2018 Annual Groundwater Monitoring and Corrective Action Report

Miami Fort Lawrenceburg Road Landfill – CCR Unit ID 113
Miami Fort Power Station
11021 Brower Road
North Bend, Ohio 45052

Dynegy Miami Fort, LLC

January 31, 2019

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2018 Annual Groundwater Monitoring and Corrective Action Report

Miami Fort Lawrenceburg Road Landfill –
CCR Unit ID 113
Miami Fort Power Station
North Bend, Ohio

Prepared for:
Dynegy Miami Fort, LLC

RACHEL A. BANOFF
Environmental Engineer

NIKKI PAGANO, PE, PG
Senior Managing Engineer

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

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

SECTION 1: INTRODUCTION

This report has been prepared on behalf of Dynegy Miami Fort, 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 Miami Fort Lawrenceburg Road Landfill located near the Miami Fort Power Station and approximately one mile west of North Bend, 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[1].

This report provides the required information for the Miami Fort Lawrenceburg Road Landfill for calendar year 2018.

[1] 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, Miami Fort Power Station, Dynegy Miami Fort, LLC (NRT/OBG, 2017) to identify any statistically significant increases (SSIs) of Appendix III parameters over background concentrations. The dates the SSIs were evaluated are provided in the detection monitoring program summary table below.

Detection Monitoring Program Summary

Sampling Dates	Parameters Collected	SSIs	ASD Completion
November 14 and 15, 2017	Appendix III	Yes	April 10, 2018
May 7, 2018	Appendix III	No	Not Applicable
November 13 and 14, 2018	Appendix III	To Be Determined	To Be Determined

Potential alternate sources were evaluated as outlined in the 40 CFR § 257.94(e)(2). An alternate source demonstration (ASD) was completed and certified by a qualified professional engineer. The date the ASD was completed is provided in the detection monitoring program summary table. The ASD is included in Appendix A.

Statistical background values are provided in Table 1. Analytical results from the events summarized in the detection monitoring program summary table above are included in Table 2.

The Miami Fort Lawrenceburg Road Landfill remains in the Detection Monitoring Program in accordance with 40 CFR § 257.94.

SECTION 3: KEY ACTIONS COMPLETED IN 2018

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

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

SECTION 4: PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

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.

SECTION 5: KEY ACTIVITIES PLANNED FOR 2019

The following key activities are planned for 2019:

