Prepared for

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2018 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

FEDERAL CCR RULE

Big Cajun II Power Plant
New Roads, Pointe Coupee Parish, Louisiana

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1. INTRODUCTION

The Federal Coal Combustion Residuals (CCR) Rule (40 Code of Federal Regulations [CFR] Part 257.90(e)) (USEPA, 2015) requires owners and or operators of existing CCR surface impoundments to prepare a Groundwater Monitoring and Corrective Action Report (Report) no later than 31 January 2019. Geosyntec Consultants (Geosyntec) has prepared this Report for the Fly and Bottom Ash Basins at the Louisiana Generating, LLC (LaGen), Big Cajun II Power Plant (Big Cajun II; the Site). This Report summarizes the groundwater monitoring activities conducted pursuant to the CCR Rule through December 31, 2018.

2. SITE DESCRIPTION

2.1 Site Description

Big Cajun II contains a coal and natural gas-fired steam turbine electric power generation facility located on 1,939 acres northeast of New Roads, Louisiana (Figure 1). Big Cajun II is currently owned and operated by LaGen and has been in operation for over 30 years. Five Louisiana Department of Environmental Quality (LDEQ) solid waste-permitted surface impoundments (Fly Ash Basin, Bottom Ash Basin, Rainfall Surge Pond, Primary Treatment Pond, and Secondary Treatment Pond) are utilized to manage CCR materials and other process wastewaters. The Fly Ash and Bottom Ash Basins occupy 240 acres and are designed to store/dispose these two types of CCR material. CCR materials from silos are transported by truck to the Fly Ash Basin (or off-site to a permitted landfill for disposal). Bottom ash from Unit 1 is sluiced to the Bottom Ash Basin. Generating Unit 3 bottom ash is hauled to the basin in trucks. The storm water and process wastewater that accumulates within the two Ash Basins are routed to the Treatment Ponds prior to discharge to the Mississippi River via Louisiana Pollutant Discharge Elimination System (LPDES) Outfall 001. Features of the Site and their locations are presented on Figure 2.

Geosyntec understands that only the Fly Ash and Bottom Ash Basins have been designated as CCR Units because they were actively accepting CCR as of the effective date of the CCR Rule (October 14, 2015). Accordingly, it is our understanding that the Groundwater Monitoring and Corrective Action requirements of the CCR Rule (40 CFR §§257.90-98) only apply to the Fly Ash and Bottom Ash Basins.

2.2 Regional Physiographic Setting

The Site is located within the Mississippi River alluvial plain in a predominantly rural area. Land use within a 3-mile radius of the Site is dominated by cropland, pasture land, and deciduous forest land (M.S. Environmental Consultants, 2013). The subsurface alluvial sediments beneath the Site comprise a complex series of southerly dipping Holocene age clay, silt, sand, and gravel deposits that coarsen with depth. Braided outwash deposits of Pleistocene age are found below the Holocene age alluvium (Shaw, 2011).

3. GROUNDWATER MONITORING SYSTEM

This section describes the groundwater monitoring well network for the CCR Rule. Groundwater quality is monitored around the impoundments by wells screened in the upper part of the Alluvial Aquifer, which is the upper water-bearing unit beneath the Site, between approximately 20 feet mean sea level (ft msl) and -20 ft msl. As described in the *Basis for Groundwater Monitoring System* (Geosyntec, 2017a), the groundwater monitoring network was designed to comply with 40 CFR Part 257.91.

A total of fifteen (15) monitoring wells (fourteen (14) downgradient compliance wells encircling the impoundments and one (1) background well) comprise the groundwater monitoring system. Table 1 provides a well construction summary. The groundwater monitoring network is currently approved by the LDEQ under the solid waste permit as essentially a multi-unit monitoring system. Monitoring well construction and soil boring logs were provided in *Basis for Groundwater Monitoring System* (Geosyntec, 2017a).

4. CCR RULE GROUNDWATER KEY ACTIVITIES COMPLETED (2018)

4.1 2017 Annual Report

The 2017 Annual Groundwater Monitoring and Corrective Action Report, which summarized groundwater monitoring activities conducted pursuant to the CCR Rule through December 31, 2017, was prepared during January 2018 and posted to the public internet site.

4.2 Groundwater Monitoring

Groundwater monitoring was conducted at the Site using the monitoring well network described above. There was one detection monitoring event (April 2018), an assessment monitoring event (June 2018), and an assessment monitoring resample event (October 2018) during calendar year 2018.

4.2.1 Groundwater Elevations

Water level measurements were collected during each of the groundwater sampling events. Table 2 provides a summary of potentiometric measurements for the three events. Similar to previous monitoring, the groundwater flow direction (Figures 3 and 4) varied but was predominantly away from the River (east to west) with localized variability in the area of the Bottom Ash Basin and eastern portion of the Fly Ash Basin.

