGD-CCR
Pace Project No.: 60280352

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: WESTAR ENERGY
Date: October 31, 2018

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

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

H1: Analysis conducted outside the EPA method holding time.
- FGD-1-091018 (Lab ID: 60280352001)
- FGD-2-091118 (Lab ID: 60280352002)
- FGD-3-091118 (Lab ID: 60280352003)
- FGD-4-091118 (Lab ID: 60280352004)

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:

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

PROJECT NARRATIVE

Project: JEC FGD-CCR
Pace Project No.: 60280352

Method: **SM 4500-H+B**
Description: 4500H+ pH, Electrometric
Client: WESTAR ENERGY
Date: October 31, 2018

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

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

H6: Analysis initiated outside of the 15 minute EPA required holding time.
- FGD-1-091018 (Lab ID: 60280352001)
- FGD-2-091118 (Lab ID: 60280352002)
- FGD-3-091118 (Lab ID: 60280352003)
- FGD-4-091118 (Lab ID: 60280352004)

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:

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

PROJECT NARRATIVE

Project: JEC FGD-CCR
Pace Project No.: 60280352

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: WESTAR ENERGY
Date: October 31, 2018

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

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

H1: Analysis conducted outside the EPA method holding time.
- FGD-1-091018 (Lab ID: 60280352001)
- FGD-2-091118 (Lab ID: 60280352002)
- FGD-3-091118 (Lab ID: 60280352003)
- FGD-4-091118 (Lab ID: 60280352004)

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: 549597

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60280352001,60282219001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 2253839)
  - Chloride
  - Sulfate
- MS (Lab ID: 2253841)
  - Chloride
- MSD (Lab ID: 2253840)
  - Chloride
  - Sulfate

Additional Comments:

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

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

ANALYTICAL RESULTS

Project: JEC FGD-CCR
Pace Project No.: 60280352

Sample: FGD-1-091018 **Lab ID: 60280352001** Collected: 09/10/18 11:53 Received: 09/12/18 15:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.28**	mg/L	0.0050	1	09/28/18 11:15	10/01/18 18:01	7440-39-3	
Boron, Total Recoverable	**<100**	ug/L	100	1	09/28/18 11:15	10/01/18 18:01	7440-42-8	
Calcium, Total Recoverable	**96100**	ug/L	400	2	09/28/18 11:15	10/08/18 12:53	7440-70-2	
Lithium	**0.015**	mg/L	0.010	1	09/28/18 11:15	10/01/18 18:01	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Cobalt, Total Recoverable	**<0.0010**	mg/L	0.0010	1	09/28/18 14:55	10/05/18 19:00	7440-48-4	
Molybdenum, Total Recoverable	**0.0014**	mg/L	0.0010	1	09/28/18 14:55	10/05/18 19:00	7439-98-7	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**523**	mg/L	5.0	1		10/15/18 16:08		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.0**	Std. Units	0.10	1		09/18/18 09:54		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**68.1**	mg/L	10.0	10		10/16/18 20:35	16887-00-6	H1,M1
Fluoride	**0.44**	mg/L	0.20	1		10/03/18 15:15	16984-48-8	
Sulfate	**90.4**	mg/L	10.0	10		10/16/18 20:35	14808-79-8	H1,M1

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD-CCR
Pace Project No.: 60280352

Sample: FGD-2-091118 **Lab ID: 60280352002** Collected: 09/11/18 14:08 Received: 09/12/18 15:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.070**	mg/L	0.0050	1	09/28/18 11:15	10/01/18 18:03	7440-39-3	
Boron, Total Recoverable	**251**	ug/L	100	1	09/28/18 11:15	10/01/18 18:03	7440-42-8	
Calcium, Total Recoverable	**160000**	ug/L	200	1	09/28/18 11:15	10/02/18 14:07	7440-70-2	
Lithium	**<0.010**	mg/L	0.010	1	09/28/18 11:15	10/01/18 18:03	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Cobalt, Total Recoverable	**0.0016**	mg/L	0.0010	1	09/28/18 14:55	10/05/18 19:02	7440-48-4	
Molybdenum, Total Recoverable	**0.0042**	mg/L	0.0010	1	09/28/18 14:55	10/05/18 19:02	7439-98-7	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**783**	mg/L	5.0	1		10/15/18 16:08		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.1**	Std. Units	0.10	1		09/17/18 11:43		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**40.2**	mg/L	5.0	5		10/16/18 21:23	16887-00-6	H1
Fluoride	**0.40**	mg/L	0.20	1		10/03/18 19:01	16984-48-8	
Sulfate	**387**	mg/L	50.0	50		10/16/18 21:39	14808-79-8	H1

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD-CCR
Pace Project No.: 60280352

Sample: FGD-3-091118 **Lab ID: 60280352003** Collected: 09/11/18 15:26 Received: 09/12/18 15:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.099**	mg/L	0.0050	1	09/28/18 11:15	10/01/18 18:05	7440-39-3	
Boron, Total Recoverable	**154**	ug/L	100	1	09/28/18 11:15	10/01/18 18:05	7440-42-8	
Calcium, Total Recoverable	**171000**	ug/L	200	1	09/28/18 11:15	10/02/18 14:09	7440-70-2	
Lithium	**0.013**	mg/L	0.010	1	09/28/18 11:15	10/01/18 18:05	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Cobalt, Total Recoverable	**<0.0010**	mg/L	0.0010	1	09/28/18 14:55	10/05/18 19:04	7440-48-4	
Molybdenum, Total Recoverable	**0.0053**	mg/L	0.0010	1	09/28/18 14:55	10/05/18 19:04	7439-98-7	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**941**	mg/L	5.0	1		10/15/18 16:08		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.0**	Std. Units	0.10	1		09/17/18 11:44		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**71.0**	mg/L	10.0	10		10/16/18 22:11	16887-00-6	H1
Fluoride	**0.53**	mg/L	0.20	1		10/03/18 19:36	16984-48-8	
Sulfate	**432**	mg/L	50.0	50		10/16/18 21:55	14808-79-8	H1