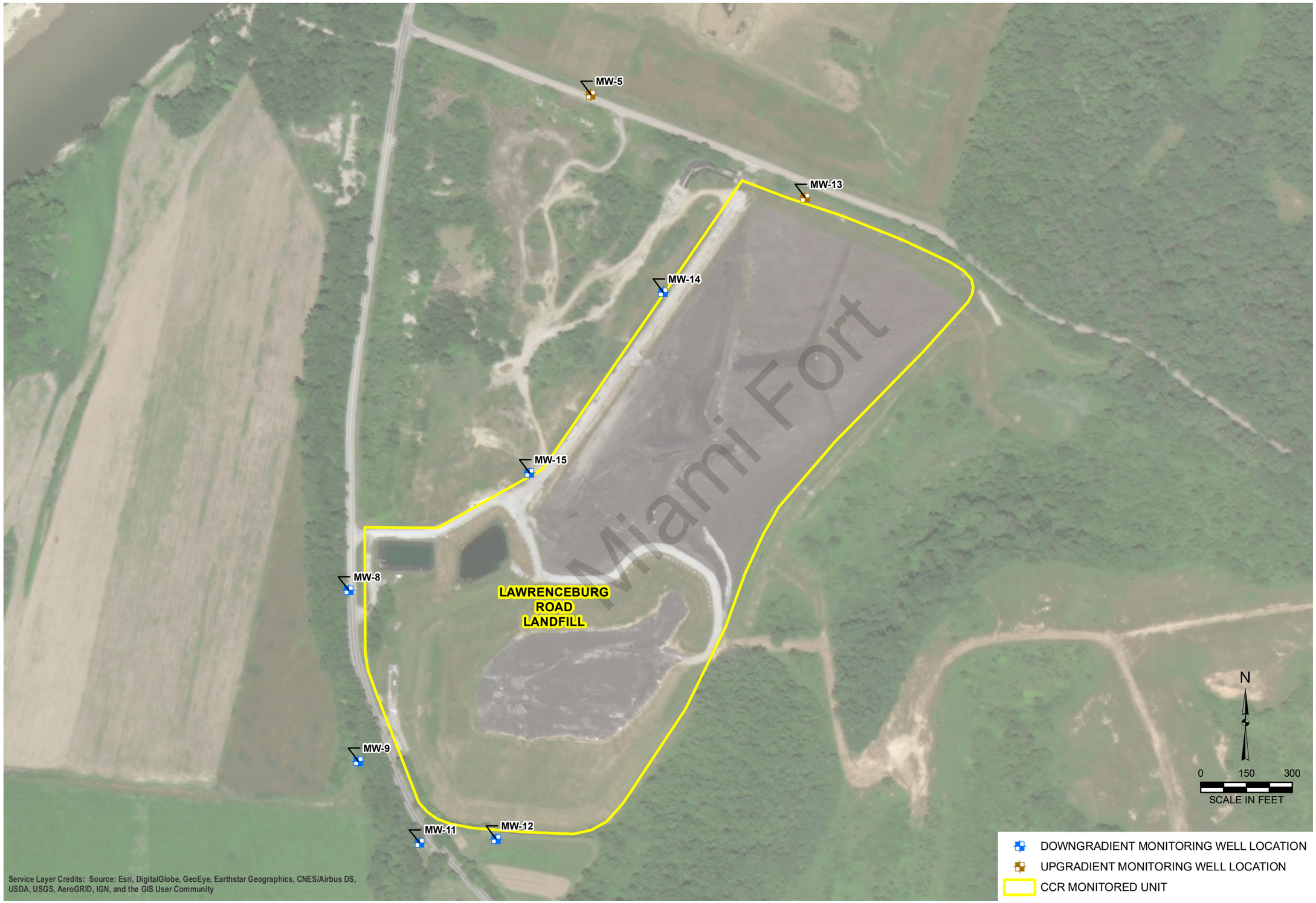
- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2019.
- Complete evaluation of analytical data from the downgradient wells, using background data to determine whether an SSI of Appendix III parameters over background concentrations has occurred.
- If an SSI is identified, potential alternate sources (i.e., a source other than the CCR unit caused the SSI or that SSI 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 SSI, a written demonstration will be completed within 90 days of SSI 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 SSI, the applicable requirements of 40 CFR §§ 257.94 through 257.98 (e.g., assessment monitoring) as may apply in 2019 will be met, including associated recordkeeping/notifications required by 40 CFR §§ 257.105 through 257.108.

REFERENCES

AECOM, 2017, Sampling and Analysis Plan, CCR Rule Groundwater Monitoring, Lawrenceburg Road Landfill, Unit 113, Miami Fort Power Station, Cleves, Ohio, Job Number 60442412, Revision 0, October 17, 2017.

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

Figures



GROUNDWATER SAMPLING WELL LOCATION MAP
MIAMI FORT LAWRENCEBURG ROAD LANDFILL
UNIT ID: 113

2018 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
VISTRA CCR RULE GROUNDWATER MONITORING
MIAMI FORT POWER STATION
NORTH BEND, OHIO

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

PROJECT NO: 70094

FIGURE NO: 1

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Tables

Table 1. Statistical Background Values

2018 Annual Groundwater Monitoring and Corrective Action Report
Miami Fort Power Station
Unit ID 113 - Miami Fort Lawrenceburg Road Landfill

Parameter	Statistical Background Value
Appendix III	
Boron (mg/L)	5.67
Calcium (mg/L)	185.7
Chloride (mg/L)	516
Fluoride (mg/L)	0.275
pH (S.U.)	6.6 / 8
Sulfate (mg/L)	322
TDS (mg/L)	1062