4.2.2 Detection Monitoring

In April 2018, the second detection monitoring program event was conducted. In accordance with 40 CFR 257.94(a) of the CCR Rule, samples were analyzed for Appendix III list parameters only. Prior to sampling, a synoptic round of groundwater measurements was collected from the

compliance and background monitoring wells. Groundwater elevation data are presented in Table 2. Analytical results are summarized in Table 3.

4.2.3 February 2018 SSI Testing

Appendix III parameters from the October 2017 detection monitoring event were compared to the background values identified in the 2017 Annual Report (Geosyntec, 2018). A statistically significant increase (SSI) was identified on February 7, 2018 for boron, calcium, chloride, sulfate, and TDS (Table 4). A comparison of April 2018 detection monitoring results to background values is also summarized in Table 4.

4.2.4 Assessment Monitoring

In late June of 2018 assessment monitoring samples were collected. In accordance with 40 CFR 257.95(b) of the CCR Rule, samples were analyzed for Appendix IV list parameters only. Prior to sampling, a synoptic round of groundwater measurements was collected from the compliance and background monitoring wells. Groundwater elevation data are presented in Table 2. Analytical results are summarized in Table 3 and the last laboratory analysis results were received on July 27, 2018. Therefore, the assessment monitoring program was 'established' on July 27, 2018.

4.2.5 Assessment Monitoring Resample

In October 2018 the assessment monitoring resample event was performed. In accordance with 40 CFR 257.95(d) of the CCR Rule, samples were analyzed for Appendix III list parameters and detected Appendix IV list parameters only. As with previous events, a synoptic round of groundwater measurements was collected from the compliance and background monitoring wells prior to sampling. Groundwater elevation data are presented in Table 2. Analytical results are summarized in Table 3. The last laboratory analysis results were received on November 15, 2018.

4.3 Alternate Source Demonstration

The Alternate Source Demonstration (ASD) was undertaken pursuant to 257.94(e) of the CCR Rule to demonstrate, if possible, that the SSI for Appendix III parameters identified on February 7, 2018 was due to an error (i.e., sampling error, laboratory error, statistical analysis error), natural variation in groundwater quality, or that there is an alternate source (other than the fly and bottom ash basins) for the constituents in groundwater, as outlined in 40 CFR 257.94e(2). The ASD was initiated on 13 March 2018. The components of the ASD were as follows:

- review of the data collected during the eight baseline monitoring events and the October 2017 detection monitoring event to identify potential sampling and/or laboratory error;
- review of statistical analysis for baseline and October 2017 detection monitoring data to identify potential statistical error;

- collection and analysis of groundwater samples during the April 2018 detection monitoring event using low-flow sampling procedures to further assess potential sampling error during the October 2017 detection monitoring event;
- collection and analysis of groundwater samples from temporary background wells in March 2018 to evaluate potential natural spatial variation in groundwater quality. Once sampled, the temporary wells were plugged and abandoned in accordance with Louisiana Department of Transportation and Development (LDOTD) and LDEQ requirements (LDEQ & LDOTD, 2000);
- collection and analysis of groundwater and surface water data in April 2018 to identify potential alternate source(s); and
- historical land-use review to identify potential alternate sources.

Neither an error in sampling, analysis, statistical evaluation, or natural variation nor an alternative source were identified, and an Assessment Monitoring Program was established and initiated.

5. PROBLEMS ENCOUNTERED AND RESOLUTIONS

No problems with the CCR monitoring network were encountered during 2018.

6. STATUS OF MONITORING PROGRAM

In June 2018, the Site transitioned from detection monitoring to assessment monitoring. The Assessment Monitoring Program was 'established' on July 27, 2018, upon receipt of the last Appendix IV laboratory results for the June 2018 groundwater samples.

7. PLANNED KEY ACTIVITIES FOR 2019

The following section outlines the activities planned for 2019.

January 2019: The 2018 Annual Groundwater Monitoring and Corrective Action Report will be entered into the facility's operating record**.**

February 2019: Testing of the assessment monitoring program sample results for a statistically significant level (SSL) will be completed.

February 2019: The 2018 Annual Groundwater Monitoring and Corrective Action Report notification will be posted to the public internet site and a notice of availability will be sent to the LDEQ.

April 2019: The first 2019 semi-annual groundwater assessment monitoring program event will be conducted.

October 2019: The second 2019 semi-annual groundwater assessment monitoring event will be conducted.

December 2019: Preparation of the 2019 Annual Groundwater Monitoring and Corrective Action Report will begin.

8. REFERENCES

Geosyntec. 2017a. Basis for Groundwater Monitoring System Certification – Federal CCR Rule. Prepared for LaGen in October 2017.

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U.S. EPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance. March.

U.S. EPA, 2015. Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities (Final Rule). Fed. Reg. 80 FR 21301, pp. 21301-21501, 40 CFR Parts 257 and 261, April.