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: JEC FGD-CCR
Pace Project No.: 60280352

Sample: FGD-4-091118 **Lab ID: 60280352004** Collected: 09/11/18 16:47 Received: 09/12/18 15:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Barium, Total Recoverable	**0.047**	mg/L	0.0050	1	09/28/18 11:15	10/01/18 18:11	7440-39-3	
Boron, Total Recoverable	**265**	ug/L	100	1	09/28/18 11:15	10/01/18 18:11	7440-42-8	
Calcium, Total Recoverable	**191000**	ug/L	200	1	09/28/18 11:15	10/01/18 18:11	7440-70-2	
Lithium	**0.014**	mg/L	0.010	1	09/28/18 11:15	10/01/18 18:11	7439-93-2	
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Cobalt, Total Recoverable	**<0.0010**	mg/L	0.0010	1	09/28/18 14:55	10/05/18 19:07	7440-48-4	
Molybdenum, Total Recoverable	**0.0037**	mg/L	0.0010	1	09/28/18 14:55	10/05/18 19:07	7439-98-7	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1160**	mg/L	5.0	1		10/15/18 16:08		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B							
pH at 25 Degrees C	**7.0**	Std. Units	0.10	1		09/17/18 11:46		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**113**	mg/L	10.0	10		10/16/18 22:27	16887-00-6	H1
Fluoride	**0.39**	mg/L	0.20	1		10/03/18 15:56	16984-48-8	
Sulfate	**540**	mg/L	50.0	50		10/16/18 23:15	14808-79-8	H1

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD-CCR
Pace Project No.: 60280352

QC Batch: 546857 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60280352001, 60280352002, 60280352003, 60280352004

METHOD BLANK: 2241777 Matrix: Water
Associated Lab Samples: 60280352001, 60280352002, 60280352003, 60280352004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Barium	mg/L	<0.0050	0.0050	10/01/18 17:58	
Boron	ug/L	<100	100	10/01/18 17:58	
Calcium	ug/L	<200	200	10/02/18 15:19	
Lithium	mg/L	<0.010	0.010	10/01/18 17:58	

LABORATORY CONTROL SAMPLE: 2241778

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	1	0.94	94	85-115	
Boron	ug/L	1000	937	94	85-115	
Calcium	ug/L	10000	9880	99	85-115	
Lithium	mg/L	1	0.96	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2241779 2241780

Parameter	Units	60281253001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	39.5 ug/L	1	1	0.98	0.99	94	95	70-130	1	20	
Boron	ug/L	5460	1000	1000	6570	6530	110	107	70-130	1	20	
Calcium	ug/L	51400	10000	10000	62400	62100	109	106	70-130	0	20	
Lithium	mg/L	19.1 ug/L	1	1	1.0	1.0	98	98	70-130	0	20	

MATRIX SPIKE SAMPLE: 2241781

Parameter	Units	60281906001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	119 ug/L	1	1.0	92	70-130	
Boron	ug/L	ND	1000	1050	96	70-130	
Calcium	ug/L	39400	10000	47800	83	70-130	
Lithium	mg/L	ND	1	0.95	94	70-130	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD-CCR
Pace Project No.: 60280352

QC Batch: 546932 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60280352001, 60280352002, 60280352003, 60280352004

METHOD BLANK: 2242004 Matrix: Water
Associated Lab Samples: 60280352001, 60280352002, 60280352003, 60280352004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cobalt	mg/L	<0.0010	0.0010	10/05/18 18:55	
Molybdenum	mg/L	<0.0010	0.0010	10/05/18 18:55	

LABORATORY CONTROL SAMPLE: 2242005

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/L	.04	0.038	94	85-115	
Molybdenum	mg/L	.04	0.038	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2242006 2242007

Parameter	Units	60281811001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cobalt	mg/L	<3.0 ug/L	.04	.04	0.039	0.039	97	98	70-130	1	20	
Molybdenum	mg/L	5.5 ug/L	.04	.04	0.046	0.047	102	104	70-130	2	20	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD-CCR
Pace Project No.: 60280352

QC Batch: 549610 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60280352001, 60280352002, 60280352003, 60280352004

METHOD BLANK: 2253887 Matrix: Water
Associated Lab Samples: 60280352001, 60280352002, 60280352003, 60280352004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	10/15/18 16:08	

LABORATORY CONTROL SAMPLE: 2253888

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

SAMPLE DUPLICATE: 2253889

Parameter	Units	60283556004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	918	919	0	10	

SAMPLE DUPLICATE: 2253890

Parameter	Units	60283561003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	515	507	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

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

QUALITY CONTROL DATA

Project: JEC FGD-CCR
Pace Project No.: 60280352

QC Batch: 544850 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH
Associated Lab Samples: 60280352002, 60280352003, 60280352004

SAMPLE DUPLICATE: 2232922

Parameter	Units	60280457001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.9	7.3	5	5	H6

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD-CCR
Pace Project No.: 60280352

QC Batch: 544984
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Associated Lab Samples: 60280352001

SAMPLE DUPLICATE: 2233221

Parameter	Units	60280352001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.0	7.1	2	5	H6

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD-CCR
Pace Project No.: 60280352

QC Batch: 547529
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60280352001

METHOD BLANK: 2244277 Matrix: Water
Associated Lab Samples: 60280352001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	<0.20	0.20	10/03/18 10:14	

