

# 2018 Annual Groundwater Monitoring and Corrective Action Report

Zimmer Landfill – CCR Unit ID 122  
Zimmer Power Station  
1781 Route 52  
Moscow, Ohio 45153

**Dynegy Zimmer, LLC**

January 31, 2019



JANUARY 31, 2019 | PROJECT #70096

# 2018 Annual Groundwater Monitoring and Corrective Action Report

Zimmer Landfill – CCR Unit ID 122  
Zimmer Power Station  
Moscow, Ohio

Prepared for:  
*Dynegy Zimmer, LLC*



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## ACRONYMS AND ABBREVIATIONS

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CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
mg/L	milligrams per liter
NRT/OBG	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, part of Ramboll
pCi/L	picoCuries per liter
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
S.U.	Standard Units
TDS	Total Dissolved Solids

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## SECTION 1: INTRODUCTION

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This report has been prepared on behalf of Dynege Zimmer, LLC by O'Brien & Gere Engineers, part of Ramboll (OBG), to provide the information required by the Code of Federal Regulations (CFR) found in 40 CFR 257.90(e) for the Zimmer Landfill located at Zimmer Power Station near Moscow, Ohio.

In accordance with 40 CFR § 257.90(e), the owner or operator of an existing Coal Combustion Residuals (CCR) unit must prepare an annual groundwater monitoring and corrective action report, for the preceding calendar year, that documents the status of the groundwater monitoring and corrective action program for the CCR unit, summarizes key actions completed, describes any problems encountered, discusses actions to resolve the problems, and projects key activities for the upcoming year. At a minimum, the annual 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.
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.
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.
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).
5. Other information required to be included in the annual report as specified in §§ 257.90 through 257.98<sup>1</sup>.

This report provides the required information for the Zimmer Landfill for calendar year 2018.

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<sup>1</sup> For calendar year 2018, corrective action and other information required to be included in the annual report as specified in §§ 257.96 through 257.98 is not applicable.

**SECTION 2: MONITORING AND CORRECTIVE ACTION PROGRAM STATUS**

Detection Monitoring Program sampling event dates and parameters collected are provided in the detection monitoring program summary table below. One sample was collected from each background and downgradient well in the monitoring system during each sampling event. Analytical data was evaluated after each event in accordance with the Statistical Analysis Plan, Zimmer Power Station, Dynegy Zimmer, LLC (NRT/OBG, 2017) to identify any statistically significant increases (SSIs) of Appendix III parameters over background concentrations. The sampling event and whether SSIs were identified are provided in the detection monitoring program summary table below.

**Detection Monitoring Program Summary**

Sampling Dates	Parameters Collected	SSIs	Assessment Monitoring Program Established
<b>November 14 and 15, 2017</b>	Appendix III	Yes	April 9, 2018

Alternate source evaluations were inconclusive for one or more of the SSIs. Consequently, and in accordance with 40 CFR § 257.94(e)(2), an Assessment Monitoring Program was established for the Zimmer Landfill on April 9, 2018 and the required notifications completed.

The first Assessment Monitoring sampling event was completed on May 7 thru 8, 2018. One sample was collected from each background and downgradient well in the monitoring system and analyzed for Appendix III and Appendix IV parameters.

In accordance with 40 CFR § 257.95(d)(1), all wells were resampled on September 17, and 18, 2018 for all Appendix III parameters and Appendix IV parameters detected during the first Assessment Monitoring sampling event. One sample was collected from each background and downgradient well in the monitoring system. The contract laboratory’s delivery service delayed delivery causing samples in 3 coolers to be over the recommended temperature of 6 degrees Celsius at the time of delivery to the lab. The sampling team returned to Zimmer Landfill on September 27, 2018 to collect additional samples from monitoring wells MW-18, MW-21, and MW-24. Analytical data from the resampling event was evaluated in accordance with the statistical analysis plan (NRT/OBG, 2017) to determine any SSIs of Appendix III parameters over background concentrations or statistically significant levels (SSLs) of Appendix IV parameters over Groundwater Protection Standards (GWPSs). The assessment monitoring program summary table below provides a summary of the Assessment Monitoring Program and results of SSL determinations.