TABLES

TABLE 1
WELL CONSTRUCTION DETAILS
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well	Installation Date	Latitude[1] *degrees, minutes, seconds*	Longitude[1] *degrees, minutes, seconds*	Ground Surface Elevation[1] *ft NGVD*	Top of Inner PVC Casing Elevation[1] *ft NGVD*	Inner Casing Diameter[1] *inches*	Top of Sand Pack[1] *ft NDVD*	Screen Interval[1] *ft NGVD*		Screen Length[1] *feet*	Screen Slot Size[1] *inch*	Groundwater Elevation[2] *ft msl*	Use[1]	Permit Number[3]
MW-85A	6/18/1985	30° 43' 44"	-91° 23' 50"	33.17	34.82	2.0	2.2	-0.80	-20.80	20	0.010	27.82	downgradient	P-0108-R1
MW-85B	6/20/1985	30° 43' 47"	-91° 22' 37"	30.60	32.25	2.0	23.6	22.00	1.60	20	0.010	28.75	downgradient	P-0108-R1
MW-85C	6/20/1985	30° 43' 57"	-91° 22' 37"	33.46	35.05	2.0	18.5	15.61	-4.74	20	0.010	28.60	downgradient	P-0108-R1
MW-85D	6/20/1985	30° 43' 44"	-91° 22' 25"	34.20	35.71	2.0	19.2	16.20	-3.80	20	0.010	28.66	downgradient	P-0108-R1
MW-85E	6/19/1985	30° 43' 30"	-91° 23' 01"	32.07	33.52	2.0	25.1	23.37	3.07	20	0.010	28.72	downgradient	P-0108-R1
MW-10A	6/2/2011	30° 43' 36.9556"	-91° 23' 39.6380"	29.886	32.967	2.0	13	10.39	0.39	10	NA	27.567	downgradient	P-0108-R1
MW-10B	6/2/2011	30° 43' 39.4964"	-91° 23' 30.6463"	27.860	34.126	2.0	11	7.86	-2.14	10	NA	27.626	downgradient	P-0108-R1
MW-10C*	6/2/2011	30° 43' 50.4624"	-91° 22' 54.5531"	31.503	34.538	2.0	14.5	11.50	1.50	10	NA	NA	downgradient	P-0108-R1
MW-10CR1	10/7/2016	30° 43' 50"	-91° 22' 55"	32.425	35.475	2.0	16.0	13.00	3.00	10	0.010	29.375	downgradient	P-0108-R1
MW-10D	6/2/2011	30° 43' 48.3614"	-91° 22' 31.9818"	30.221	33.177	2.0	12.2	10.22	0.22	10	NA	28.727	downgradient	P-0108-R1
MW-10E	5/31/2011	30° 43' 23.1013"	-91° 23' 15.1555"	30.421	33.536	2.0	13	10.42	0.42	10	NA	28.636	downgradient	P-0108-R1
MW-10F	5/31/2011	30° 43' 32.0729"	-91° 22' 43.8773"	28.968	31.265	2.0	7	3.97	-6.03	10	NA	27.665	downgradient	P-0108-R1
MW-10G	6/1/2011	30° 43' 19.2468"	-91° 23' 28.4676"	29.298	32.167	2.0	3	0.30	-9.70	10	NA	27.567	downgradient	P-0108-R1
MW-10H	6/1/2011	30° 43' 16.6544"	-91° 23' 37.3344"	29.208	32.013	2.0	-7	-8.79	-18.79	10	NA	27.513	downgradient	P-0108-R1
MW-10I	6/1/2011	30° 43' 15.1068"	-91° 23' 47.8133"	30.060	33.124	2.0	2.5	0.06	-9.94	10	NA	26.721	downgradient	P-0108-R1
MW-10BG	6/3/2011	30° 43' 54.5174"	-91° 23' 23.0111"	30.788	33.740	2.0	13	10.29	0.29	10	NA	25.54	background	P-0108-R1

Notes:

ft msl feet above mean sea level
NGVD National Geodetic Vertical Datum
NA Information not available.
[1] Information obtained from Minor Permit Modification Application, Type 1 Solid Waste Facility, Groundwater Assessment Sampling and Analysis Plan, M.S. Environmental Consultants, January 25, 2016, with the exception of MW-10CR1. MW-10CR1 construction information obtained from Replacement Well (MW-10CR1) Report, CB&I, November 18, 2016.
[2] Groundwater elevations (water level measurement date of April 10, 2017) obtained from First Half, 2017 Semiannual Monitoring Report, M.S. Environmental Consultants, July 10, 2017.
[3] Louisiana Department of Environmental Quality Solid Waste Permit Number
* Monitor well plugged and abandoned on 10/7/2016. Well was replaced with MW-10CR1.