LABORATORY CONTROL SAMPLE: 2244278

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: 2244279 2244280

Parameter	Units	60281430003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	ND	25	25	24.9	25.6	97	100	90-110	3	15	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: JEC FGD-CCR
Pace Project No.: 60280352

QC Batch: 547662 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60280352002, 60280352003, 60280352004

METHOD BLANK: 2244908 Matrix: Water
Associated Lab Samples: 60280352002, 60280352003, 60280352004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	<0.20	0.20	10/03/18 11:38	

LABORATORY CONTROL SAMPLE: 2244909

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.3	94	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

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

QUALITY CONTROL DATA

Project: JEC FGD-CCR
Pace Project No.: 60280352

QC Batch: 549597 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60280352001, 60280352002, 60280352003, 60280352004

METHOD BLANK: 2253837 Matrix: Water
Associated Lab Samples: 60280352001, 60280352002, 60280352003, 60280352004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	10/16/18 20:03	
Sulfate	mg/L	<1.0	1.0	10/16/18 20:03	

LABORATORY CONTROL SAMPLE: 2253838

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	101	90-110	
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2253839 2253840

Parameter	Units	60280352001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	68.1	50	50	139	135	141	133	90-110	3	15	H1,M1
Sulfate	mg/L	90.4	50	50	157	152	132	124	90-110	3	15	H1,M1

MATRIX SPIKE SAMPLE: 2253841

Parameter	Units	60282219001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	94.5	100	224	130	90-110	H1,M1
Sulfate	mg/L	2050	2500	4630	103	90-110	H1

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

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

QUALIFIERS

Project: JEC FGD-CCR
Pace Project No.: 60280352

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

H1	Analysis conducted outside the EPA method holding time.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JEC FGD-CCR
Pace Project No.: 60280352

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60280352001	**FGD-1-091018**	EPA 200.7	546857	EPA 200.7	546923
60280352002	**FGD-2-091118**	EPA 200.7	546857	EPA 200.7	546923
60280352003	**FGD-3-091118**	EPA 200.7	546857	EPA 200.7	546923
60280352004	**FGD-4-091118**	EPA 200.7	546857	EPA 200.7	546923
60280352001	**FGD-1-091018**	EPA 200.8	546932	EPA 200.8	546975
60280352002	**FGD-2-091118**	EPA 200.8	546932	EPA 200.8	546975
60280352003	**FGD-3-091118**	EPA 200.8	546932	EPA 200.8	546975
60280352004	**FGD-4-091118**	EPA 200.8	546932	EPA 200.8	546975
60280352001	**FGD-1-091018**	SM 2540C	549610		
60280352002	**FGD-2-091118**	SM 2540C	549610		
60280352003	**FGD-3-091118**	SM 2540C	549610		
60280352004	**FGD-4-091118**	SM 2540C	549610		
60280352001	**FGD-1-091018**	SM 4500-H+B	544984		
60280352002	**FGD-2-091118**	SM 4500-H+B	544850		
60280352003	**FGD-3-091118**	SM 4500-H+B	544850		
60280352004	**FGD-4-091118**	SM 4500-H+B	544850		
60280352001	**FGD-1-091018**	EPA 300.0	547529		
60280352001	**FGD-1-091018**	EPA 300.0	549597		
60280352002	**FGD-2-091118**	EPA 300.0	547662		
60280352002	**FGD-2-091118**	EPA 300.0	549597		
60280352003	**FGD-3-091118**	EPA 300.0	547662		
60280352003	**FGD-3-091118**	EPA 300.0	549597		
60280352004	**FGD-4-091118**	EPA 300.0	547662		
60280352004	**FGD-4-091118**	EPA 300.0	549597		

HMW

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60280352

60280352

Client Name: Westar Energy

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

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

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

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other ☑ zip ic

Thermometer Used: T299 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 3.7 **Corr. Factor** +0.1 **Corrected** 3.8

Date and initials of person examining contents: 9.12.18 HF

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☑Yes ☐No ☐N/A	pH
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☑No ☐N/A	
Filtered volume received for dissolved tests?	☐Yes ☑No ☐N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☑No ☐N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

REVIEWED
By Nolie Wood at 5:46 pm, 9/13/18

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical™ www.pacelabs.com

Page: of

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,
Purchase Order No.:	10JEC-0000033150
Project Name:	JEC FGD-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 #:	9657, 2

REGULATORY AGENCY

☑ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: KS

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	200.7 Total Metals*	300.0: chloride, fluoride	300.0: sulfate	2540C: TDS	4500: pH	200.8 Total Metals**					Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	Requested Analysis Filtered (Y/N)																											
1	FGD-1-091018	WT	G			9/10	1153												x	x	x	x	x	x	BPLN	BPLN			0280352.001
2	FGD-2-091118	WT	G			9/11	1408												x	x	x	x	x	x					002
3	FGD-3-091118	WT	G			9/11	1526												x	x	x	x	x	x					003
4	FGD-4-091118	WT	G			9/11	1647												x	x	x	x	x	x					004
5																													
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 Cooler (Y/N)	Samples Intact (Y/N)
*200.7 Total Metals: B, Ca, Ba, Li	Westar	9/12/18	0900	Fedex	9.12.18	1530	3.8	Y	Y	Y
**200.8 Total Metals: Co, Mo										

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brandon Griffin

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 09/11/18

*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.

