



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

31 January 2018
File No. 129778-002

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

Attention: Jared Morrison
Manager, Water and Waste Programs

Subject: 2017 Annual Groundwater Monitoring and Corrective Action Report for
the Flue Gas Desulfurization Landfill
Jeffrey Energy Center
St. Marys, Kansas

Dear Mr. Morrison:

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

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

Sincerely yours,
HALEY & ALDRICH, INC.

A handwritten signature in black ink, appearing to read "Steve Putrich".

Steve Putrich, P.E.
Project Principal

A handwritten signature in blue ink, appearing to read "Mark Nicholls".

Mark Nicholls, P.G.
Lead Hydrogeologist

2017 ANNUAL GROUNDWATER MONITORING
AND CORRECTIVE ACTION REPORT
FGD LANDFILL
JEFFREY ENERGY CENTER
ST. MARYS, KANSAS

by Haley & Aldrich, Inc.
Cleveland, Ohio

for Westar Energy, Inc.
Topeka, Kansas

File No. 129778-002
January 2018



Table of Contents

	Page
List of Tables	i
List of Figures	i
1. 40 CFR § 257.90 Applicability	1
1.1 40 CFR § 257.90(A)	1
1.2 40 CFR § 257.90(E)	1
1.3 40 CFR § 257.90(F)	3

Tables

Figures

List of Tables

Table No.	Title
I	Summary of Analytical Results

List of Figures

Figure No.	Title
1	FGD Landfill Monitoring Well Location Map

1. 40 CFR § 257.90 Applicability

1.1 40 CFR § 257.90(a)

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

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

1.2 40 CFR § 257.90(e)

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

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

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

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

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

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

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

(3) In addition to all the monitoring data obtained under §257.90 through §257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

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

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

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

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

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

1.3 40 CFR § 257.90(f)

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

To comply with the Rule recordkeeping requirements:

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

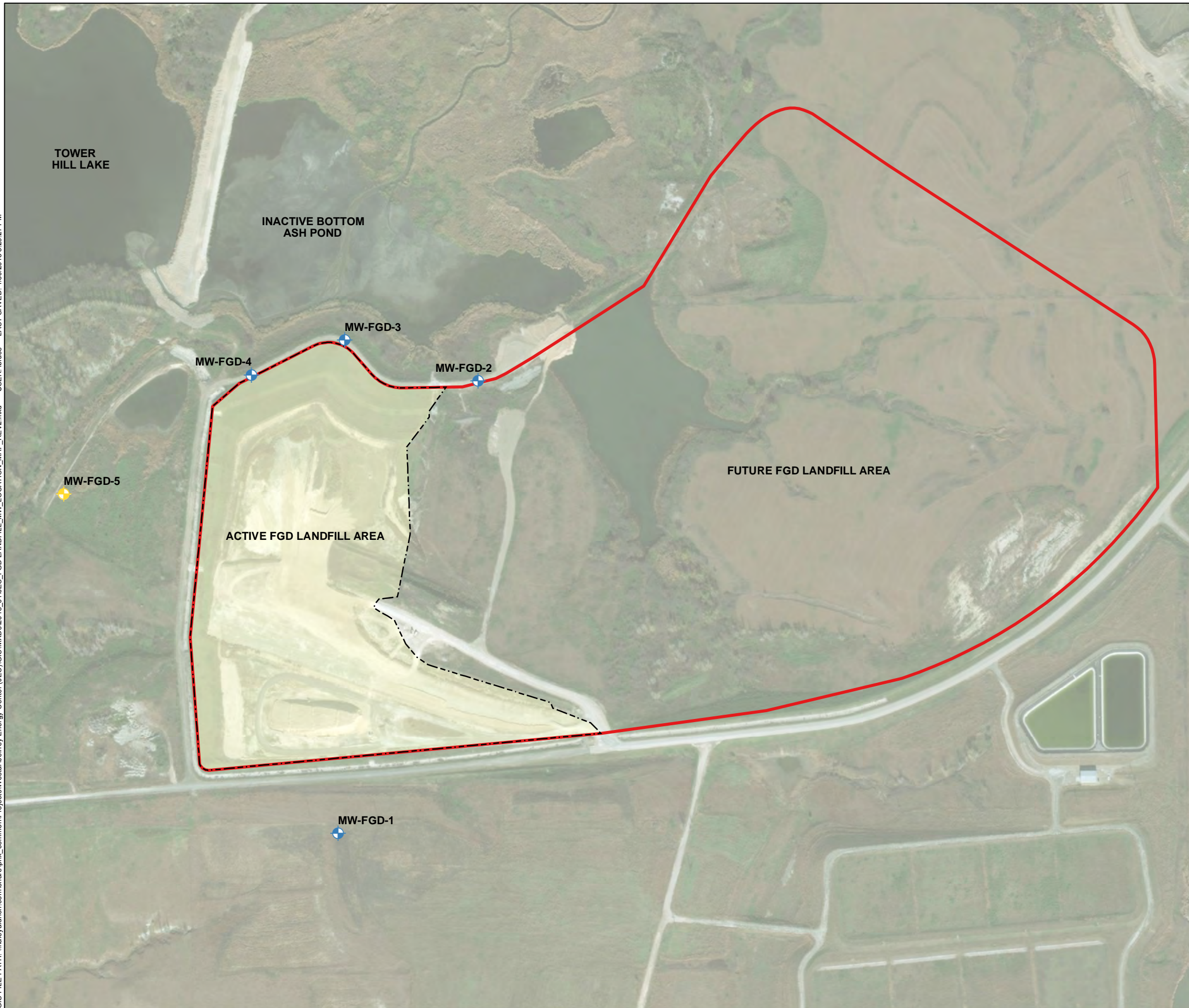
TABLES

TABLE I
SUMMARY OF ANALYTICAL RESULTS
 Westar Jeffrey Energy Center
 FGD Landfill
 St. Marys, Kansas