TABLE 2
GROUNDWATER ELEVATION MEASUREMENTS
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well	Top of Inner PVC Casing Elevation[1] *ft NGVD*	16-Apr-18		25-Jun-18		15-Oct-18	
		Depth to Water FT below TOC	Water Level Elevation ft NGVD	Depth to Water FT below TOC	Water Level Elevation ft NGVD	Depth to Water FT below TOC	Water Level Elevation ft NGVD
MW-85A	34.82	3.00	31.82	9.80	25.02	9.50	25.32
MW-85B	32.25	0.39	31.86	6.20	26.05	6.00	26.25
MW-85C	35.05	5.20	29.85	6.50	28.55	7.50	27.55
MW-85D	35.71	5.43	30.28	7.08	28.63	7.45	28.26
MW-85E	33.52	1.15	32.37	7.33	26.19	7.32	26.20
MW-10A	32.967	5.27	27.70	7.09	25.88	7.80	25.17
MW-10B	34.126	0.50	33.63	5.98	28.15	6.30	27.83
MW-10C*	34.538	NA	NA	NA	NA	NA	NA
MW-10CR1	35.475	2.50	32.98	8.70	26.78	8.70	26.78
MW-10D	33.177	4.40	28.78	5.71	27.47	5.63	27.55
MW-10E	33.536	1.15	32.39	7.03	26.51	8.18	25.36
MW-10F	31.265	0.00	31.27	6.29	24.98	6.25	25.02
MW-10G	32.167	1.00	31.17	7.22	24.95	7.30	24.87
MW-10H	32.013	1.00	31.01	6.96	25.05	17.00	15.01
MW-10I	33.124	5.27	27.85	9.13	23.99	9.41	23.71
MW-10BG	33.740	2.65	31.09	7.48	26.26	10.00	23.74

Notes:
[1] Information obtained from Minor Permit Modification
The October 2018 water level for MW-10H appears erroneous. This data point was not utilized in the preparation of the potentiometric surface map (Figure 4).
NGVD National Geodetic Vertical Datum

TABLE 3
2018 GROUNDWATER MONITORING ANALYTICAL DATA SUMMARY
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well ID	Constituents	16-Apr-18	25-Jun-18	15-Oct-18
MW-85A	Boron	0.085	NA	0.082
	Calcium	69	NA	71
	Chloride	12	NA	14
	Fluoride	0.35	0.36	0.39
	Sulfate	<1.4	NA	<1.4
	pH (std.)	5.98	6.38	6.71
	TDS	320	NA	330
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.0023	0.002
	Barium	NA	0.33	0.3
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	<0.00040	<0.0004
	Lead	NA	0.0015	<0.00035
	Lithium	NA	0.015	0.017
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	0.0016 J	<0.002
	Selenium	NA	0.00079 JB	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226 (pCi/L)	NA	0.312	0.565
	Radium-228 (PCi/L)	NA	<0.00234	<0.218
MW-85B	Boron	0.062	NA	0.055
	Calcium	93	NA	100
	Chloride	43	NA	46
	Fluoride	0.18	0.20	0.21
	Sulfate	140	NA	160
	pH (std.)	6.59	6.80	7.08
	TDS	550	NA	610
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.0011 J	0.00061 J
	Barium	NA	0.5	0.48
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	0.00094 J	<0.0004
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.013	0.015
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	0.00091 J	<0.002
	Selenium	NA	0.00046 JB	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.413	0.892
	Radium-228	NA	0.586	2.26

TABLE 3
2018 GROUNDWATER MONITORING ANALYTICAL DATA SUMMARY
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well ID	Constituents	16-Apr-18	25-Jun-18	15-Oct-18
MW-85C	Boron	0.24	NA	0.36
	Calcium	130	NA	130
	Chloride	62 F1	NA	68
	Fluoride	0.33	0.33	0.34
	Sulfate	260 F1	NA	330
	pH (std.)	7.12	6.86	7.17
	TDS	690	NA	880
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.0053	0.0061
	Barium	NA	0.25	0.24
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	<0.00040	0.00054 J
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.012	0.015
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	0.0014 J	<0.002
	Selenium	NA	0.00027 JB	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.316	0.390
	Radium-228	NA	<0.313	1.45
MW-85D	Boron	0.2	NA	0.22
	Calcium	140	NA	140
	Chloride	34	NA	39
	Fluoride	0.32	0.33	0.32
	Sulfate	150	NA	180
	pH (std.)	6.89	6.96	7.18
	TDS	660	NA	890
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.0055	0.0055
	Barium	NA	0.24	0.23
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	<0.00040	0.00078 J
	Lead	NA	<0.00035	0.00089 J
	Lithium	NA	0.017	0.023
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	0.0012 J	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.235	0.401
	Radium-228	NA	0.352	0.562