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

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

September 26, 2018

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

RE: Project: JEC FGD CCR
Pace Project No.: 60280641

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

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

CERTIFICATIONS

Project: JEC FGD CCR
Pace Project No.: 60280641

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

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

SAMPLE SUMMARY

Project: JEC FGD CCR
Pace Project No.: 60280641

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60280641001	**FGD-1-091018**	Water	09/10/18 11:53	09/13/18 10:00
60280641002	**FGD-2-091118**	Water	09/11/18 14:08	09/13/18 10:00
60280641003	**FGD-3-091118**	Water	09/11/18 15:26	09/13/18 10:00
60280641004	**FGD-4-091118**	Water	09/11/18 16:47	09/13/18 10:00

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: JEC FGD CCR
Pace Project No.: 60280641

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60280641001	**FGD-1-091018**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60280641002	**FGD-2-091118**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60280641003	**FGD-3-091118**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA
60280641004	**FGD-4-091118**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	JAL	1	PASI-PA

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60280641

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: WESTAR ENERGY
Date: September 26, 2018

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

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

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

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

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

Additional Comments:

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60280641

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: WESTAR ENERGY
Date: September 26, 2018

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

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

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

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

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

Additional Comments:

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

PROJECT NARRATIVE

Project: JEC FGD CCR
Pace Project No.: 60280641

Method: **Total Radium Calculation**
Description: Total Radium 228+226
Client: WESTAR ENERGY
Date: September 26, 2018

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

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

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

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

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

Additional Comments:

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

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60280641

Sample: FGD-1-091018 **Lab ID: 60280641001** Collected: 09/10/18 11:53 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	**1.55 ± 0.827 (0.969) C:NA T:82%**	pCi/L	09/25/18 21:19	13982-63-3	
Radium-228	EPA 904.0	**0.0558 ± 0.413 (0.937) C:77% T:85%**	pCi/L	09/24/18 13:01	15262-20-1	
Total Radium	Total Radium Calculation	**1.61 ± 1.24 (1.91)**	pCi/L	09/26/18 09:42	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60280641

Sample: FGD-2-091118 **Lab ID: 60280641002** Collected: 09/11/18 14:08 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	**0.412 ± 0.700 (1.24) C:NA T:62%**	pCi/L	09/25/18 21:19	13982-63-3	
Radium-228	EPA 904.0	**-0.0591 ± 0.322 (0.768) C:78% T:82%**	pCi/L	09/24/18 13:02	15262-20-1	
Total Radium	Total Radium Calculation	**0.412 ± 1.02 (2.01)**	pCi/L	09/26/18 09:42	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60280641

Sample: FGD-3-091118 **Lab ID: 60280641003** Collected: 09/11/18 15:26 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	**0.967 ± 0.812 (1.16) C:NA T:62%**	pCi/L	09/25/18 21:19	13982-63-3	
Radium-228	EPA 904.0	**-0.147 ± 0.374 (0.903) C:78% T:78%**	pCi/L	09/24/18 14:00	15262-20-1	
Total Radium	Total Radium Calculation	**0.967 ± 1.19 (2.06)**	pCi/L	09/26/18 09:42	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60280641

Sample: FGD-4-091118 **Lab ID: 60280641004** Collected: 09/11/18 16:47 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	**0.696 ± 0.552 (0.749) C:NA T:85%**	pCi/L	09/25/18 21:19	13982-63-3	
Radium-228	EPA 904.0	**0.494 ± 0.477 (0.982) C:79% T:72%**	pCi/L	09/24/18 14:01	15262-20-1	
Total Radium	Total Radium Calculation	**1.19 ± 1.03 (1.73)**	pCi/L	09/26/18 09:42	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60280641

QC Batch: 313310 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 60280641001, 60280641002, 60280641003, 60280641004

METHOD BLANK: 1529840 Matrix: Water
Associated Lab Samples: 60280641001, 60280641002, 60280641003, 60280641004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.305 ± 0.311 (0.640) C:78% T:84%	pCi/L	09/24/18 13:03	

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

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

QUALITY CONTROL - RADIOCHEMISTRY

Project: JEC FGD CCR
Pace Project No.: 60280641

QC Batch: 313308 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 60280641001, 60280641002, 60280641003, 60280641004

METHOD BLANK: 1529832 Matrix: Water
Associated Lab Samples: 60280641001, 60280641002, 60280641003, 60280641004

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0730 ± 0.379 (0.785) C:NA T:87%	pCi/L	09/25/18 21:19	

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

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

QUALIFIERS

Project: JEC FGD CCR
Pace Project No.: 60280641

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JEC FGD CCR
Pace Project No.: 60280641

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60280641001	**FGD-1-091018**	EPA 903.1	313308		
60280641002	**FGD-2-091118**	EPA 903.1	313308		
60280641003	**FGD-3-091118**	EPA 903.1	313308		
60280641004	**FGD-4-091118**	EPA 903.1	313308		
60280641001	**FGD-1-091018**	EPA 904.0	313310		
60280641002	**FGD-2-091118**	EPA 904.0	313310		
60280641003	**FGD-3-091118**	EPA 904.0	313310		
60280641004	**FGD-4-091118**	EPA 904.0	313310		
60280641001	**FGD-1-091018**	Total Radium Calculation	314418		
60280641002	**FGD-2-091118**	Total Radium Calculation	314418		
60280641003	**FGD-3-091118**	Total Radium Calculation	314418		
60280641004	**FGD-4-091118**	Total Radium Calculation	314418		

WO# : 60280641

60280641

Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name: Westar Energy

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label _____

LIMS Login

Tracking #: 454227808017

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 9.4 °C Correction Factor: 0 °C Final Temp: 9.4 °C

Temp should be above freezing to 6°C

pH paper Lot# 10D4671 Date and Initials of person examining contents: 9/13/18 JLB

Comments:	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: -Includes date/time/ID Matrix: WT	✓			5.
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: -Pace Containers Used:	✓			10.
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. All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenolics	✓			16. pH<2 Initial when completed JLB 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: JLB Date: 9/13/18

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.