Location	Measure Point Elevation (TOC)	Sample Name	Sample Date	Depth to Water (btoc)	Groundwater Elevation (ft AMSL)	Field Parameters				USEPA Appendix III Constituents (mg/L)							USEPA Appendix IV Constituents (mg/L)										USEPA Appendix IV Constituents (pCi/L)					
						Temperature (Deg C)	Conductivity (µS/cm)	Turbidity (NTU)	pH (su)	Boron, Total	Calcium, Total	Chloride	Fluoride	Sulfate	Ph (su)	TDS	Antimony, Total	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Chromium, Total	Cobalt, Total	Lead, Total	Lithium, Total	Molybdenum, Total	Selenium, Total	Thallium, Total	Mercury, Total	Fluoride	Radium-226 & 228 Combined	
Up Gradient	MW-FGD-1	1239.05	FGD1-082416	8/24/2016	73.42	1165.63	17.35	837	4.2	7.31	0.12	95.7	44.5	0.30	91.3	7.5	543	<0.0010	<0.0010	0.29	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.015	0.0015	<0.0010	<0.0010	<0.00020	0.30	0.420
			FGD1-092216	9/22/2016	73.24	1165.81	17.13	836	2.6	7.36	0.11	90.4	46.5	0.33	93.9	7.6	507	<0.0010	<0.0010	0.28	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.014	0.0013	<0.0010	<0.0010	<0.00020	0.33	1.55
			FGD-1-110316	11/3/2016	72.35	1166.70	15.69	766	3.8	7.14	0.10	94.6	49.2	0.32	95.4	7.4	495	<0.0010	<0.0010	0.31	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.016	0.0013	<0.0010	<0.0010	<0.00020	0.32	1.34
			FGD-1-121516	12/15/2016	73.38	1165.67	12.70	836	5.7	7.09	<0.10	90.3	44.2	0.33	91.6	7.8	496	<0.0010	<0.0010	0.28	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.016	0.0012	<0.0010	<0.0010	<0.00020	0.33	0.758
			FGD-1-020917	2/9/2017	73.46	1165.59	12.74	840	4.9	7.14	<0.10	90.4	62.5	0.33	89.5	7.2	505	<0.0010	<0.0010	0.27	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.010	0.0003	<0.0010	<0.0010	<0.00020	0.33	1.16
			FGD-1-040717	4/7/2017	69.71	1169.34	14.26	847	3.2	7.08	<0.10	98.2	63.9	0.34	85.5	7.2	524	<0.0010	<0.0010	0.31	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.011	0.0014	<0.0010	<0.0010	<0.00020	0.34	0.947
			FGD-1-052617	5/26/2017	70.35	1168.70	15.25	861	3.9	7.32	<0.10	97.3	66.2	0.36	87.0	7.6	545	<0.0010	<0.0010	0.30	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.014	0.0014	<0.0010	<0.0010	<0.00020	0.36	0.927
FGD-1-062917	6/29/2017	72.47	1166.58	15.67	846	3.2	7.31	0.11	90.4	49.7	0.35	93.1	7.3	515	<0.0010	<0.0010	0.29	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.015	0.0013	<0.0010	<0.0010	<0.00020	0.35	0.680			
Down Gradient	MW-FGD-2	1184.20	FGD2-082416	8/24/2016	22.55	1161.65	16.80	899	5.2	7.25	0.26	121	31.7	0.36	181	7.3	643	<0.0010	<0.0010	0.078	<0.0010	<0.00050	<0.0050	0.0011	<0.0050	<0.010	0.0047	<0.0010	<0.0010	<0.00020	0.36	0.803
			FGD2-092316	9/23/2016	23.05	1161.15	15.03	888	2.6	7.33	0.26	111	31.9	0.38	177	7.8	573	<0.0010	<0.0010	0.072	<0.0010	<0.00050	<0.0050	0.0010	<0.0050	<0.010	0.0044	<0.0010	<0.0010	<0.00020	0.38	0.368
			FGD-2-110316	11/3/2016	22.74	1161.46	15.65	1029	11.0	6.99	0.26	161	36.6	0.35	325	7.3	769	<0.0010	<0.0010	0.097	<0.0010	<0.00050	<0.0050	0.0016	<0.0050	<0.010	0.0040	0.0010	<0.0010	<0.00020	0.35	0.703
			FGD-2-121516	12/15/2016	23.22	1160.98	12.05	953	8.5	7.09	0.23	121	34.3	0.34	201	7.5	632	<0.0010	<0.0010	0.072	<0.0010	<0.00050	<0.0050	0.0011	<0.0050	0.010	0.0039	<0.0010	<0.0010	<0.00020	0.34	0.866
			FGD-2-020917	2/9/2017	23.24	1160.96	12.81	912	4.9	7.14	0.24	118	33.1	0.39	191	7.4	593	<0.0010	<0.0010	0.072	<0.0010	<0.00050	<0.0050	0.0014	<0.0050	<0.010	0.0045	<0.0010	<0.0010	<0.00020	0.39	1.14
			FGD-2-040717	4/7/2017	21.60	1162.60	14.79	1047	3.9	6.94	0.22	150	34.0	0.36	263	7.2	745	<0.0010	<0.0010	0.089	<0.0010	<0.00050	<0.0050	0.0016	<0.0050	<0.010	0.0041	0.0010	<0.0010	<0.00020	0.36	0.901
			FGD-2-052617	5/26/2017	21.82	1162.38	16.55	1074	3.6	7.17	0.25	158	36.9	0.35	299	7.5	772	<0.0010	<0.0010	0.081	<0.0010	<0.00050	<0.0050	0.0014	<0.0050	<0.010	0.0038	<0.0010	<0.0010	<0.00020	0.35	0.920
	FGD-2-063017	6/30/2017	22.70	1161.50	15.53	1067	2.6	7.07	0.23	131	35.6	0.31	247	7.2	710	<0.0010	<0.0010	0.076	<0.0010	<0.00050	<0.0050	0.0010	<0.0050	<0.010	0.0037	<0.0010	<0.0010	<0.00020	0.31	0.891		