TABLE 3
2018 GROUNDWATER MONITORING ANALYTICAL DATA SUMMARY
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well ID	Constituents	16-Apr-18	25-Jun-18	15-Oct-18
MW-85E	Boron	4.7	NA	4.2
	Calcium	220	NA	200
	Chloride	78	NA	88
	Fluoride	0.24	0.26	0.27
	Sulfate	880	NA	760
	pH (std.)	6.24	6.52	6.70
	TDS	1300	NA	1700
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.011	0.012
	Barium	NA	0.073	0.077
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	0.0007 J	0.0007 J
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.018	0.021
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	0.0021 J	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	<0.2	0.518
	Radium-228	NA	0.420	<0.316
MW-10A	Boron	0.76	NA	0.72
	Calcium	130	NA	120
	Chloride	82	NA	82
	Fluoride	0.44	0.44	0.45
	Sulfate	310	NA	310
	pH (std.)	6.64	6.76	7.13
	TDS	770	NA	810
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.0033	0.0033
	Barium	NA	0.26	0.24
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	<0.00040	<0.0004
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.012	0.013
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	0.0018 J	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.441	0.341
	Radium-228	NA	0.392	<0.0602

TABLE 3
2018 GROUNDWATER MONITORING ANALYTICAL DATA SUMMARY
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well ID	Constituents	16-Apr-18	25-Jun-18	15-Oct-18
MW-10B	Boron	0.55	NA	0.48
	Calcium	92	NA	99
	Chloride	73	NA	70
	Fluoride	0.16	0.16	0.19
	Sulfate	110	NA	83
	pH (std.)	6.32	6.59	6.76
	TDS	570	NA	650
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.0083	0.0062
	Barium	NA	0.49	0.46
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	0.00069 J	0.00067 J
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.014	0.016
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	<0.00085	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.405	0.652
	Radium-228	NA	0.404	0.503
MW-10CR1	Boron	0.29	NA	0.3
	Calcium	100	NA	110
	Chloride	40	NA	44
	Fluoride	0.3	0.32	0.34
	Sulfate	110	NA	120
	pH (std.)	6.69	6.74	7.02
	TDS	590	NA	660
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.0076	0.0078
	Barium	NA	0.35	0.34
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	0.0012 J	0.0014 J
	Lead	NA	<0.00035	0.00073 J
	Lithium	NA	0.015	0.02
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	0.0035 J	0.0023 J
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.360	0.491
	Radium-228	NA	0.439	1.18

TABLE 3
2018 GROUNDWATER MONITORING ANALYTICAL DATA SUMMARY
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well ID	Constituents	16-Apr-18	25-Jun-18	15-Oct-18
MW-10D	Boron	0.28	NA	0.29
	Calcium	150	NA	150
	Chloride	72	NA	75
	Fluoride	0.27	0.29	0.3
	Sulfate	360	NA	360
	pH (std.)	6.27	7.10	7.21
	TDS	680	NA	950
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.005	0.0048
	Barium	NA	0.21	0.21
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	<0.00040	<0.0004
	Lead	NA	<0.00035	0.00037 J
	Lithium	NA	0.014	0.017
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	<0.00085	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.285	0.228
	Radium-228	NA	<0.335	1.63
MW-10E	Boron	0.25	NA	0.24
	Calcium	77	NA	92
	Chloride	27	NA	30
	Fluoride	0.27	0.29	0.3
	Sulfate	120	NA	120
	pH (std.)	6.54	7.01	7.07
	TDS	490	NA	590
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.01	0.012
	Barium	NA	0.23	0.24
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	0.00055 J	<0.0004
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.013	0.015
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	<0.00085	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.364	0.292
	Radium-228	NA	<0.063	0.678

TABLE 3
2018 GROUNDWATER MONITORING ANALYTICAL DATA SUMMARY
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well ID	Constituents	16-Apr-18	25-Jun-18	15-Oct-18
MW-10F	Boron	0.25	NA	2.3
	Calcium	75	NA	190
	Chloride	40	NA	37
	Fluoride	0.25	0.28	0.29
	Sulfate	910	NA	460
	pH (std.)	6.29	6.85	7.04
	TDS	1700	NA	1200
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.0066	0.0067
	Barium	NA	0.073	0.048
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	0.0011 J	0.0017 J
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.02	0.023
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	<0.00085	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.310	0.406
	Radium-228	NA	<0.273	2.24
MW-10G	Boron	0.83	NA	0.85
	Calcium	94	NA	96
	Chloride	77	NA	76
	Fluoride	0.26	0.27	0.29
	Sulfate	130	NA	130
	pH (std.)	6.52	7.08	7.37
	TDS	570	NA	660
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.002	0.0011 J
	Barium	NA	0.37	0.36
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	<0.00040	<0.0004
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.017	0.019
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	<0.00085	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.387	0.672
	Radium-228	NA	0.410	<0.260