**Assessment Monitoring Program Summary**

Sampling Dates	Parameters Collected	SSLs
<b>May 7 and 8, 2018</b>	Appendix III Appendix IV	Not Applicable
<b>September 17, 18, and 27, 2018</b>	Appendix III Appendix IV Detected	To Be Determined

Statistical background values are provided in Table 1 and GWPSs in Table 2. Analytical results from the events summarized in the detection and assessment monitoring summary tables above are included in Tables 3 and 4.

The Zimmer Landfill remains in the Assessment Monitoring Program in accordance with 40 CFR § 257.95.

### SECTION 3: KEY ACTIONS COMPLETED IN 2018

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Two groundwater monitoring events were completed in 2018 under the Assessment Monitoring Program. These events occurred in May and September, and are detailed in Section 2.

In general, one groundwater sample was collected from each background and downgradient well in the monitoring system during each event. The sampling team returned to Zimmer Landfill to collect samples from monitoring wells MW-18, MW-21, and MW-24 because the original samples collected earlier in the September sampling event arrived at the laboratory above the recommended temperature of 6 degrees Celsius.

All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (AECOM, 2017). All monitoring data obtained under 40 CFR §§ 257.90 through 257.98 (as applicable) in 2018 are presented in Tables 3 and 4.

The groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells, is presented in Figure 1.

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#### SECTION 4: PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

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No problems were encountered with the groundwater monitoring program during 2018. Groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan (AECOM, 2017), and all data was accepted.

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## SECTION 5: KEY ACTIVITIES PLANNED FOR 2019

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The following key activities are planned for 2019:

- Continuation of the Assessment Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2019.
- Complete evaluation of analytical data from the downgradient wells, using GWPSs to determine whether an SSL of Appendix IV parameters has occurred.
- If an SSL is identified, potential alternate sources (i.e., a source other than the CCR unit caused the SSL or that SSL resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated. If an alternate source is demonstrated to be the cause of the SSL, a written demonstration will be completed within 90 days of SSL determination and included in the annual groundwater monitoring and corrective action report for 2019.
  - » If an alternate source(s) is not identified to be the cause of the SSL, the applicable requirements of 40 CFR §§ 257.94 through 257.98 (e.g., assessment of corrective measures) as may apply in 2019 will be met, including associated recordkeeping/notifications required by 40 CFR §§ 257.105 through 257.108.

## REFERENCES

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AECOM, 2017, Sampling and Analysis Plan, CCR Rule Groundwater Monitoring, Zimmer Residual Waste Landfill, Unit 122, Zimmer Power Landfill, Moscow, Ohio, Job Number: 60442412, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company, 2017, Statistical Analysis Plan, Zimmer Power Station, Dynegy Zimmer, LLC, October 17, 2017.

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Figures

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Y:\Mapping\Projects\2212285\MXD\2018\_AnnualGWM\_CAR\Figure\_1\_GWS\_WellLoc\_Zimmer\_Landfill.mxd Author: stobrsd Date/Time: 1/28/2019, 2:03:23 PM



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

-  DOWNGRADIENT MONITORING WELL LOCATION
-  UPGRADIENT MONITORING WELL LOCATION
-  CCR MONITORED UNIT

DRAWN BY/DATE:  
SDS 11/28/18  
REVIEWED BY/DATE:  
AJB 1/24/19  
APPROVED BY/DATE:  
NMP 1/28/19

GROUNDWATER SAMPLING WELL LOCATION MAP  
ZIMMER LANDFILL  
UNIT ID: 122

2018 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT  
VISTRA CCR RULE GROUNDWATER MONITORING  
ZIMMER POWER STATION  
MOSCOW, OHIO