Pace Analytical
www.pacelabs.com

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:		Section B Required Project Information:		Section C Invoice Information:	
Company:	WESTAR ENERGY	Report To:	Brandon Griffin	Attention:	Jared Morrison
Address:	818 Kansas Ave	Copy To:	Jared Morrison, Heath Hornya	Company Name:	WESTAR ENERGY
	Topeka, KS 66612			Address:	SEE SECTION A
Email To:	brandon.l.griffin@westarenergy.com	Purchase Order No.:	10JEC-0000033150	Pace Quote Reference:	
Phone:	(785) 575-8135 Fax:	Project Name:	JEC FGD CCR	Pace Project Manager:	Heather Wilson, 913-563-1407
Requested Due Date/TAT:	15 Day	Project Number:		Pace Profile #:	9657, 2

REGULATORY AGENCY

☑ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: KS

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Radium-226	Radium-228	Total Radium	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	FGD-1-091018		WT	G			9/10	1153		2			2							X	X	X			01
2	FGD-2-091118		WT	G			9/11	1408		2			2							X	X	X			02
3	FGD-3-091118		WT	G			9/11	1526		2			2							X	X	X			03
4	FGD-4-091118		WT	G			9/11	1647		2			2							X	X	X			04
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

6025826041

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	WESTAR	9/12/18	0900	DAVE	9/13/18	1000	9.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE			Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Brandon Griffin					
SIGNATURE of SAMPLER:		DATE Signed (MM/DD/YY): 09/11/18				

*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.

Chain of Custody

☐ Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: KS
Cert. Needed: ☐ Yes ☐ No
Owner Received Date: 9/13/2018 Results Requested By: 10/4/2018

Pace Analytical®
www.pacelabs.com

Workorder: 60280641 **Workorder Name:** JEC FGD CCR

Report To	Subcontract To
Heather Wilson Pace Analytical Kansas 9608 Loiret Blvd. Lenexa, KS 66219 Phone 1(913)563-1407	Pace Analytical Pittsburgh 1638 Roseytown Road Suites 2,3, & 4 Greensburg, PA 15601 Phone (724)850-5600

WO# : 30265245

30265245

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Other	Requested Analysis: Radium 226 & Total Radium	Requested Analysis: Radium 228	LAB USE ONLY
1	FGD-1-091018	PS	9/10/2018 11:53	60280641001	Water	1	X	X	001
2	FGD-2-091118	PS	9/11/2018 14:08	60280641002	Water	1	X	X	002
3	FGD-3-091118	PS	9/11/2018 15:26	60280641003	Water	1	X	X	003
4	FGD-4-091118	PS	9/11/2018 16:47	60280641004	Water	1	X	X	004
5									

Transfers	Released By	Date/Time	Received By	Date/Time
1			Emily Fay	9-13-18 1000 ET 9-17-18
2				
3				

Comments

Cooler Temperature on Receipt 9.4 °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.*

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

30265245

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:	15 Day

Section B Required Project Information:

Report To:	Brandon Griffin
Copy To:	Jared Morrison, Heath Hornya
Purchase Order No.:	10JEC-0000033150
Project Name:	JEC FGD 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 #:	9657, 2

REGULATORY AGENCY

☑ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: KS

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	Radium-226	Radium-228	Total Radium	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	FGD-1-091018	WT	G			9/10	1153		2			2							X	X	X		
2	FGD-2-091118	WT	G			9/11	1408		2			2							X	X	X		
3	FGD-3-091118	WT	G			9/11	1526		2			2							X	X	X		
4	FGD-4-091118	WT	G			9/11	1647		2			2							X	X	X		
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[signature] / Westar	9/12/18	0900	[signature] DAVE	9/13/18	1000	9.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brandon Griffin

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 09/11/18

*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.

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

Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name: Westar Energy Project # # 30265245

Courier: ☑ Fed Ex EX ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label ET
LIMS Login ET

Tracking #: 454227808017

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 9.4 °C Correction Factor: 0 °C Final Temp: 9.4 °C

Temp should be above freezing to 6°C

pH paper Lot# 10D4621 Date and Initials of person examining contents: 9/13/18 JW3

Comments:	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: -Includes date/time/ID Matrix: WT	✓			5.
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: -Pace Containers Used:	✓			10.
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. All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenolics	✓ ✓			16. pH<2 Initial when completed JW3 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: JW3 Date: 9/13/18

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

November 10, 2022
File No. 129778

TO: Evergy Kansas Central, 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
Jeffrey Energy Center
Flue Gas Desulfurization Landfill

Pursuant to Title 40 Code of Federal Regulations (40 CFR) § 257.90 (Rule), this memorandum summarizes the statistical evaluation of analytical results for the background monitoring groundwater sampling events for the Jeffrey Energy Center (JEC) Flue Gas Desulfurization (FGD) Landfill. These background monitoring groundwater sampling events were completed from **August 2016 through June 2017,** with laboratory results received and accepted by **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-FGD-1). 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 (α) value shall comply with the performance criteria set forth in § 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. A fluoride result from MW-FGD-4 collected on June 30, 2017 was identified as an outlier and warranted removal from the data set.