TABLE 3
2018 GROUNDWATER MONITORING ANALYTICAL DATA SUMMARY
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well ID	Constituents	16-Apr-18	25-Jun-18	15-Oct-18
MW-10H	Boron	0.19	NA	0.11
	Calcium	130	NA	130
	Chloride	53	NA	54
	Fluoride	0.28	0.28	0.3
	Sulfate	46	NA	30
	pH (std.)	6.51	7.05	7.32
	TDS	570	NA	620
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.011	0.011
	Barium	NA	0.43	0.42
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	<0.00040	<0.0004
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.018	0.019
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	<0.00085	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	0.242	0.542
	Radium-228	NA	1.05	0.408
MW-10I	Boron	0.17	NA	0.11
	Calcium	93	NA	94
	Chloride	37	NA	26
	Fluoride	0.23	0.24	0.24
	Sulfate	62	NA	9.7
	pH (std.)	6.08	6.86	6.83
	TDS	540	NA	430
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.00062 J	0.00068 J
	Barium	NA	0.42	0.35
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	<0.00040	<0.0004
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.022	0.024
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	<0.00085	<0.002
	Selenium	NA	0.00028 JB	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	<0.171	0.410
	Radium-228	NA	0.786	<0.277

TABLE 3
2018 GROUNDWATER MONITORING ANALYTICAL DATA SUMMARY
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

Well ID	Constituents	16-Apr-18	25-Jun-18	15-Oct-18
MW-10BG	**Boron**	0.069	NA	0.059
	Calcium	66	NA	71
	Chloride	5.1	NA	5.4
	Fluoride	0.39	0.40	0.43
	Sulfate	<1.4	NA	<1.4
	pH (std.)	7.09	7.13	7.09
	TDS	340	NA	370
	Antimony	NA	<0.0010	NA
	Arsenic	NA	0.015	0.01
	Barium	NA	0.23	0.22
	Beryllium	NA	<0.00034	NA
	Cadmium	NA	<0.00034	NA
	Chromium	NA	<0.0011	NA
	Cobalt	NA	0.00067 J	0.00044 J
	Lead	NA	<0.00035	<0.00035
	Lithium	NA	0.012	0.013
	Mercury	NA	<0.000070	NA
	Molybdenum	NA	0.0022 J	<0.002
	Selenium	NA	<0.00024	<0.00071
	Thallium	NA	<0.000085	NA
	Radium-226	NA	<0.0319	0.302
	Radium-228	NA	0.501	<0.157

Notes:
TDS - total dissolved solids
All units are in milligrams per liter (mg/L) unless otherwise noted.
std - standard units
pCi/L - picocuries per liter
< - concentration less than the method detection limit (MDL)
J - result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value.
B - compound was found in the blank and sample.
NA - Not analyzed

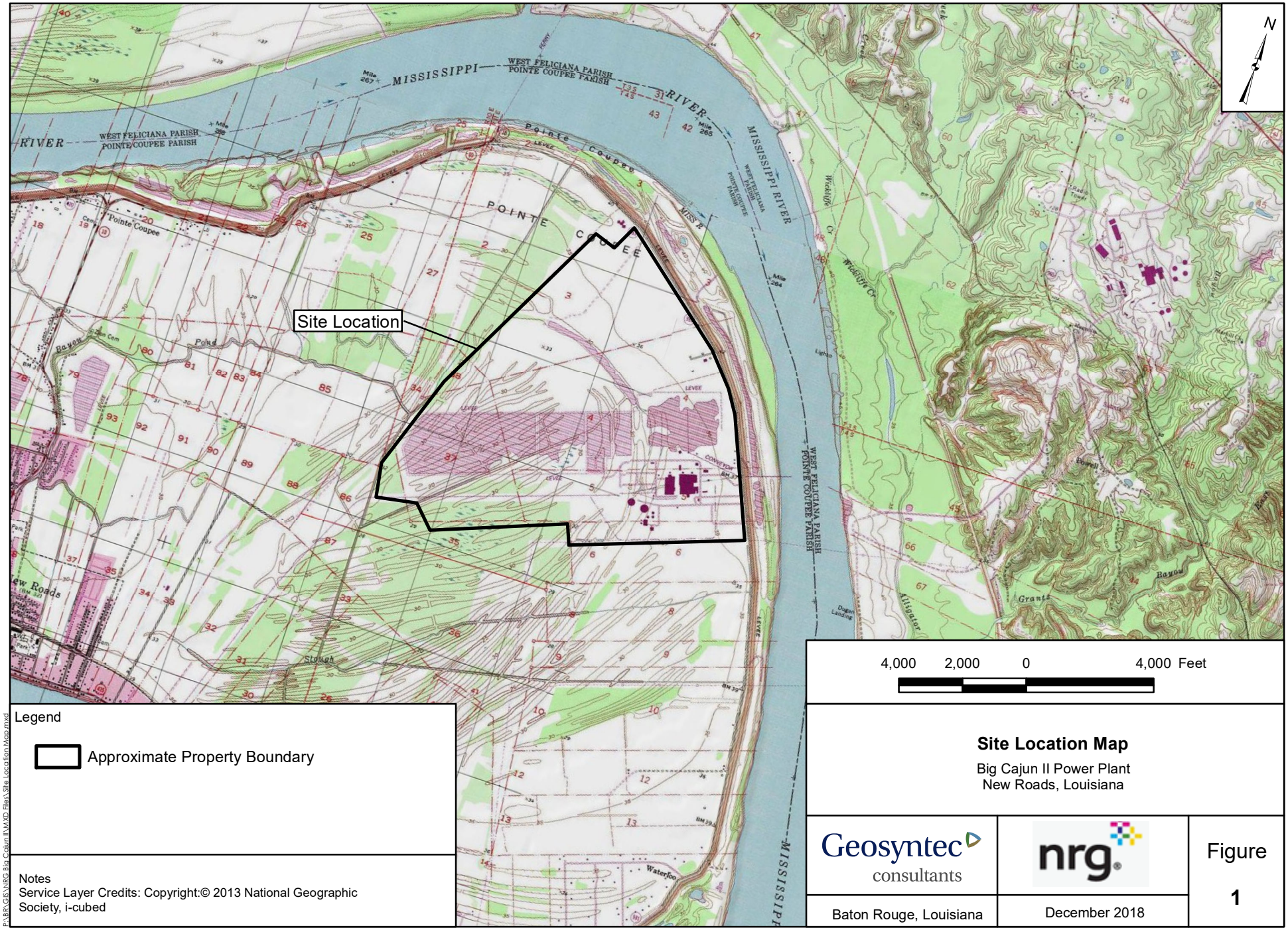
TABLE 4
DETECTION MONITORING ANALYTICAL DATA COMPARED TO BACKGROUND
Big Cajun II Power Station CCR Rule Monitoring System
New Roads, Louisiana