[O: KLS 8/15/18, C: RAB 8/28/18]

Notes:

mg/L = milligrams per liter
S.U. = Standard Units
TDS = Total Dissolved Solids

Table 2. Appendix III Analytical Results

2018 Annual Groundwater Monitoring and Corrective Action Report
Miami Fort Power Station
Unit ID 113 - Miami Fort Lawrenceburg Road Landfill

Sample Location	Date Sampled	B, total (mg/L)	Ca, total (mg/L)	Cl, total (mg/L)	F, total (mg/L)	pH (field) (S.U.)	SO4, total (mg/L)	TDS (mg/L)
Background / Upgradient Monitoring Wells								
MW-5	11/15/2017	2.48	90.7	4.3	<1	7.1	150	462
	5/7/2018	<5	101	7.58	<1	7.3	164	523
	11/13/2018	2.39	116	51.9	<5	7.2	<250	584
MW-13	11/15/2017	<0.08	130	247	<1	6.8	<250	841
	5/7/2018	<1	101	201	<1	7.0	36.1	833
	11/13/2018	<1	124	213	<10	7.3	40.7	778
Downgradient Monitoring Wells								
MW-8	11/15/2017	0.0956	107	16.0	<1	7.0	29.6	439
	5/7/2018	<1	114	20.6	<1	7.1	30.5	484
	11/13/2018	<1	102	142	<10	7.0	<100	406
MW-9	11/15/2017	0.106	147	109	<1	6.7	<50	683
	5/7/2018	<1	132	107	<1	7.0	42.1	693
	11/14/2018	<1	113	66.1	<1	6.9	<50	586
MW-11	11/14/2017	<0.08	103	14.9	<1	6.7	<50	447
	5/7/2018	<1	111	18.2	<1	7.0	39.9	496
	11/13/2018	<1	111	<30	<10	7.0	<50	454
MW-12	11/14/2017	<0.08	139	10.4	<1	6.7	<50	524
	5/7/2018	<1	131	16.2	<1	7.1	55.2	542
	11/14/2018	<1	143	12.7	<1	6.9	<50	555
MW-14	11/14/2017	0.181	95.9	33.3	<1	6.8	<50	416
	5/7/2018	<1	98.5	32.0	<1	7.3	<50	424
	11/14/2018	<1	100	42.9	<1	7.2	<50	408
MW-15	11/14/2017	<0.08	102	20.8	<1	6.8	<50	403
	5/7/2018	<1	91.5	20.1	<1	7.2	<50	395
	11/14/2018	<1	112	15.2	<1	7.0	34.6	460

[O: RAB 12/27/18, C: JQW 12/27/18][U: RAB 1/23/19]

Notes:

mg/L = milligrams per liter
S.U. = Standard Units
TDS = Total Dissolved Solids
< = concentration is less than the reporting limit

Appendix A

Alternate Source Demonstration

April 10, 2018

This alternate source demonstration has been prepared on behalf of Dynegy Miami Fort, LLC by O'Brien & Gere Engineers, Inc. (OBG) to provide pertinent information for an alternate source demonstration as allowed by 40 CFR § 257.94(e)(2) for the Miami Fort Lawrenceburg Road Landfill, which is located near the Miami Fort Power Station and approximately one mile west of North Bend, Ohio.

Initial background groundwater monitoring consisting of a minimum of eight samples as required under 40 CFR § 257.94(b) was initiated in November 2015 and completed prior to October 17, 2017. The first semi-annual detection monitoring sample was collected on November 14-15, 2017. Comparison of background groundwater quality with parameters monitored in downgradient wells during the November 2017 detection monitoring program sampling event indicated that downgradient parameters were within the background prediction limits for each parameter at each monitoring well, except for the following statistically significant increase (SSI):

- pH lower than the background prediction interval at wells MW-9, MW-11, MW-12, MW-14, and MW-15

40 CFR § 257.94(e)(2) allows the owner or operator 90 days from the date of an SSI determination to complete a written demonstration that a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality ("alternate source demonstration"). Pursuant to 40 CFR § 257.94(e)(2), the following demonstrates that the SSI for pH, as previously determined on January 10, 2018, resulted from sampling error. Specifically, the prediction limits calculated at that time were not representative of site conditions due to anomalous elevated pH measurements that were included in the background data set. The elevated pH measurements were due to equipment malfunction during the March 2017 sampling event.

