Prepared for
Dynegy Midwest Generation, LLC

Date
January 31, 2021

Project No.
1940074914

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

BALDWIN BOTTOM ASH POND, BALDWIN ENERGY COMPLEX

RAMBOLL Bright ideas. Sustainable change.

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BALDWIN BOTTOM ASH POND, BALDWIN ENERGY COMPLEX

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Project no.	**1940074914**
Recipient	**Dynegy Midwest Generation, LLC**
Document type	**Annual Groundwater Monitoring and Corrective Action Report**
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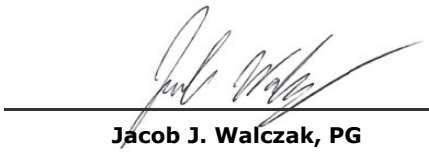
Date	**January 31, 2021**
Prepared by	**Kristen L. Theesfeld**
Checked by	**Jacob J. Walczak, PG**
Approved by	**Lauren D. Cook**
Description	**Annual Report in Support of the CCR Rule Groundwater Monitoring Program**

Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
USA

T 414-837-3607
F 414-837-3608
https://ramboll.com

Kristen L. Theesfeld
Hydrogeologist



Jacob J. Walczak, PG
Senior Hydrogeologist

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ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
BAP	Bottom Ash Pond
CCR	Coal Combustion Residuals
CMA	Corrective Measures Assessment
GWPS	Groundwater Protection Standard
SSI	Statistically Significant Increase
SSL	Statistically Significant Level

EXECUTIVE SUMMARY

This report has been prepared to provide the information required by Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.90(e) for Baldwin Bottom Ash Pond (BAP) located at Baldwin Energy Complex near Baldwin, Illinois.

Groundwater is being monitored at Baldwin BAP in accordance with the Assessment Monitoring Program requirements specified in 40 C.F.R. § 257.95. Assessment Monitoring was initiated at Baldwin BAP on April 9, 2018.

No changes were made to the monitoring system in 2020.

The following Statistically Significant Levels (SSLs) of 40 C.F.R. Part 257 Appendix IV parameters were determined in 2020:

- Lithium at well MW-370

Alternate Source Demonstrations (ASDs) were completed for the SSLs referenced above. Consequently, a Corrective Measures Assessment (CMA) is not required and Baldwin BAP remains in the Assessment Monitoring Program.

1. INTRODUCTION

This report has been prepared by Ramboll Americas Engineering Solutions Inc. (Ramboll) on behalf of Dynegy Midwest Generation, LLC, to provide the information required by 40 C.F.R.§ 257.90(e) for Baldwin BAP located at Baldwin Energy Complex near Baldwin, Illinois.

In accordance with 40 C.F.R. § 257.90(e), the owner or operator of a 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 [SSI] relative to background levels).
5. Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.
6. A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:
   i. At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
   ii. At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
   iii. If it was determined that there was a SSI over background for one or more constituents listed in Appendix III of §257 pursuant to §257.94(e):
      A. Identify those constituents listed in Appendix III of §257 and the names of the monitoring wells associated with the SSI(s).

B. Provide the date when the assessment monitoring program was initiated for the CCR unit.

iv. If it was determined that there was a SSL above the Groundwater Protection Standard (GWPS) for one or more constituents listed in Appendix IV of §257 pursuant to §257.95(g) include all of the following:

A. Identify those constituents listed in Appendix IV of §257 and the names of the monitoring wells associated with the SSL(s).

B. Provide the date when the CMA was initiated for the CCR unit.

C. Provide the date when the public meeting was held for CMA for the CCR unit.

D. Provide the date when the CMA was completed for the CCR unit.

v. Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection.

vi. Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.

This report provides the required information for Baldwin BAP for calendar year 2020.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

No changes have occurred to the Monitoring Program status in calendar year 2020, and Baldwin BAP remains in the Assessment Monitoring Program in accordance with 40 C.F.R. § 257.95.

3. KEY ACTIONS COMPLETED IN 2020

The Assessment Monitoring Program is summarized in Table A. The groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells, is presented in Figure 1. No changes were made to the monitoring system in 2020. In general, one groundwater sample was collected from each background and downgradient well during each monitoring event. All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017a). All monitoring data obtained under 40 C.F.R. §§ 257.90 through 257.98 (as applicable) in 2020, and analytical results for the September 2019 sampling event, are presented in Tables 1 and 2. Analytical data were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017b) to determine any SSLs of Appendix IV parameters over GWPSs. Notifications were completed in accordance with 40 C.F.R. § 257.95(g).

Statistical background values are provided in Table 3 and GWPSs in Table 4.

Potential alternate sources were evaluated as outlined in the 40 C.F.R. § 257.95(g)(3)(ii). ASDs were completed and certified by a qualified professional engineer. The dates the ASDs were completed are provided in Table A. The ASDs are included in Appendix A.

Table A – 2019-2020 Assessment Monitoring Program Summary

Sampling Dates	Analytical Data Receipt Date	Parameters Collected	SSL(s)	SSL(s) Determination Date	ASD Completion Date
September 24 - 25, 2019	October 24, 2019	Appendix III			
		Appendix IV Detected [1]	Lithium at well MW-370	January 22, 2020	April 21, 2020
March 25 - 26, 2020	April 28, 2020	Appendix III			
		Appendix IV	Lithium at well MW-370	July 27, 2020	October 26, 2020
September 15 - 17, 2020	October 19, 2020	Appendix III			
		Appendix IV Detected [1]	TBD	TBD	TBD

Notes:
NA: Not Applicable
TBD: To Be Determined
1. Groundwater sample analysis was limited to Appendix IV parameters detected in previous events in accordance with 40 C.F.R. § 257.95(d)(1).

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the Groundwater Monitoring Program during 2020. Groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017a), and all data were accepted.