October 2017																
Constituents	**Unit**	**UPL[1]**	**MW-85A**	**MW-85B**	**MW-85C**	**MW-85D**	**MW-85E**	**MW-10A**	**MW-10B**	**MW-10CR1**	**MW-10D**	**MW-10E**	**MW-10F**	**MW-10G**	**MW-10H**	**MW-10I**
Boron	mg/L	0.076	**0.080**	0.06	**0.3**	**0.19**	**3.7**	**0.66**	**0.62**	**0.28**	**0.26**	**0.21**	**2.5**	**0.77**	**0.11**	**0.15**
Calcium	mg/L	164	72.4	93	140	146	**201**	120	88.5	127	**165**	87	**262**	97.3	140	105
Chloride	mg/L	8.3	**20.8**	**39.6**	**70.5**	**42**	**57.4**	**82.8**	**80.5**	**49.7**	**78.7**	**27.5**	**42.2**	**72.9**	**52.5**	**42.1**
Fluoride	mg/L	0.7	0.32	0.2	0.36	0.29	0.14	0.43	0.13	0.4	0.24	0.24	0.12	0.24	0.19	0.45
Sulfate	mg/L	1.4	**1.8**	**225**	**476**	**338**	**890**	**453**	**244**	**289**	**1800**	**254**	**1000**	**391**	**39.8**	**112**
pH (std.)	S.U.	4.60 - 9.19[2]	6.63	6.85	6.94	6.71	6.31	6.91	6.41	6.83	6.95	6.89	6.39	6.91	6.85	6.69
TDS	mg/L	895	365	615	800	805	**1560**	855	640	805	**1040**	505	**1570**	635	735	630

April 2018																
Constituents	**Unit**	**UPL[1]**	**MW-85A**	**MW-85B**	**MW-85C**	**MW-85D**	**MW-85E**	**MW-10A**	**MW-10B**	**MW-10CR1**	**MW-10D**	**MW-10E**	**MW-10F**	**MW-10G**	**MW-10H**	**MW-10I**
Boron	mg/L	0.076	**0.085**	0.062	**0.24**	**0.2**	**4.7**	**0.76**	**0.55**	**0.29**	**0.28**	**0.25**	**0.25**	**0.83**	**0.19**	**0.17**
Calcium	mg/L	164	69.0	93	130	140	**220**	130	92	100	150	77	75	94	130	93
Chloride	mg/L	8.3	**12.0**	**43**	**62**	**34**	**78**	**82**	**73**	**40**	**72**	**27**	**40**	**77**	**53**	**37**
Fluoride	mg/L	0.7	0.35	0.18	0.33	0.32	0.24	0.44	0.16	0.3	0.27	0.27	0.25	0.26	0.28	0.23
Sulfate	mg/L	1.4	<1.4	**140**	**260**	**150**	**880**	**310**	**110**	**110**	**360**	**120**	**910**	**130**	**46**	**62**
pH (std.)	S.U.	4.60 - 9.19[2]	5.98	6.59	7.12	6.89	6.24	6.64	6.32	6.69	6.27	6.54	6.29	6.52	6.51	6.08
TDS	mg/L	895	320	550	690	660	**1300**	770	570	590	680	490	**1700**	570	570	540