BACKGROUND DISTRIBUTIONS

The groundwater analytical results for each sampling event from the background sample location (MW-FGD-1) 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 DOWNGRADIENT 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 a 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 through June 2017, SSIs were identified for multiple constituents above background PLs at the FGD Landfill.** Evergy established an assessment monitoring program at the JEC FGD 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 BACKGROUND GROUNDWATER MONITORING STATISTICAL EVALUATION
BACKGROUND SAMPLING EVENTS (AUGUST 2016 - JUNE 2017)
JEFFREY ENERGY CENTER FLUE GAS DESULFURIZATION LANDFILL
ST. MARYS, KANSAS

														Interwell Comparison
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 Well***	**[2]Exceedance above Background at Individual Well**
APPENDIX- III: BORON (mg/L)															
MW-FGD-1 (Upgradient)	4	/	8	50%	0.1	:	0.1	0.12	5.00E-05	0.00707	0.0673	No	No	Stable		
MW-FGD-2	8	/	8	0%	N/A	:	N/A	0.26	2.55E-04	0.016	0.0656	No	No	Stable	Parametric	Yes
MW-FGD-3	6	/	8	25%	0.1	:	0.1	0.16	4.00E-04	0.02	0.154	No	No	Stable	Parametric	Yes
MW-FGD-4	8	/	8	0%	N/A	:	N/A	0.3	2.86E-04	0.0169	0.0615	No	No	Stable	Parametric	Yes
APPENDIX- III: CALCIUM (mg/L)															
MW-FGD-1 (Upgradient)	8	/	8	0%	N/A	:	N/A	98.2	1.17E+01	3.414	0.0365	No	No	Stable		
MW-FGD-2	8	/	8	0%	N/A	:	N/A	161	3.85E+02	19.61	0.147	No	No	Stable	Parametric	Yes
MW-FGD-3	8	/	8	0%	N/A	:	N/A	164	2.57E+02	16.04	0.11	No	No	Stable	Parametric	Yes
MW-FGD-4	8	/	8	0%	N/A	:	N/A	180	3.73E+01	6.105	0.0366	No	No	Stable	Parametric	Yes
APPENDIX- III: CHLORIDE (mg/L)															
MW-FGD-1 (Upgradient)	8	/	8	0%	N/A	:	N/A	66.2	8.57E+01	9.256	0.174	No	No	Stable		
MW-FGD-2	8	/	8	0%	N/A	:	N/A	36.9	3.97E+00	1.992	0.0581	No	No	Stable	Parametric	No
MW-FGD-3	8	/	8	0%	N/A	:	N/A	70.5	1.26E+02	11.21	0.199	No	No	Stable	Parametric	No
MW-FGD-4	8	/	8	0%	N/A	:	N/A	85.7	2.39E+01	4.887	0.0613	No	No	Increasing	Parametric	Yes
APPENDIX- III: FLUORIDE (mg/L)															
MW-FGD-1 (Upgradient)	8	/	8	0%	N/A	:	N/A	0.36	3.36E-04	0.0183	0.0551	No	No	Stable		
MW-FGD-2	8	/	8	0%	N/A	:	N/A	0.39	6.00E-04	0.0245	0.069	No	No	Stable	Parametric	No
MW-FGD-3	8	/	8	0%	N/A	:	N/A	0.31	5.41E-04	0.0233	0.085	No	No	Stable	Parametric	No
MW-FGD-4	8	/	8	0%	N/A	:	N/A	0.43	1.57E-03	0.0396	0.119	Yes	Yes	Stable	Parametric	No
APPENDIX- III: pH															
MW-FGD-1 (Upgradient)	8	/	8	0%	N/A	:	N/A	7.8	4.57E-02	0.214	0.0287	No	No	Stable		
MW-FGD-2	8	/	8	0%	N/A	:	N/A	7.8	4.00E-02	0.2	0.027	No	No	Stable	Parametric	No
MW-FGD-3	8	/	8	0%	N/A	:	N/A	7.6	3.14E-02	0.177	0.0243	No	No	Stable	Parametric	No
MW-FGD-4	8	/	8	0%	N/A	:	N/A	7.6	2.29E-02	0.151	0.0207	No	No	Stable	Parametric	No
APPENDIX- III: SULFATE (mg/L)															
MW-FGD-1 (Upgradient)	8	/	8	0%	N/A	:	N/A	95.4	1.16E+01	3.403	0.0374	No	No	Stable		
MW-FGD-2	8	/	8	0%	N/A	:	N/A	325	3.21E+03	56.69	0.241	No	No	Stable	Parametric	Yes
MW-FGD-3	8	/	8	0%	N/A	:	N/A	335	4.07E+03	63.79	0.244	No	No	Stable	Parametric	Yes
MW-FGD-4	8	/	8	0%	N/A	:	N/A	412	7.03E+02	26.51	0.0693	No	No	Stable	Parametric	Yes
APPENDIX- III: TDS (mg/L)															
MW-FGD-1 (Upgradient)	8	/	8	0%	N/A	:	N/A	545	3.83E+02	19.56	0.0379	No	No	Stable		
MW-FGD-2	8	/	8	0%	N/A	:	N/A	772	6.31E+03	79.46	0.117	No	No	Stable	Parametric	Yes
MW-FGD-3	8	/	8	0%	N/A	:	N/A	880	7.48E+03	86.46	0.111	No	No	Stable	Parametric	Yes
MW-FGD-4	8	/	8	0%	N/A	:	N/A	1070	5.47E+03	73.95	0.0761	No	No	Increasing	Parametric	Yes

Notes & Abbreviations:

** - 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 Statistical Analyses

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

TECHNICAL MEMORANDUM

November 10, 2022
File No. 129778

TO: Evergy Kansas Central, Inc.
Jared Morrison – Director, Water and Waste Programs

FROM: Haley & Aldrich, Inc.
Steven F. Putrich, P.E., Senior Associate – Engineering Principal
Mark Nicholls, P.G., Senior Associate – Senior Hydrogeologist

SUBJECT: March 2018 Semi-Annual Groundwater Detection Monitoring Data
Statistical Analyses Summary
Jeffrey Energy Center
Flue Gas Desulfurization Landfill

Pursuant to Title 40 Code of Federal Regulations §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 Jeffrey Energy Center Flue Gas Desulfurization Landfill, which took place in March 2018. This semi-annual detection monitoring groundwater sampling event was completed on March 12, 2018, with laboratory results received and accepted on April 16, 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
Groundwater Potentiometric Maps

LEGEND

MW-FGD-6 1168.88 WELL NAME AND GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (AMSL), MARCH 2018

MONITORING WELL

PIEZOMETER OBSERVATION ONLY

ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 2-FT INTERVAL (AMSL), DASHED WHERE INFERRED

GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)

FGD LANDFILL

FUTURE FGD LANDFILL DISPOSAL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 06 MARCH 2018.