5. KEY ACTIVITIES PLANNED FOR 2021

The following key activities are planned for 2021:

- Continuation of the Assessment Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2021.
- 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 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 2021 Annual Groundwater Monitoring and Corrective Action Report.
  - If an alternate source(s) is not identified to be the cause of the SSL, the applicable requirements of 40 C.F.R. §§ 257.94 through 257.98 (*e.g.*, assessment of corrective measures) as may apply in 2021 will be met, including associated recordkeeping/notifications required by 40 C.F.R. §§ 257.105 through 257.108.

6. REFERENCES

Natural Resource Technology, an OBG Company (NRT/OBG), 2017a. Sampling and Analysis Plan, Baldwin Bottom Ash Pond, Baldwin Energy Complex, Baldwin, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017b. Statistical Analysis Plan, Baldwin Energy Complex, Havana Power Station, Hennepin Power Station, Wood River Power Station, Dynegy Midwest Generation, LLC, October 17, 2017.

TABLES

TABLE 1.
ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BALDWIN ENERGY COMPLEX
601 - BOTTOM ASH POND
BALDWIN, IL

Well ID	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft) 6020A	Groundwater Elevation (ft NAVD88) 6020A	Boron, total (mg/L) 6020A	Calcium, total (mg/L) 6020A	Chloride, total (mg/L) 9251	Fluoride, total (mg/L) 9214	pH (field) (STD) SM4500 H+B	Sulfate, total (mg/L) 9036	Total Dissolved Solids (mg/L) SM 2540C
MW-304 Background	38.188332	-89.853441	9/25/2019	9.3	446.19	1.84	18.4	152	1.74	7.9	169	1350
			3/24/2020	9.56	445.93							
			3/26/2020			1.66	17.2	153	1.81	7.9	177	1320
			9/15/2020	9.97	445.52							
			9/17/2020			1.89	15.3	161	1.79	8.0	196	1320
MW-306 Background	38.20114	-89.846756	9/25/2019	18.1	435.07	0.166	46	62	0.59	11.0	37	318
			3/24/2020	17.31	435.86							
			3/26/2020			0.18	43.1	63	0.6	11.5	37	288
			9/15/2020	17.75	435.42							
			9/17/2020			0.174	26.9	58	0.56	10.5	37	224
MW-356 Downgradient	38.198963	-89.869578	9/24/2019	3.02	424.58	2.04	11.6	29	2	7.7	38	644
			3/24/2020	3.23	424.37							
			3/25/2020			1.94	12.2	29	2.01	7.9	43	654
			9/15/2020	3.62	423.98	2.09	11.4	32	2.02	7.8	45	660
MW-369 Downgradient	38.196986	-89.870258	9/24/2019	13.1	409.61	0.948	85	101	1.08	6.7	90	788
			3/24/2020	7.65	415.06							
			3/25/2020			0.714	92.3	94	0.95	7.1	92	726
			9/15/2020	17.62	405.09	0.683	88.5	105	0.97	7.1	91	756
MW-370 Downgradient	38.195603	-89.869669	9/24/2019	18.98	401.87	1.95	47	1290	3	7.5	237	2830
			3/24/2020	17.56	403.29							
			3/25/2020			1.79	44.5	1340	3.19	7.7	251	2880
			9/15/2020	18.92	401.93	1.97	43.4	1470	3.05	7.5	263	3040
MW-382 Downgradient	38.19454	-89.868044	9/24/2019	16.23	414.96	1.78	20.5	34	2.85	7.7	388	1150
			3/24/2020	15.79	415.4							
			3/25/2020			1.75	19.7	34	3.04	7.9	415	1100
			9/15/2020	16.5	414.69	1.75	18.8	32	2.8	7.8	415	1090

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TABLE 1.
ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BALDWIN ENERGY COMPLEX
601 - BOTTOM ASH POND
BALDWIN, IL

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
ft = foot/feet
mg/L = milligrams per liter
NAVD88 = North American Vertical Datum of 1988
S.U. = Standard Units
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method; estimated concentrations below the reporting limit and associated qualifiers are not provided since not utilized in statistics to determine Statistically Significant Increases (SSIs) over background.
4-digit numbers below parameter represent SW-846 analytical methods and alpha-numeric values that begin with SM represent Standard Methods for the Examination of Water and Wastewater.

TABLE 2.
ANALYTICAL RESULTS - APPENDIX IV PARAMETERS
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BALDWIN ENERGY COMPLEX
601 - BOTTOM ASH POND
BALDWIN, IL