	MW-FGD-3	1186.26	FGD3-082516	8/25/2016	24.06	1162.20	16.39	1086	7.4	7.04	0.13	142	52.4	0.25	213	7.2	692	<0.0010	<0.0010	0.23	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.015	0.0071	<0.0010	<0.0010	<0.00020	0.25	1.348
			FGD3-092316	9/23/2016	24.38	1161.88	16.96	1151	3.9	7.14	0.15	146	49.9	0.28	281	7.3	820	<0.0010	<0.0010	0.20	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.015	0.0064	<0.0010	<0.0010	<0.00020	0.28	0.740
			FGD-3-110316	11/3/2016	24.04	1162.22	16.82	1087	4.5	6.96	0.13	160	66.7	0.29	313	7.3	817	<0.0010	<0.0010	0.19	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.016	0.0062	<0.0010	<0.0010	<0.00020	0.29	0.798
			FGD-3-121516	12/15/2016	24.62	1161.64	11.20	1254	6.1	7.01	0.14	164	70.5	0.26	335	7.4	880	<0.0010	<0.0010	0.15	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.018	0.0056	<0.0010	<0.0010	<0.00020	0.26	0.848
			FGD-3-020917	2/9/2017	24.68	1161.58	12.18	1221	6.0	7.11	0.16	159	67.2	0.27	334	7.4	851	<0.0010	<0.0010	0.13	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.014	0.0058	<0.0010	<0.0010	<0.00020	0.27	1.53
			FGD-3-040717	4/7/2017	23.01	1163.25	15.20	1019	4.3	6.91	<0.10	135	44.2	0.31	206	7.0	716	<0.0010	<0.0010	0.13	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.013	0.0058	<0.0010	<0.0010	<0.00020	0.31	0.375
			FGD-3-052617	5/26/2017	23.23	1163.03	16.82	957	3.7	7.18	<0.10	115	40.8	0.29	166	7.6	637	<0.0010	<0.0010	0.14	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.012	0.0059	<0.0010	<0.0010	<0.00020	0.29	1.50
	FGD-3-063017	6/30/2017	24.13	1162.13	17.09	1130	2.9	7.05	0.13	142	59.1	0.24	246	7.2	825	<0.0010	<0.0010	0.14	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.016	0.0055	<0.0010	<0.0010	<0.00020	0.24	1.06		
	MW-FGD-4	1188.43	FGD4-082516	8/25/2016	31.39	1157.04	17.90	1341	18.0	7.22	0.30	166	71.8	0.31	331	7.6	831	<0.0010	<0.0010	0.064	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.013	0.0046	<0.0010	<0.0010	<0.00020	0.31	1.17
			FGD4-092316	9/23/2016	31.69	1156.74	16.79	1357	4.1	7.24	0.29	160	74.5	0.32	371	7.3	927	<0.0010	<0.0010	0.057	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.014	0.0041	<0.0010	<0.0010	<0.00020	0.32	0.731
			FGD-4-110316	11/3/2016	31.60	1156.83	16.32	1236	4.4	6.97	0.28	164	80.9	0.32	412	7.2	947	<0.0010	<0.0010	0.057	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.015	0.0040	<0.0010	<0.0010	<0.00020	0.32	0.494
			FGD-4-121516	12/15/2016	32.18	1156.25	12.14	1400	22.4	7.00	0.26	163	78.2	0.33	369	7.4	972	<0.0010	<0.0010	0.064	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.017	0.0037	<0.0010	<0.0010	<0.00020	0.33	1.32
			FGD-4-020917	2/9/2017	32.20	1156.23	12.45	1392	7.0	7.05	0.26	169	79.6	0.32	393	7.3	981	<0.0010	<0.0010	0.058	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.012	0.0039	<0.0010	<0.0010	<0.00020	0.32	0.629
			FGD-4-040717	4/7/2017	30.40	1158.03	14.93	1374	4.8	6.83	0.25	180	82.3	0.33	377	7.1	1070	<0.0010	<0.0010	0.054	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.012	0.0039	<0.0010	<0.0010	<0.00020	0.33	0.891
			FGD-4-052617	5/26/2017	30.75	1157.68	16.54	1417	4.7	7.20	0.28	169	85.3	0.31	398	7.3	1040	<0.0010	<0.0010	0.056	<0.0020	<0.00050	<0.0050	<0.0010	<0.0050	<0.020	0.0038	<0.0010	<0.0010	<0.00020	0.31	0.652
	FGD-4-063017	6/30/2017	31.50	1156.93	17.16	1459	2.9	7.00	0.28	164	85.7	0.43	409	7.2	1010	<0.0010	<0.0010	0.052	<0.0010	<0.00050	<0.0050	<0.0010	<0.0050	0.012	0.0036	<0.0010	<0.0010	<0.00020	0.43	1.53		

FIGURES

GIS FILE PATH: \\haleyaldrich.com\share\phx_common\Projects\Westar\Jeffrey Energy Center (JEC)\GIS\MXDs\2018_01\JEC_FGD LANDFILL_MW_LOCATION_MAP_REV2.mxd — USER: ibnce — LAST SAVED: 1/30/2018 5:29:27 PM

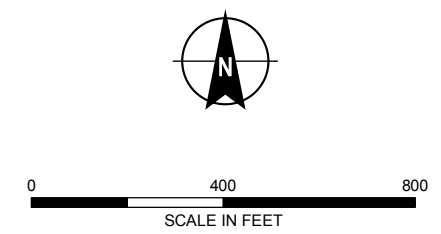


LEGEND

-  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



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

**FGD LANDFILL
 MONITORING WELL LOCATION MAP**

JANUARY 2018

FIGURE 1