PROJECT NO: 70096

FIGURE NO: 1



Tables

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## Table 1. Statistical Background Values

2018 Annual Groundwater Monitoring and Corrective Action Report

Zimmer Power Station

Unit ID 122 - Zimmer Landfill

Parameter	Statistical Background Value
<b>Appendix III</b>	
Boron (mg/L)	1.88
Calcium (mg/L)	240.92
Chloride (mg/L)	201
Fluoride (mg/L)	0.761
pH (S.U.)	6.6 / 7.4
Sulfate (mg/L)	990
TDS (mg/L)	887

[O: RAB 8/22/18, C: KLS: 8/27/18]

### Notes:

mg/L = milligrams per liter

S.U. = Standard Units

TDS = Total Dissolved Solids

## Table 2. Groundwater Protection Standards

2018 Annual Groundwater Monitoring and Corrective Action Report  
Zimmer Power Station  
Unit ID 122 - Zimmer Landfill

Parameter	Groundwater Protection Standard
<b>Appendix IV</b>	
Antimony (mg/L)	0.006
Arsenic (mg/L)	0.01
Barium (mg/L)	2
Beryllium (mg/L)	0.004
Cadmium (mg/L)	0.005
Chromium (mg/L)	0.10
Cobalt (mg/L)	0.006
Fluoride (mg/L)	4
Lead (mg/L)	0.015
Lithium (mg/L)	0.12771
Mercury (mg/L)	0.002
Molybdenum (mg/L)	0.10
Selenium (mg/L)	0.05
Thallium (mg/L)	0.002
Radium 226+228 (pCi/L)	5

[O: RAB 8/22/18, C: KLS: 8/27/18]