Well ID	Date	Antimony, total (mg/L) 6020A	Arsenic, total (mg/L) 6020A	Barium, total (mg/L) 6020A	Beryllium, total (mg/L) 6020A	Cadmium, total (mg/L) 6020A	Chromium, total (mg/L) 6020A	Cobalt, total (mg/L) 6020A	Fluoride, total (mg/L) 6020A	Lead, total (mg/L) 6020A	Lithium, total (mg/L) 6020A	Mercury, total (mg/L) 7470A	Molybdenum, total (mg/L) 6020A	Radium-226 + Radium 228, total (pCi/L) 6020A	Selenium, total (mg/L) 6020A	Thallium, total (mg/L) 6020A
MW-304 Background	9/25/2019	<0.001	0.0017	0.0211	<0.001	<0.001	<0.0015	<0.001	1.74	<0.001	0.0836	<0.0002	0.0017	0.42	<0.001	<0.002
	3/26/2020	<0.001	0.0016	0.0212	<0.001	<0.001	<0.0015	<0.001	1.81	<0.001	0.0782	<0.0002	0.0015	0.95	<0.001	<0.002
	9/17/2020	<0.001	0.0024	0.0192			<0.0015	<0.001	1.79	<0.001	0.091		0.0019	0.37	<0.001	
MW-306 Background	9/25/2019	<0.001	0.0021	0.015	<0.001	<0.001	<0.0015	<0.001	0.59	<0.001	0.0133	<0.0002	0.0267	0.36	<0.001	<0.002
	3/26/2020	<0.001	0.0023	0.0163	<0.001	<0.001	<0.0015	<0.001	0.6	<0.001	0.0132	<0.0002	0.0269	1.08	<0.001	<0.002
	9/17/2020	<0.001	0.002	0.0124			<0.0015	<0.001	0.56	<0.001	0.0143		0.0262	1.59	<0.001	
MW-356 Downgradient	9/24/2019		<0.001	0.0307			<0.0015		2		0.058		<0.0015	0.1		
	3/25/2020	<0.001	<0.001	0.0303	<0.001	<0.001	<0.0015	<0.001	2.01	<0.001	0.0529	<0.0002	<0.0015	2.18	<0.001	<0.002
	9/15/2020	<0.001	<0.001	0.0291			<0.0015	<0.001	2.02	<0.001	0.0579		<0.0015	1.08	<0.001	
MW-369 Downgradient	9/24/2019		0.0059	0.0849			<0.0015		1.08		0.0259		0.0186	0.84		
	3/25/2020	<0.001	0.0028	0.0918	<0.001	<0.001	<0.0015	<0.001	0.95	<0.001	0.0182	<0.0002	0.0113	1.72	<0.001	<0.002
	9/15/2020	<0.001	0.0018	0.0894			<0.0015	0.0033	0.97	<0.001	0.0212		0.0092	1.2	<0.001	
MW-370 Downgradient	9/24/2019		<0.001	0.0424			<0.0015		3		0.149		0.0188	0.75		
	3/25/2020	<0.001	<0.001	0.0421	<0.001	<0.001	<0.0015	<0.001	3.19	<0.001	0.132	<0.0002	0.018	2.01	<0.001	<0.002
	9/15/2020	<0.001	<0.001	0.0377			<0.0015	<0.001	3.05	<0.001	0.151		0.0157	0.95	<0.001	
MW-382 Downgradient	9/24/2019		0.0012	0.0221			0.0044		2.85		0.0623		0.0025	0.51		
	3/25/2020	<0.001	0.0014	0.0196	<0.001	<0.001	0.0028	<0.001	3.04	<0.001	0.0561	<0.0002	0.0021	2.33	<0.001	<0.002
	9/15/2020	<0.001	<0.001	0.0158			0.0032	<0.001	2.8	<0.001	0.064		0.0033	0.23	<0.001	

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
mg/L = milligrams per liter
NA = Not Analyzed
pCi/L = picoCuries per liter
< = concentration is less than concentration shown, which corresponds to the reporting limit for the method; estimated concentrations below the reporting limit and associated qualifiers are not provided since not utilized in statistics to determine Statistically Significant Levels (SSLs) over Groundwater Protection Standards.
4-digit numbers below parameter represent SW-846 analytical methods and 3-digit numbers represent Clean Water Act analytical methods.

TABLE 3.
STATISTICAL BACKGROUND VALUES
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BALDWIN ENERGY COMPLEX
601 - BOTTOM ASH POND
BALDWIN, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Parameter	Statistical Background Value (UPL)
40 C.F.R. Part 257 Appendix III	
Boron (mg/L)	1.84
Calcium (mg/L)	60.5
Chloride (mg/L)	153
Fluoride (mg/L)	1.88
pH (S.U.)	7.4 / 11.5
Sulfate (mg/L)	208
Total Dissolved Solids (mg/L)	1420

[O: RAB 7/6/2020, C: MIK 9/9/2020]

Notes:

40 C.F.R. = Title 40 of the Code of Federal Regulations
mg/L = milligrams per liter
S.U. = Standard Units
UPL = Upper Prediction Limit

TABLE 4.
GROUNDWATER PROTECTION STANDARDS
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
BALDWIN ENERGY COMPLEX
601 - BOTTOM ASH POND
BALDWIN, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Parameter	Groundwater Protection Standard[1]
40 C.F.R. Part 257 Appendix IV	
Antimony (mg/L)	0.006
Arsenic (mg/L)	0.010
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)	0.0958
Mercury (mg/L)	0.002
Molybdenum (mg/L)	0.10
Radium 226+228 (pCi/L)	5
Selenium (mg/L)	0.05
Thallium (mg/L)	0.002

[O: RAB 7/6/2020, C: MIK 9/9/2020]

Notes:

40 C.F.R. = Title 40 of the Code of Federal Regulations

mg/L = milligrams per liter

pCi/L = picoCuries per liter

[1]Groundwater Protection Standard is the higher of the Maximum Contaminant Level / Health-Based Level or background.

FIGURES

Y:\Mapping\Projects\122285\MXD\2020_AnnualGWM_CAR\Figure 1_GWS_WellLoc_Baldwin_BAP.mxd

PROJECT: 169000XXXX | DATED: 1/25/2021 | DESIGNER: galammc

DOWNGRADIENT MONITORING WELL LOCATION
BACKGROUND MONITORING WELL LOCATION
CCR MONITORED UNIT

0 400 800 Feet

MONITORING WELL LOCATION MAP
BALDWIN BOTTOM ASH POND
UNIT ID:601

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
VISTRA CCR RULE GROUNDWATER MONITORING
BALDWIN ENERGY COMPLEX
BALDWIN, ILLINOIS

FIGURE 1

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ENGINEERING SOLUTIONS, INC.

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APPENDICES

Intended for
Dynegy Midwest Generation, LLC

Date
April 21, 2020

Project No.
74914

40 C.F.R. § 257.95(g)(3)(ii): ALTERNATE SOURCE DEMONSTRATION

BALDWIN BOTTOM ASH POND

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CERTIFICATIONS

I, Jacob J. Walczak, a professional geologist in good standing in the State of Illinois, 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.