The elevated pH measurements were identified during the alternate source demonstration evaluation process, after statistical limits were established in accordance with the Statistical Analysis Plan[1], and the pH SSI determinations were initially determined. Anomalous pH measurements were identified for the March 2017 sampling event, ranging between 0.5-2.5 S.U. greater than other sampling events for both background and downgradient wells (Figure 1). The Grubb's outlier test was used to confirm that the elevated pH measurements for the March 2017 sampling event were statistical outliers. The Grubbs' Outlier Analysis Results Report is provided in Attachment A.

Equipment malfunction was suspected to be the cause of the anomalous measurements. The sampling team was contacted and it was confirmed that the pH probe had malfunctioned.

The anomalous elevated pH measurements for the March 2017 sampling event were removed from the background data set and statistical limits were recalculated for pH (Figure 2). The revised upper and lower prediction limits for pH are 7.98 S.U. and 6.56 S.U., respectively.

[1] Natural Resource Technology, an OBG Company, Statistical Analysis Plan, Miami Fort Power Station, Dynegy Miami Fort, LLC, October 17, 2017.

Figure 1 - time series including anomalous pH measurements from March 2017 sampling event

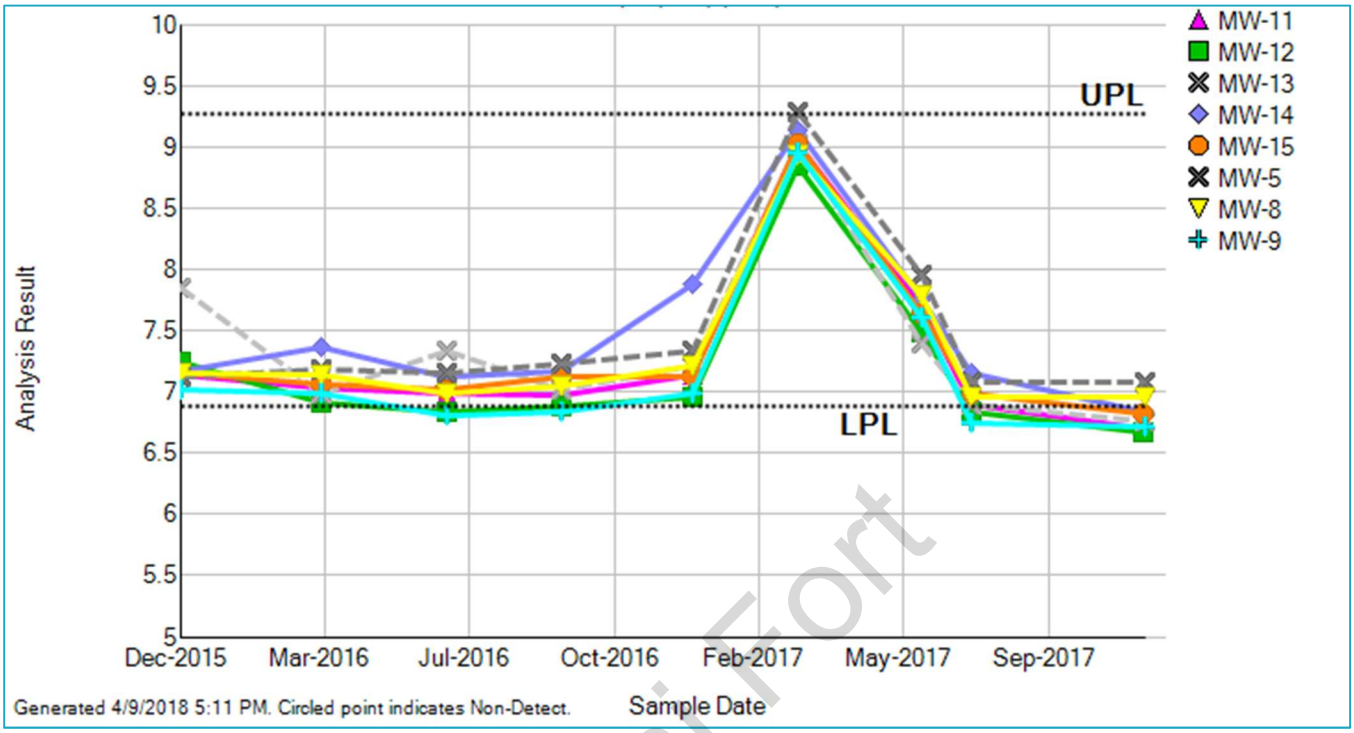
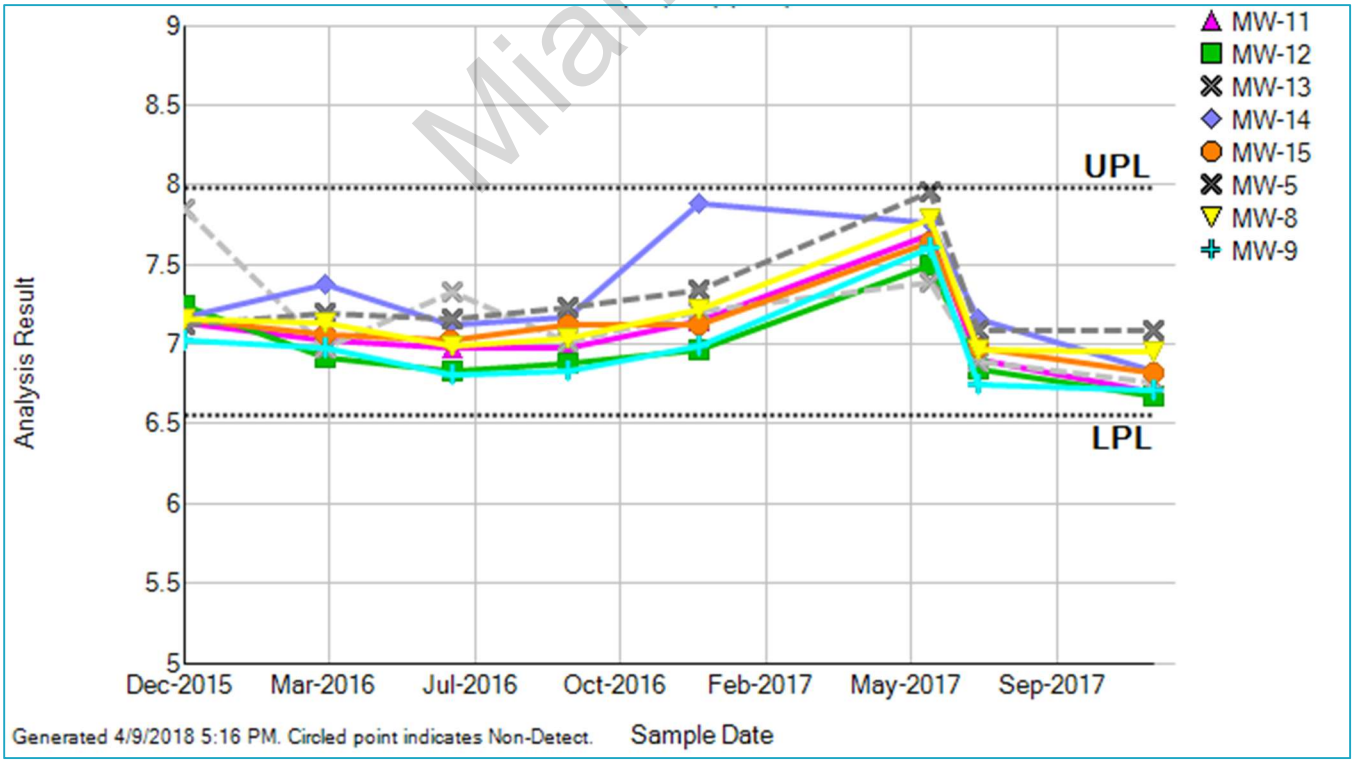