### Notes:

mg/L = milligrams per liter

pCi/L = picoCuries per liter

**Table 3. Appendix III Analytical Results**

## 2018 Annual Groundwater Monitoring and Corrective Action Report

Zimmer Power Station

Unit ID 122 - Zimmer Landfill

Sample Location	Date Sampled	B, total (mg/L)	Ca, total (mg/L)	Cl, total (mg/L)	F, total (mg/L)	pH (field) (SU)	SO4, total (mg/L)	TDS (mg/L)
<b>Background / Upgradient Monitoring Wells</b>								
MW-3	11/15/2017	<0.08	174	213	<1	6.8	58.7	747
	5/7/2018	<1	179	204	<1	6.8	50.9	934
	9/17/2018	0.0829	193	223	<10	6.6	<50	900
MW-13S	11/14/2017	<0.08	101	141	<1	7.0	<50	505
	5/7/2018	<1	87.4	92.2	<1	7.1	31.3	448
	9/17/2018	<0.08	108	99.4	<1	6.7	30.9	517
MW-18	11/15/2017	<0.08	78.9	18.1	<1	7.3	132	574
	5/7/2018	<1	83.6	17.4	<1	7.2	142	594
	9/27/2018	0.125	111	19.4	<1	7.1	219	676
MW-21	11/14/2017	1.72	93.6	168	<1	7.0	67.6	767
	5/7/2018	1.41	83.6	159	<1	7.1	70.4	755
	9/27/2018	1.54	95.0	143	<1	7.0	71.1	719
<b>Downgradient Monitoring Wells</b>								
MW-9D	11/14/2017	1.05	73.1	638	<1	7.0	<5	1020
	5/8/2018	<1	75.1	301	<1	7.2	<5	852
	9/18/2018	1.64	71.7	337	<1	7.1	<5	909
MW-11D	11/14/2017	0.179	76.6	6.17	<1	6.8	8.00	381
	5/8/2018	<1	71.5	5.15	<1	7.2	11.8	389
	9/18/2018	0.207	78.2	5.56	<1	7.0	12.8	367
MW-16D	11/15/2017	1.02	48.7	61.2	<1	7.2	<5	533
	5/7/2018	<1	50.2	57.9	<1	7.3	<5	537
	9/18/2018	1.20	54.4	60.2	<1	7.1	<5	520
MW-20D	11/15/2017	0.266	76.5	16.1	<1	7.1	20.9	330
	5/7/2018	<1	72.8	14.6	<1	7.2	20.7	337
	9/17/2018	0.290	80.2	24.1	<1	6.9	19.3	371
MW-22	11/14/2017	0.522	121	39.0	<1	6.7	101	604
	5/8/2018	<1	114	32.1	<1	7.0	99.7	585
	9/18/2018	0.521	122	37.3	<1	6.9	91.0	595
MW-24	11/14/2017	0.183	51.4	6.84	<1	7.1	26.5	260
	5/7/2018	<1	46.3	6.74	<1	7.5	25.1	245
	9/27/2018	0.217	53.4	6.46	<1	7.4	25.2	251
MW-D	11/14/2017	5.69	3.55	26.2	2.63	8.2	14.1	527
	5/8/2018	4.62	3.17	32.5	2.01	8.2	12.2	544
	9/18/2018	5.30	3.43	30.7	1.9	7.7	12.6	532
MW-E	11/14/2017	2.08	51.0	43.1	<1	7.1	27.4	448
	5/8/2018	<1	45.2	14.8	<1	7.3	20.0	345
	9/18/2018	0.968	55.8	19.9	<1	7.2	19.5	361
MW-F	11/15/2017	5.83	113	531	<1	7.0	185	1420
	5/8/2018	6.14	93.1	628	<1	7.3	181	1620
	9/18/2018	4.79	105	568	<1	6.9	158	1510
MW-G	11/15/2017	1.22	70.6	189	<1	7.2	<5	712
	5/7/2018	<1	60.1	167	<1	7.2	<5	711
	9/17/2018	1.24	69.1	173	<1	6.9	<5	744
MW-H	11/15/2017	0.678	121	138	<1	7.0	32.8	677
	5/7/2018	<1	105	123	<1	7.1	36.2	729
	9/18/2018	0.674	122	120	<1	6.9	39.0	722

[O: RAB 12/27/18, C: JQW 12/27/18][U: RAB 1/17/19]