3. FGD LANDFILL BOUNDARY REPRESENTATIVE OF ACTIVE UNIT OPERATIONS, AS OUTLINED IN THE OCTOBER 2021 GROUNDWATER SAMPLING AND ANALYSIS PLAN.

4. THE GROUNDWATER FLOW RATE WAS APPROXIMATED USING THE HYDRAULIC GRADIENT CALCULATED FROM GROUNDWATER POTENTIOMETRIC ELEVATIONS MEASURED 06 MARCH 2018 AND THE CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, SEPTEMBER 3, 2019

N

0 450 900

SCALE IN FEET

HALEY ALDRICH

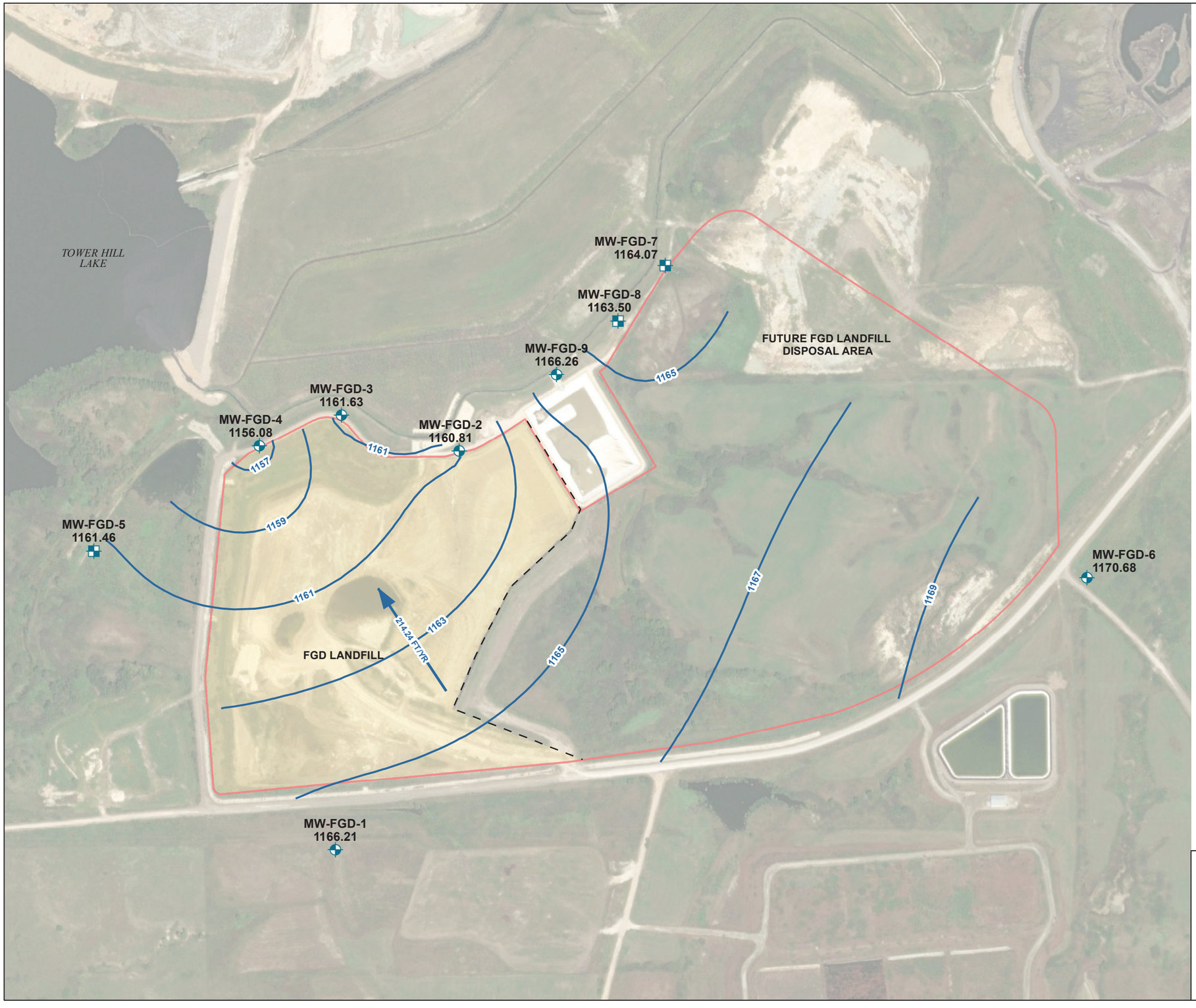
EVERGY KANSAS CENTRAL, INC.
JEFFREY ENERGY CENTER
ST. MARY'S, KANSAS

FGD LANDFILL GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP MARCH 6, 2018

evergy

NOVEMBER 2022

FIGURE 2



LEGEND

MW-FGD-6
1168.88 WELL NAME AND GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (AMSL), JUNE 2018

MONITORING WELL

PIEZOMETER OBSERVATION ONLY

ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 2-FT INTERVAL (AMSL)

GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)

FGD LANDFILL

FUTURE FGD LANDFILL DISPOSAL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 04 JUNE 2018.

3. FGD LANDFILL BOUNDARY REPRESENTATIVE OF ACTIVE UNIT OPERATIONS, AS OUTLINED IN THE OCTOBER 2021 GROUNDWATER SAMPLING AND ANALYSIS PLAN.