Jacob J. Walczak
Professional Geologist
196-001473
Illinois
O'Brien & Gere Engineers, Inc., a Ramboll Company
Date: April 21, 2020

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, 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.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
O'Brien & Gere Engineers, Inc., a Ramboll Company
Date: April 21, 2020

Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
USA
T 414-837-3607
F 414-837-3608
https://ramboll.com

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FIGURES (ATTACHED)

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ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
BAP	Bottom Ash Pond
CCR	Coal Combustion Residuals
DMG	Dynegy Midwest Generation, LLC
GWPS	Groundwater Protection Standard
LOE	line of evidence
mg/L	milligrams per liter
NRT/OBG	Natural Resource Technology, an OBG Company
Ramboll	O'Brien & Gere Engineers, Inc., a Ramboll Company
SSI	Statistically Significant Increase
SSL	Statistically Significant Level

1. INTRODUCTION

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.95(g)(3)(ii) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of Statistically Significant Levels (SSLs) over Groundwater Protection Standards (GWPSs) of groundwater constituents listed in Appendix IV of 40 C.F.R. Part 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSL(s), or that the SSL(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Dynegy Midwest Generation, LLC (DMG), by O'Brien & Gere Engineers, Inc., a Ramboll Company (Ramboll), to provide pertinent information pursuant to 40 C.F.R. § 257.95(g)(3)(ii) for the Baldwin Bottom Ash Pond (BAP) located near Baldwin, Illinois.

The most recent Assessment Monitoring sampling event (A2D) was completed on September 24 and September 25, 2019 and analytical data were received on October 24, 2019. Analytical data from all sampling events, from December 2015 through A2D, were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017) to determine any Statistically Significant Increases (SSIs) of Appendix III parameters over background concentrations or SSLs of Appendix IV parameters over GWPSs. That evaluation identified one SSL at downgradient monitoring wells as follows:

- Lithium at well MW-370

Pursuant to 40 C.F.R. § 257.95(g)(3)(ii), the following lines of evidence demonstrate that sources other than the Baldwin BAP were the cause of the lithium SSL listed above. This ASD was completed by April 21, 2020, within 90 days of determination of the SSLs (January 22, 2020), as required by 40 C.F.R. § 257.95(g)(3)(ii).

2. ALTERNATE SOURCE DEMONSTRATION: LINES OF EVIDENCE

This ASD is based on the following lines of evidence (LOEs):

1. Lithium concentrations in the BAP porewater are lower than the concentrations observed in downgradient groundwater.
2. The BAP porewater has a different ionic composition than groundwater.

These LOEs are described and supported in greater detail below. Monitoring wells and the BAP porewater sample locations are shown Figure 1.

2.1 LOE #1: Lithium Concentrations in the BAP Porewater are Lower Than the Concentrations Observed in Downgradient Groundwater.

The table below (Table A) provides summary statistics of groundwater lithium concentrations and BAP porewater lithium concentrations collected from TPZ-164 bottom ash porewater well (see boring log in Attachment A).

Table A – Summary Statistics for Lithium in Groundwater and BAP Porewater (December 2015 to September 2019).

Sample Location	Lithium (mg/L)		
	Minimum	Maximum	Median
Background Groundwater[1]	0.013	0.096	0.046
Downgradient Groundwater[2]	0.023	0.18	0.058
BAP Porewater[3]	0.014	0.018	not reported[4]

Note:
[1]Background groundwater was collected at monitoring wells MW-304 and MW-306.
[2]Downgradient groundwater was collected at monitoring wells MW-356, MW-369, MW-370 and MW-382.
[3]BAP porewater was collected at TPZ-164.
[4]Only two samples were collected, one sample in September 2018 and one sample in June 2019, and analyzed for lithium from TPZ-164 during the monitoring period, therefore the median is not reported.

The following observations can be made from Table A above:

- Concentrations of lithium in background wells ranged from 0.013 to 0.096 milligrams per liter (mg/L), with a median concentration of 0.046 mg/L.
- Concentrations of lithium in downgradient wells ranged from 0.023 to 0.18 mg/L, with a median concentration of 0.058 mg/L.
- Concentrations of lithium in BAP porewater ranged from 0.014 to 0.018 mg/L. These levels of lithium are below the maximum and median lithium concentrations detected in background groundwater monitoring wells, and below the lower end of the range of lithium concentrations detected in all downgradient groundwater monitoring wells.

If the BAP was the source of lithium in downgradient groundwater, BAP porewater concentrations of lithium would be anticipated to be higher than the groundwater concentrations. Therefore, the BAP is not the source of the lithium in the downgradient groundwater, including at MW-370. Background lithium concentrations were also shown to be higher than BAP porewater, suggesting

lithium concentrations are either naturally occurring due to geochemical variations within the Uppermost Aquifer or from upgradient anthropogenic sources.

2.2 LOE #2: The BAP Porewater has a Different Ionic Composition Than Groundwater.

Stiff diagrams graphically represent ionic composition of aqueous solutions. Figure A below shows a series of Stiff diagrams that display the ionic compositions of groundwater from background monitoring wells (brown), downgradient monitoring wells (blue) and the BAP porewater (green). Polygons with similar shapes represent solutions with similar ionic compositions, whereas polygons with different shapes indicate solutions with dissimilar ionic compositions; the larger the area of the polygon, the greater the concentration of the various ions.

The ionic compositions of the groundwater and BAP porewater represented by Figure A are discussed in more detail below.

- The ionic composition of the groundwater in background and downgradient monitoring wells is similar with some exceptions, as represented by the similarity of the Stiff diagram sizes and shapes.
  - The dominant cations in groundwater monitoring wells (background and downgradient) are sodium-potassium and the dominant anions are bicarbonate-carbonate. The exceptions are MW-370, which has chloride as the dominant anion, and MW-306, which has no dominant anion.
- The dominant cation in the BAP porewater sample is calcium and the dominant anion is bicarbonate-carbonate.