**Notes:**

mg/L = milligrams per liter

S.U. = Standard Units

TDS = Total Dissolved Solids

&lt; = concentration is less than the reporting limit

**Table 4. Appendix IV Analytical Results**

2018 Annual Groundwater Monitoring and Corrective Action Report  
 Zimmer Power Station  
 Unit ID 122 - Zimmer Landfill

Sample Location	Date Sampled	Sb, total (mg/L)	As, total (mg/L)	Ba, total (mg/L)	Be, total (mg/L)	Cd, total (mg/L)	Cr, total (mg/L)	Co, total (mg/L)	F, total (mg/L)	Pb, total (mg/L)	Li, total (mg/L)	Hg, total (mg/L)	Mo, total (mg/L)	Ra226/228 Combined (pCi/L)	Se, total (mg/L)	Tl, total (mg/L)
<b>Background / Upgradient Monitoring Wells</b>																
MW-3	5/7/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	0.254	<0.01	<0.002
	9/17/2018 <sup>a</sup>	NA	<0.001	0.0637	NA	NA	<0.002	NA	<10	NA	0.0140	NA	NA	0.892	NA	NA
MW-13S	5/7/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	0.212	<0.01	<0.002
	9/17/2018 <sup>a</sup>	NA	<0.001	0.0579	NA	NA	0.00216	NA	<1	NA	0.0121	NA	NA	0.620	NA	NA
MW-18	5/7/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	0.0747	<0.0002	<0.01	0.397	<0.01	<0.002
	9/27/2018 <sup>a</sup>	NA	<0.001	0.0213	NA	NA	0.00203	NA	<1	NA	0.0990	NA	NA	0.550	NA	NA
MW-21	5/7/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	0.0773	<0.0002	<0.01	1.10	<0.01	<0.002
	9/27/2018 <sup>a</sup>	NA	<0.001	0.0768	NA	NA	<0.002	NA	<1	NA	0.0700	NA	NA	1.36	NA	NA
<b>Downgradient Monitoring Wells</b>																
MW-9D	5/8/2018	<0.003	<0.005	0.677	<0.004	<0.005	<0.005	<0.005	<1	<0.005	0.0526	<0.0002	<0.01	2.36	<0.01	<0.002
	9/18/2018 <sup>a</sup>	NA	0.00319	0.757	NA	NA	0.00953	NA	<1	NA	0.0995	NA	NA	2.99	NA	NA
MW-11D	5/8/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	0.450	<0.01	<0.002
	9/18/2018 <sup>a</sup>	NA	0.00221	0.188	NA	NA	<0.002	NA	<1	NA	0.00938	NA	NA	0.286	NA	NA
MW-16D	5/7/2018	<0.003	0.0105	<0.2	<0.004	<0.005	0.00519	<0.005	<1	<0.005	0.0416	<0.0002	<0.01	0.260	<0.01	<0.002
	9/18/2018 <sup>a</sup>	NA	0.00724	0.130	NA	NA	<0.002	NA	<1	NA	0.0435	NA	NA	0.416	NA	NA
MW-20D	5/7/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	0.315	<0.01	<0.002
	9/17/2018 <sup>a</sup>	NA	0.00124	0.149	NA	NA	<0.002	NA	<1	NA	0.0147	NA	NA	0.782	NA	NA
MW-22	5/8/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	0.935	<0.01	<0.002
	9/18/2018 <sup>a</sup>	NA	0.00379	0.0544	NA	NA	<0.002	NA	<1	NA	0.0243	NA	NA	0.958	NA	NA
MW-24	5/7/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	0.511	<0.01	<0.002
	9/27/2018 <sup>a</sup>	NA	<0.001	0.0467	NA	NA	<0.002	NA	<1	NA	0.0177	NA	NA	0.534	NA	NA
MW-D	5/8/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	2.01	<0.005	0.125	<0.0002	<0.01	0.138	<0.01	<0.002
	9/18/2018 <sup>a</sup>	NA	<0.001	0.0282	NA	NA	<0.002	NA	1.90	NA	0.125	NA	NA	0.355	NA	NA
MW-E	5/8/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	0.894	<0.01	<0.002
	9/18/2018 <sup>a</sup>	NA	<0.001	0.166	NA	NA	<0.002	NA	<1	NA	0.0324	NA	NA	0.874	NA	NA
MW-F	5/8/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	0.265	<0.0002	<0.01	0.928	<0.01	<0.002
	9/18/2018 <sup>a</sup>	NA	<0.001	0.039	NA	NA	<0.002	NA	<1	NA	0.249	NA	NA	1.45	NA	NA
MW-G	5/7/2018	<0.003	<0.005	0.417	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	1.01	<0.01	<0.002
	9/17/2018 <sup>a</sup>	NA	0.00202	0.441	NA	NA	<0.002	NA	<1	NA	0.0425	NA	NA	1.36	NA	NA
MW-H	5/7/2018	<0.003	<0.005	<0.2	<0.004	<0.005	<0.005	<0.005	<1	<0.005	<0.04	<0.0002	<0.01	0.470	<0.01	<0.002
	9/18/2018 <sup>a</sup>	NA	<0.001	0.135	NA	NA	<0.002	NA	<1	NA	0.0376	NA	NA	0.487	NA	NA

[O: RAB 12/27/18, C: JQW 12/17/18][U: RAB 1/17/19, U: AJB 1/28/19]

**Notes:**

mg/L = milligrams per liter

pCi/L = picoCuries per liter

NA = Not Analyzed

< = concentration is less than the reporting limit

<sup>a</sup>Only the parameters detected during the previous sampling event were analyzed during this sampling event, in accordance with 40CFR § 257.95(d)(1).

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