4. THE GROUNDWATER FLOW RATE WAS APPROXIMATED USING THE HYDRAULIC GRADIENT CALCULATED FROM GROUNDWATER POTENTIOMETRIC ELEVATIONS MEASURED 04 JUNE 2018 AND THE CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, SEPTEMBER 3, 2019

N

0 450 900
SCALE IN FEET

HALEY ALDRICH

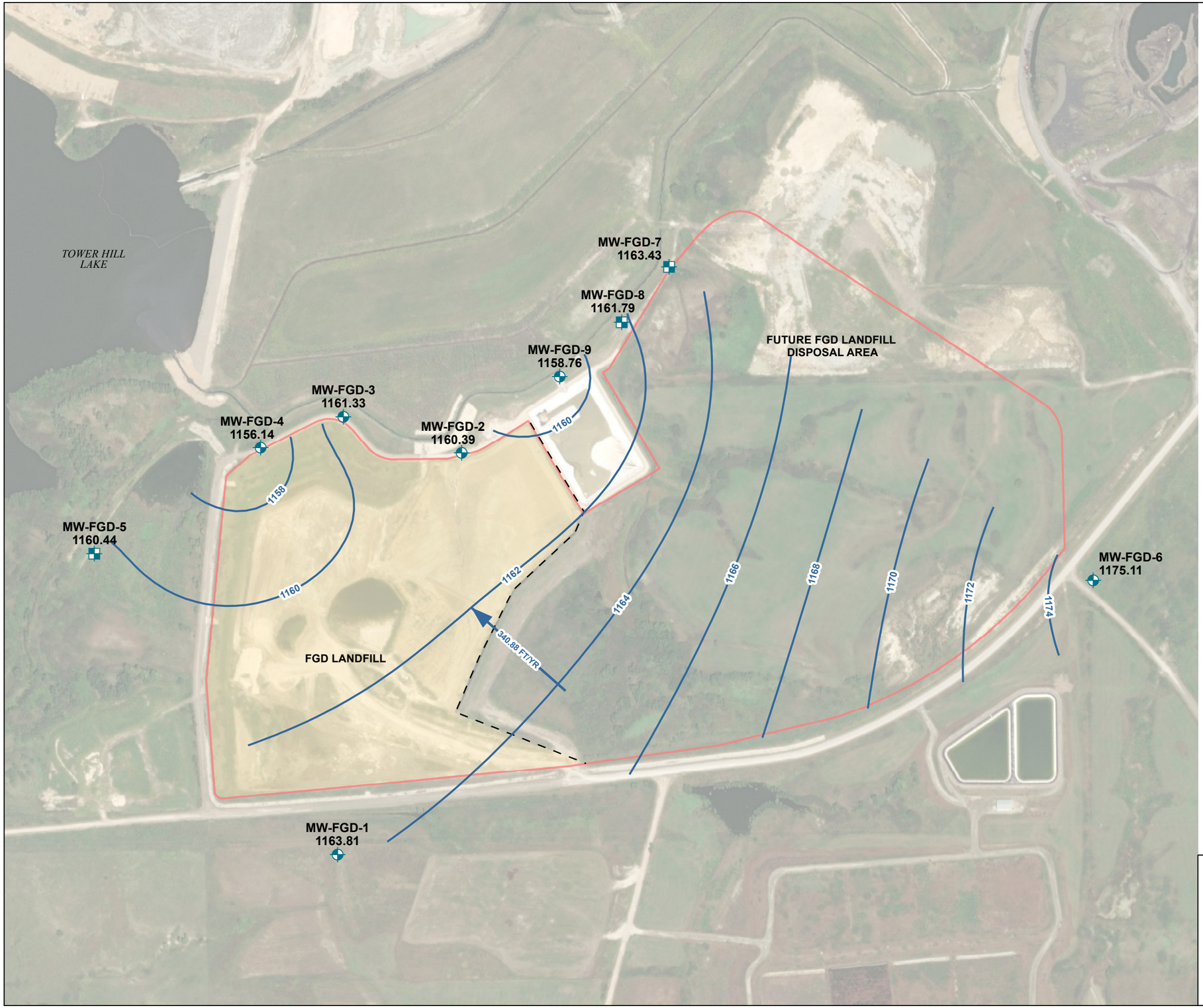
EVERGY KANSAS CENTRAL, INC.
JEFFREY ENERGY CENTER
ST. MARY'S, KANSAS

FGD LANDFILL GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP JUNE 4, 2018

evergy

NOVEMBER 2022

FIGURE 3



LEGEND

MW-FGD-6
1168.88 WELL NAME AND GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (AMSL), SEPTEMBER 2018

MONITORING WELL

PIEZOMETER OBSERVATION ONLY

ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 2-FT INTERVAL (AMSL)

GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)

FGD LANDFILL

FUTURE FGD LANDFILL DISPOSAL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 10 SEPTEMBER 2018.

3. FGD LANDFILL BOUNDARY REPRESENTATIVE OF ACTIVE UNIT OPERATIONS, AS OUTLINED IN THE OCTOBER 2021 GROUNDWATER SAMPLING AND ANALYSIS PLAN.

4. THE GROUNDWATER FLOW RATE WAS APPROXIMATED USING THE HYDRAULIC GRADIENT CALCULATED FROM GROUNDWATER POTENTIOMETRIC ELEVATIONS MEASURED 10 SEPTEMBER 2018 AND THE CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, SEPTEMBER 3, 2019

N

0 450 900
SCALE IN FEET

HALEY ALDRICH

EVERGY KANSAS CENTRAL, INC.
JEFFREY ENERGY CENTER
ST. MARY'S, KANSAS

FGD LANDFILL GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP SEPTEMBER 10, 2018

evergy

NOVEMBER 2022

FIGURE 4