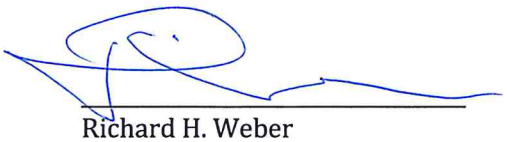
Figure 2 - time series excluding anomalous pH measurements from March 2017 sampling event

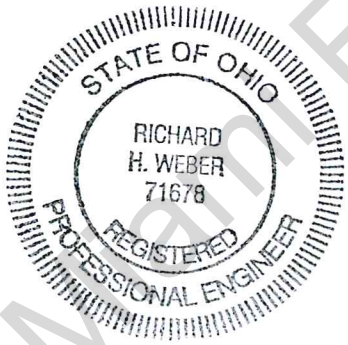


The October 2017 pH measurements were within the corrected statistical limits; therefore, an SSI did not occur as initially determined. This information serves as the written alternate source demonstration prepared in accordance with 40 CFR § 257.94(e)(2) that the SSI observed during the detection monitoring program resulted from error in sampling and was not due to a release from the CCR unit. Therefore, an assessment monitoring program is not required and Miami Fort Lawrenceburg Road Landfill will remain in detection monitoring.

Attachment A Grubbs' Outlier Analysis Results Report

I, Richard H. Weber, a qualified professional engineer in good standing in the State of Ohio, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.





Richard H. Weber
Qualified Professional Engineer
71678
Ohio
O'Brien & Gere Engineers, Inc.
Date: April 10, 2018

I, Nicole M. Pagano, a qualified professional hydrogeologist, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Nicole M. Pagano
Senior Managing Engineer
O'Brien & Gere Engineers, Inc.
Date: April 10, 2018

Attachment A

Grubbs' Outlier Analysis Results Report

Miami Fort Lawrenceburg Road Landfill

Outlier Analysis Results

User Supplied Information

Date Range: 12/11/2015 to 11/15/2017
Confidence Level: 95%
Transform: None
LT Multiplier: x 1.00
Number of Outliers: One Outlier

pH (field), STD
Location: MW-11

Mean of all data: 7.284
Standard Deviation of all data: 0.704
Largest Observation Concentration of all data: Xn = 9.020
Test Statistic, high extreme of all data: Tn = 2.465
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/11/2015	7.130	False		
03/23/2016	7.030	False		
06/23/2016	6.980	False		
09/15/2016	6.970	False		
12/20/2016	7.140	False		
03/06/2017	9.020	False		1
06/05/2017	7.690	False		
07/11/2017	6.900	False		
11/14/2017	6.700	False		

pH (field), STD
Location: MW-12

Mean of all data: 7.186
Standard Deviation of all data: 0.671
Largest Observation Concentration of all data: Xn = 8.850
Test Statistic, high extreme of all data: Tn = 2.482
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/11/2015	7.240	False		
03/23/2016	6.910	False		
06/23/2016	6.830	False		
09/15/2016	6.880	False		
12/20/2016	6.960	False		
03/06/2017	8.850	False		1

Based on Grubbs one-sided outlier test

Miami Fort Lawrenceburg Road Landfill

Outlier Analysis Results

User Supplied Information

Date Range: 12/11/2015 to 11/15/2017 | **LT Multiplier: x 1.00**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