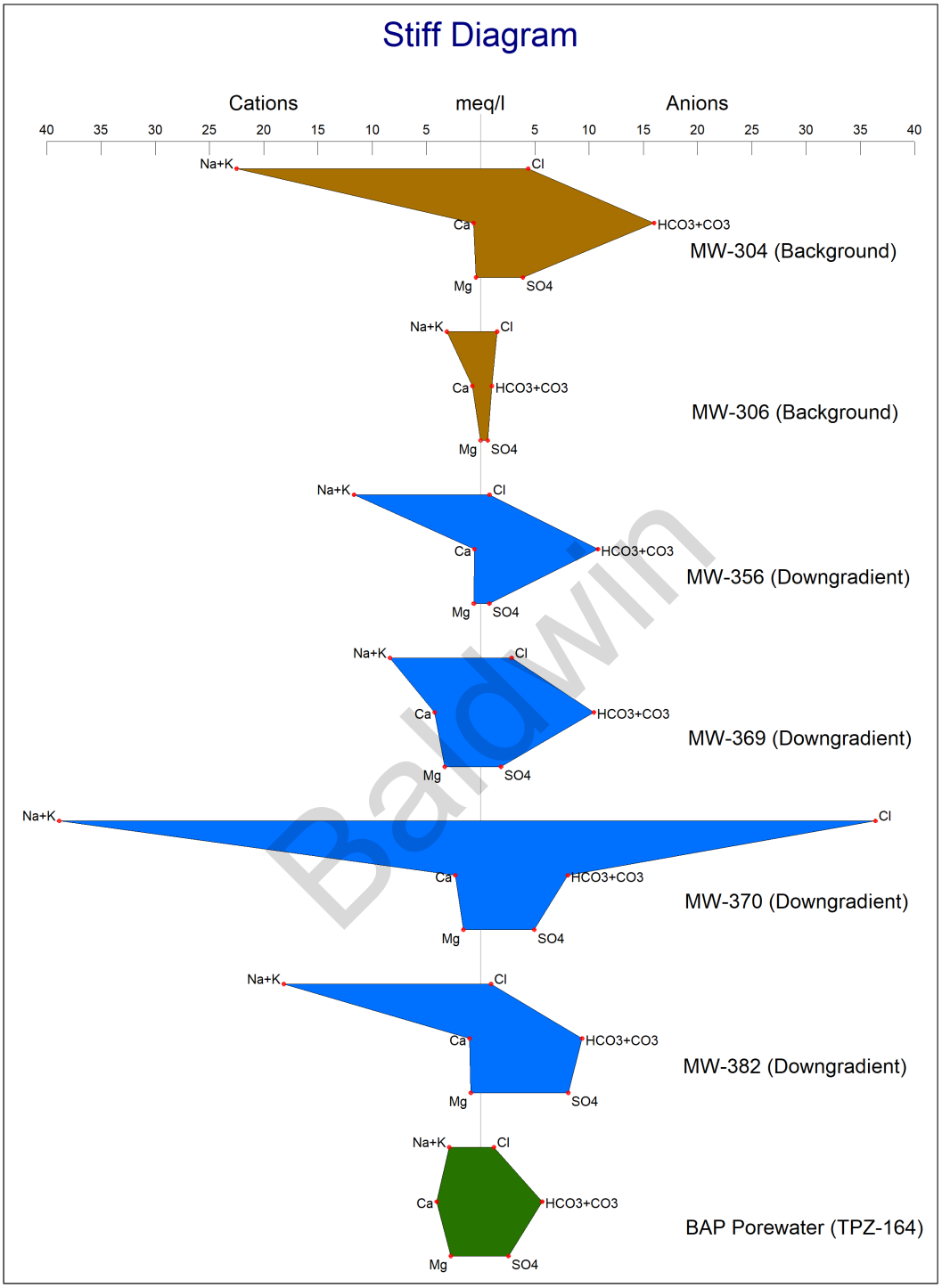


Figure A. Stiff Diagram Showing Ionic Composition of Samples of BAP Background (Brown) and Downgradient (Blue) Groundwater and BAP Porewater (Green).

The ionic composition of the BAP porewater is different than the ionic composition of the groundwater, thus the groundwater at MW-370 is not influenced by the BAP.

3. CONCLUSIONS

Based on the following two lines of evidence, it has been demonstrated that the lithium SSL at MW-370 is not due to the Baldwin BAP but is from a source other than the CCR unit being monitored:

1. Lithium concentrations in the BAP porewater are lower than the concentrations observed in downgradient groundwater.
2. The BAP porewater has a different ionic composition than groundwater.

This information serves as the written ASD prepared in accordance with 40 C.F.R. § 257.95(g)(3)(ii) that the SSL observed during the A2D sampling event was not due to the BAP. Therefore, a corrective measures assessment is not required and the Baldwin BAP will remain in assessment monitoring.

4. REFERENCES

Natural Resource Technology, an OBG Company (NRT/OBG), 2017, Statistical Analysis Plan, Baldwin Energy Complex, Havana Power Station, Hennepin Power Station, Wood River Power Station, Dynegy Midwest Generation, LLC, October 17, 2017.

FIGURES

- BOTTOM ASH POND DOWNGRADIENT CCR MONITORING WELL LOCATION
- BOTTOM ASH POND BACKGROUND CCR MONITORING WELL LOCATION
- BOTTOM ASH POND POREWATER SAMPLE LOCATION
- BOTTOM ASH POND UNIT BOUNDARY

0 400 800 Feet

MONITORING WELL AND BOTTOM ASH POND WATER SAMPLE LOCATION MAP

BALDWIN BOTTOM ASH POND (UNIT ID: 601)
ALTERNATE SOURCE DEMONSTRATION
BALDWIN ENERGY COMPLEX
BALDWIN, ILLINOIS

FIGURE 1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

APPENDIX A
BORING LOG FOR POREWATER WELL TPZ-164

KELRON ENVIRONMENTAL
Incorporated

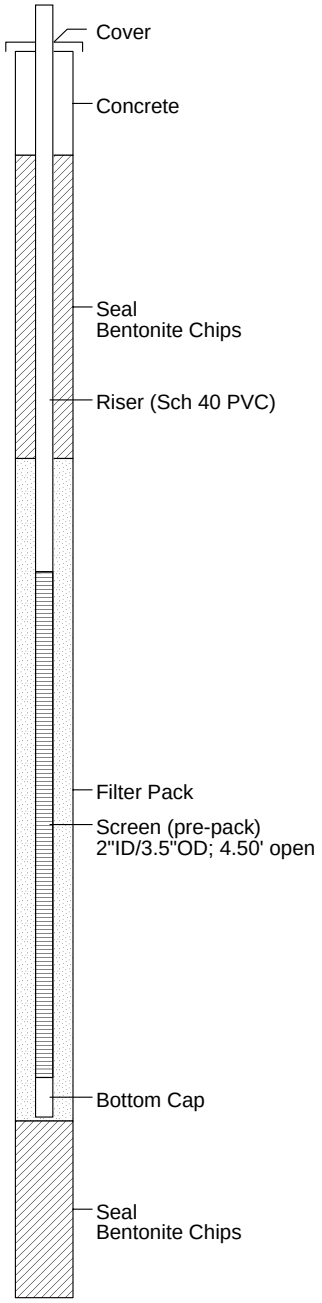
LOG OF PROBEHOLE TPZ-164

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/26/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
Drilling Method	: HSA (CME-55LC)	Ground Elevation	: 432.50
Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 435.10
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383909, 556829

Depth in Feet	DESCRIPTION	Surf. Elev. 432.50	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
0	FILL - Bottom Ash, coarse, black (10YR 2/1), dry							
1								
2		430						
3	- moist <Shelby Tube Sample ST164-5 @ 3-5'> grain size analysis (Ash): 50% Sand, 42.9% Silt, 7.1% Clay	429						
4			1		17/24		AR	
5	- wet	428						
6		427						
7		426						
8		425						
9	CLAY (lean), stiff, medium to high plasticity, dark gray (10YR 4/1), moist - @8.9' - light yellowish brown (10YR 6/4) with <10% light gray mottling - @9.3' - gray (10YR 6/1) with 25-50% brownish-yellow mottling (10YR 6/6)	424		3				
10		423	2	3 5	18/18		CL	
11	- light olive brown <Shelby Tube Sample ST164-12 @ 10-12'> grain size analysis: 7.2% Sand, 62.2% Silt, 30.6% Clay	422						
12	END BOREHOLE AT 10.3 FEET BLS END Split-Spoon Sampling at 12 feet BLS	421	3		23/24		CL	
		420						
		419						

Well: TPZ-164
Elev.: 435.10



11-08-2013 C:\Consulting AlPower Plants\Baldwin\Baldwin 2013 Hydrogeologic Study\Field Work Phase\Boring Logs\BEC164.BOR

Intended for
Dynegy Midwest Generation, LLC

Date
October 26, 2020

Project No.
1940074914

40 C.F.R. § 257.95(g)(3)(ii): ALTERNATE SOURCE DEMONSTRATION

BALDWIN BOTTOM ASH POND

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Jacob J. Walczak, a professional geologist in good standing in the State of Illinois, 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.

Jacob J. Walczak
Professional Geologist
196-001473
Illinois
Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc.
Date: October 26, 2020

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, 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.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc.
Date: October 26, 2020

Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
USA
T 414-837-3607
F 414-837-3608
https://ramboll.com

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TABLES (IN TEXT)

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FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
BAP	Bottom Ash Pond
CCR	Coal Combustion Residuals
DMG	Dynegy Midwest Generation, LLC
f/k/a	formerly known as
GWPS	Groundwater Protection Standard
LOE	line of evidence
mg/L	milligrams per liter
NRT/OBG	Natural Resource Technology, an OBG Company
Ramboll	Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc.
SSI	Statistically Significant Increase
SSL	Statistically Significant Level

1. INTRODUCTION

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.95(g)(3)(ii) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of Statistically Significant Levels (SSLs) over Groundwater Protection Standards (GWPSs) of groundwater constituents listed in Appendix IV of 40 C.F.R. Part 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSL(s), or that the SSL(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Dynegy Midwest Generation, LLC (DMG), by Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc (Ramboll), to provide pertinent information pursuant to 40 C.F.R. § 257.95(g)(3)(ii) for the Baldwin Bottom Ash Pond (BAP) located near Baldwin, Illinois.

The most recent Assessment Monitoring sampling event (A3) was completed on March 26, 2020 and analytical data were received on April 28, 2020. Analytical data from all sampling events, from December 2015 through A3, were evaluated in accordance with the Statistical Analysis Plan (Natural Resource Technology, an OBG Company [NRT/OBG], 2017) to determine any Statistically Significant Increases (SSIs) of Appendix III parameters over background concentrations or SSLs of Appendix IV parameters over GWPSs. That evaluation identified one SSL at downgradient monitoring wells as follows:

- Lithium at well MW-370

Pursuant to 40 C.F.R. § 257.95(g)(3)(ii), the following lines of evidence (LOEs) demonstrate that sources other than the Baldwin BAP were the cause of the lithium SSL listed above. This ASD was completed by October 26, 2020, within 90 days of determination of the SSLs (July 27, 2020), as required by 40 C.F.R. § 257.95(g)(3)(ii).

2. ALTERNATE SOURCE DEMONSTRATION: LINES OF EVIDENCE

This ASD is based on the following LOEs:

1. The median lithium concentration in the BAP porewater is lower than the median concentrations observed in background and downgradient groundwater.
2. The BAP porewater has a different ionic composition than groundwater.