06/05/2017	7.490	False
07/11/2017	6.840	False
11/14/2017	6.670	False

pH (field), STD

Location: MW-13

Mean of all data: 7.383

Standard Deviation of all data: 0.698

Largest Observation Concentration of all data: Xn = 9.030

Test Statistic, high extreme of all data: Tn = 2.360

T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/11/2015	7.850	False		
03/23/2016	6.980	False		
06/23/2016	7.330	False		
09/15/2016	7.010	False		
12/20/2016	7.210	False		
03/06/2017	9.030	False		1
06/05/2017	7.390	False		
07/11/2017	6.890	False		
11/15/2017	6.760	False		

pH (field), STD

Location: MW-14

Mean of all data: 7.510

Standard Deviation of all data: 0.690

Largest Observation Concentration of all data: Xn = 9.130

Test Statistic, high extreme of all data: Tn = 2.347

T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/11/2015	7.170	False		
03/23/2016	7.370	False		
06/22/2016	7.120	False		

Based on Grubbs one-sided outlier test

Miami Fort Lawrenceburg Road Landfill

Outlier Analysis Results

User Supplied Information

Date Range: 12/11/2015 to 11/15/2017 | **LT Multiplier: x 1.00**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

09/15/2016	7.170	False		
12/20/2016	7.880	False		
03/06/2017	9.130	False		1
06/05/2017	7.760	False		
07/11/2017	7.160	False		
11/14/2017	6.830	False		

pH (field), STD

Location: MW-15

Mean of all data: 7.327

Standard Deviation of all data: 0.673

Largest Observation Concentration of all data: Xn = 9.020

Test Statistic, high extreme of all data: Tn = 2.517

T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/11/2015	7.160	False		
03/23/2016	7.060	False		
06/22/2016	7.020	False		
09/15/2016	7.120	False		
12/20/2016	7.120	False		
03/06/2017	9.020	False		1
06/05/2017	7.640	False		
07/11/2017	6.980	False		
11/14/2017	6.820	False		

pH (field), STD

Location: MW-5

Mean of all data: 7.493

Standard Deviation of all data: 0.723

Largest Observation Concentration of all data: Xn = 9.280

Test Statistic, high extreme of all data: Tn = 2.470

T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

Based on Grubbs one-sided outlier test

Miami Fort Lawrenceburg Road Landfill

Outlier Analysis Results

User Supplied Information

Date Range: 12/11/2015 to 11/15/2017 | **LT Multiplier: x 1.00**

Confidence Level: 95% | **Number of Outliers: One Outlier**

Transform: None

12/11/2015	7.120	False		
03/23/2016	7.190	False		
06/23/2016	7.160	False		
09/15/2016	7.230	False		
12/20/2016	7.340	False		
03/06/2017	9.280	False		1
06/05/2017	7.960	False		
07/11/2017	7.080	False		
11/15/2017	7.080	False		

pH (field), STD

Location: MW-8

Mean of all data: 7.353

Standard Deviation of all data: 0.648

Largest Observation Concentration of all data: Xn = 8.940

Test Statistic, high extreme of all data: Tn = 2.448

T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/11/2015	7.160	False		
03/23/2016	7.130	False		
06/23/2016	6.990	False		
09/15/2016	7.040	False		
12/20/2016	7.220	False		
03/06/2017	8.940	False		1
06/05/2017	7.790	False		
07/11/2017	6.960	False		
11/15/2017	6.950	False		

Based on Grubbs one-sided outlier test

Miami Fort Lawrenceburg Road Landfill

Outlier Analysis Results

User Supplied Information

Date Range: 12/11/2015 to 11/15/2017
LT Multiplier: x 1.00
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

pH (field), STD
Location: MW-9

Mean of all data: 7.182
Standard Deviation of all data: 0.714
Largest Observation Concentration of all data: Xn = 8.950
Test Statistic, high extreme of all data: Tn = 2.477
T Critical of all data: Tcr = 2.110

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/11/2015	7.020	False		
03/23/2016	6.980	False		
06/23/2016	6.810	False		
09/15/2016	6.830	False		
12/20/2016	6.990	False		
03/06/2017	8.950	False		1
06/05/2017	7.600	False		
07/11/2017	6.750	False		
11/15/2017	6.710	False		

Based on Grubbs one-sided outlier test

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