These LOEs are described and supported in greater detail below. Monitoring wells and the BAP porewater sample locations are shown Figure 1.

2.1 LOE #1: The Median Lithium Concentration in the BAP Porewater is Lower Than Median Concentrations Observed in Background and Downgradient Groundwater.

The table below (Table A) provides summary statistics of groundwater lithium concentrations and BAP porewater lithium concentrations collected from TPZ-164 bottom ash porewater well (see boring log in Attachment A).

Table A – Summary Statistics for Lithium in Groundwater and BAP Porewater (December 2015 to March 2020).

Sample Location	Lithium (milligrams per liter [mg/L])		
	Minimum	Maximum	Median
Background Groundwater[1]	0.013	0.096	0.046
Downgradient Groundwater[2]	0.018	0.18	0.058
BAP Porewater[3]	0.013	0.018	0.014

Note:
[1]Background groundwater was collected at monitoring wells MW-304 and MW-306.
[2]Downgradient groundwater was collected at monitoring wells MW-356, MW-369, MW-370 and MW-382.
[3]BAP porewater was collected at TPZ-164.

The following observations can be made from Table A above:

- Concentrations of lithium in background wells ranged from 0.013 to 0.096 mg/L, with a median concentration of 0.046 mg/L.
- Concentrations of lithium in downgradient wells ranged from 0.018 to 0.18 mg/L, with a median concentration of 0.058 mg/L.
- Concentrations of lithium in BAP porewater ranged from 0.013 to 0.018 mg/L, with a median concentration of 0.014 mg/L. The median lithium concentration observed in porewater is below the median lithium concentrations observed in both background and downgradient groundwater monitoring wells.

If the BAP was the source of lithium in downgradient groundwater, BAP porewater concentrations of lithium would be anticipated to be higher than the groundwater concentrations. Therefore, the BAP is not the source of lithium in the downgradient groundwater, including at MW-370. Background lithium concentrations were also shown to be higher than BAP porewater, suggesting

lithium concentrations are either naturally occurring due to geochemical variations within the Uppermost Aquifer or from upgradient anthropogenic sources.

2.2 LOE #2: The BAP Porewater has a Different Ionic Composition Than Groundwater.

Stiff diagrams graphically represent ionic composition of aqueous solutions. Figure A below shows a series of Stiff diagrams that display the ionic compositions of groundwater from background monitoring wells (brown), downgradient monitoring wells (blue), and the BAP porewater (green). Polygons with similar shapes represent solutions with similar ionic compositions, whereas polygons with different shapes indicate solutions with dissimilar ionic compositions; the larger the area of the polygon, the greater the concentration of the various ions.

The ionic compositions of the groundwater and BAP porewater represented by Figure A are discussed in more detail below.

- The ionic composition of the groundwater in downgradient monitoring wells is similar to that in background monitoring well MW-304, with one exception, as represented by the similarity of the Stiff diagram sizes and shapes.
  - The dominant cations in downgradient groundwater monitoring wells and background monitoring well MW-304 are sodium-potassium and the dominant anions are bicarbonate-carbonate. The exception is MW-370, which has chloride as the dominant anion.
- The BAP porewater sample has no dominant cation and the dominant anion is bicarbonate-carbonate.

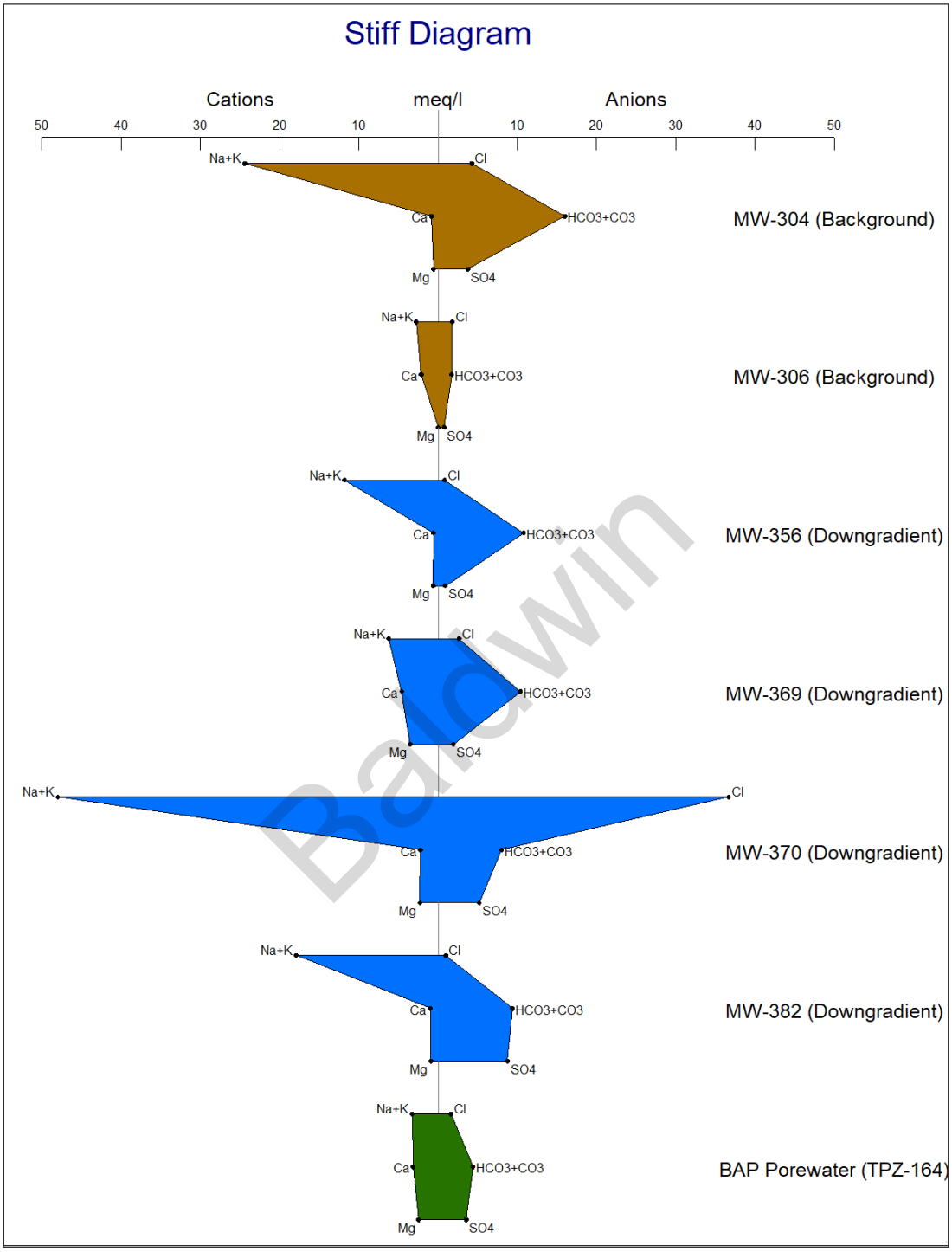

Figure A. Stiff Diagram Showing Ionic Composition of Samples of BAP Background (Brown) and Downgradient Groundwater (Blue) and BAP Porewater (Green).

The ionic composition of the BAP porewater is different than the ionic composition of the groundwater, thus the groundwater at MW-370 is not influenced by the BAP.

3. CONCLUSIONS

Based on the following two LOEs, it has been demonstrated that the lithium SSL at MW-370 is not due to the Baldwin BAP but is from a source other than the CCR unit being monitored:

1. The median lithium concentration in the BAP porewater is lower than the median concentrations observed in background and downgradient groundwater.
2. The BAP porewater has a different ionic composition than groundwater.

This information serves as the written ASD prepared in accordance with 40 C.F.R. § 257.95(g)(3)(ii) that the SSL observed during the A3 sampling event was not due to the BAP. Therefore, a corrective measures assessment is not required, and the Baldwin BAP will remain in assessment monitoring.

4. REFERENCES

Natural Resource Technology, an OBG Company (NRT/OBG), 2017, Statistical Analysis Plan, Baldwin Energy Complex, Havana Power Station, Hennepin Power Station, Wood River Power Station, Dynegy Midwest Generation, LLC, October 17, 2017.

FIGURES

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- BOTTOM ASH POND BACKGROUND CCR MONITORING WELL LOCATION
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- BOTTOM ASH POND UNIT BOUNDARY

0 400 800 Feet

MONITORING WELL AND BOTTOM ASH POND WATER SAMPLE LOCATION MAP

BALDWIN BOTTOM ASH POND (UNIT ID: 601)
ALTERNATE SOURCE DEMONSTRATION
BALDWIN ENERGY COMPLEX
BALDWIN, ILLINOIS

FIGURE 1

RAMBOLL US CORPORATION
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APPENDIX A
BORING LOG FOR POREWATER WELL TPZ-164

KELRON ENVIRONMENTAL
Incorporated

LOG OF PROBEHOLE TPZ-164

Phase II Hydrogeologic Investigation
Baldwin Energy Complex
Dynegy Midwest Generation, Inc.

Date Completed	: 08/26/2013	Driller	: John Gates
Hole Diameter	: 8 1/2" OD / 4 1/4" ID	Geologist	: Stuart Cravens (Kelron)
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Sampling Method	: Split Spoon / Shelby Tube	Casing (MP) Elevation	: 435.10
Drilling Company	: Bulldog Drilling, LLC	X,Y Coordinates	: 2383909, 556829

Depth in Feet	DESCRIPTION	Surf. Elev. 432.50	Samples	Blow Count	Recovery inches	Qp TSF	USCS	GRAPHIC
0	FILL - Bottom Ash, coarse, black (10YR 2/1), dry							
1								
2		430						
3	- moist <Shelby Tube Sample ST164-5 @ 3-5'> grain size analysis (Ash): 50% Sand, 42.9% Silt, 7.1% Clay	429						
4			1		17/24		AR	
5	- wet	428						
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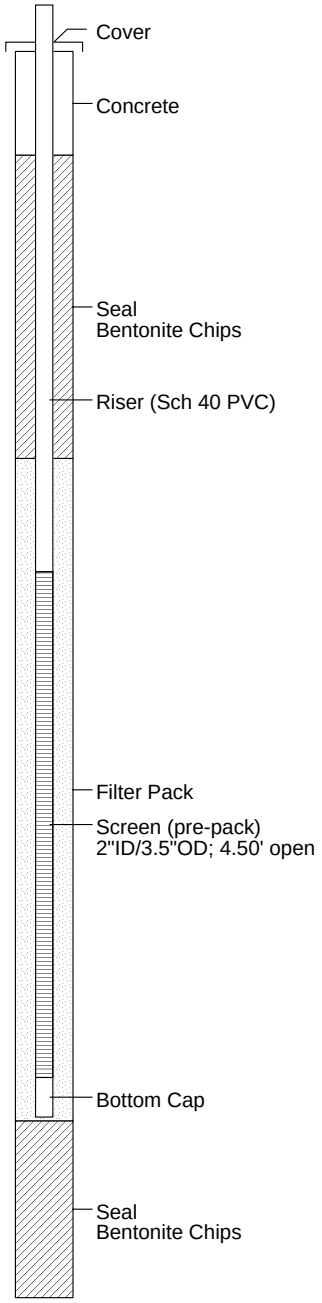
		420						
		419						

Well: TPZ-164
Elev.: 435.10



11-08-2013 C:\Consulting AlPower Plants\Baldwin\Baldwin 2013 Hydrogeologic Study\Field Work Phase\Boring Logs\BEC164.BOR