Notes:
TDS - total dissolved solids
mg/L - milligrams per liter
S.U. - standard units
October 2017 samples collected on 17 and 18 October
April 2018 samples collected on 16 and 17 April
[1] - UPL background values identified in the 2017 Annual Groundwater Monitoring and Corrective Action Report, Geosyntec, January 2018
[2] - Upper Prediction Limit (UPL) for high pH range
Bold value indicates exceedance of UPL

FIGURES



Site Location Map

Big Cajun II Power Plant
New Roads, Louisiana

Geosyntec consultants

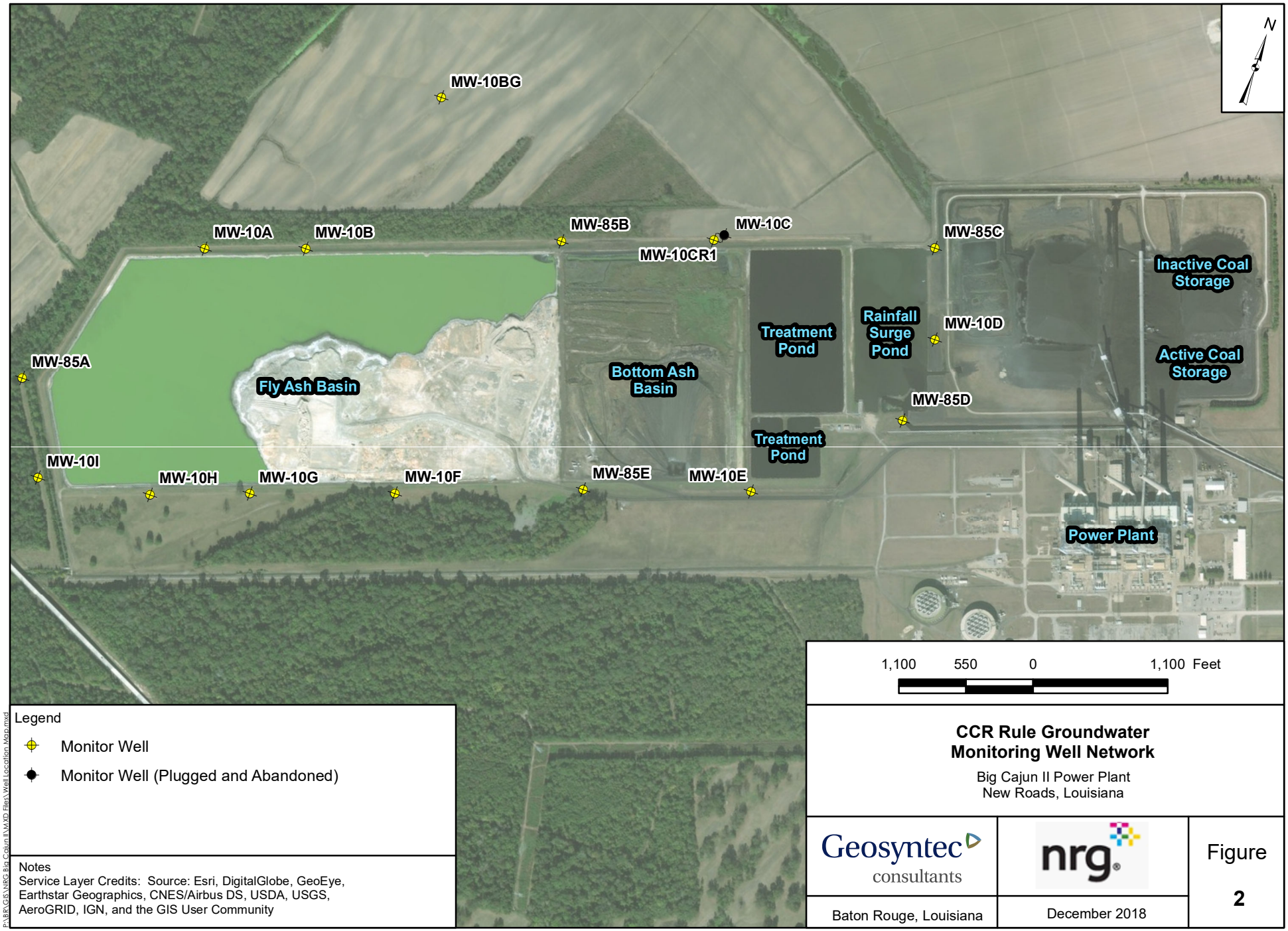
Baton Rouge, Louisiana

nrg

December 2018

Figure

1



CCR Rule Groundwater Monitoring Well Network

Big Cajun II Power Plant
New Roads, Louisiana

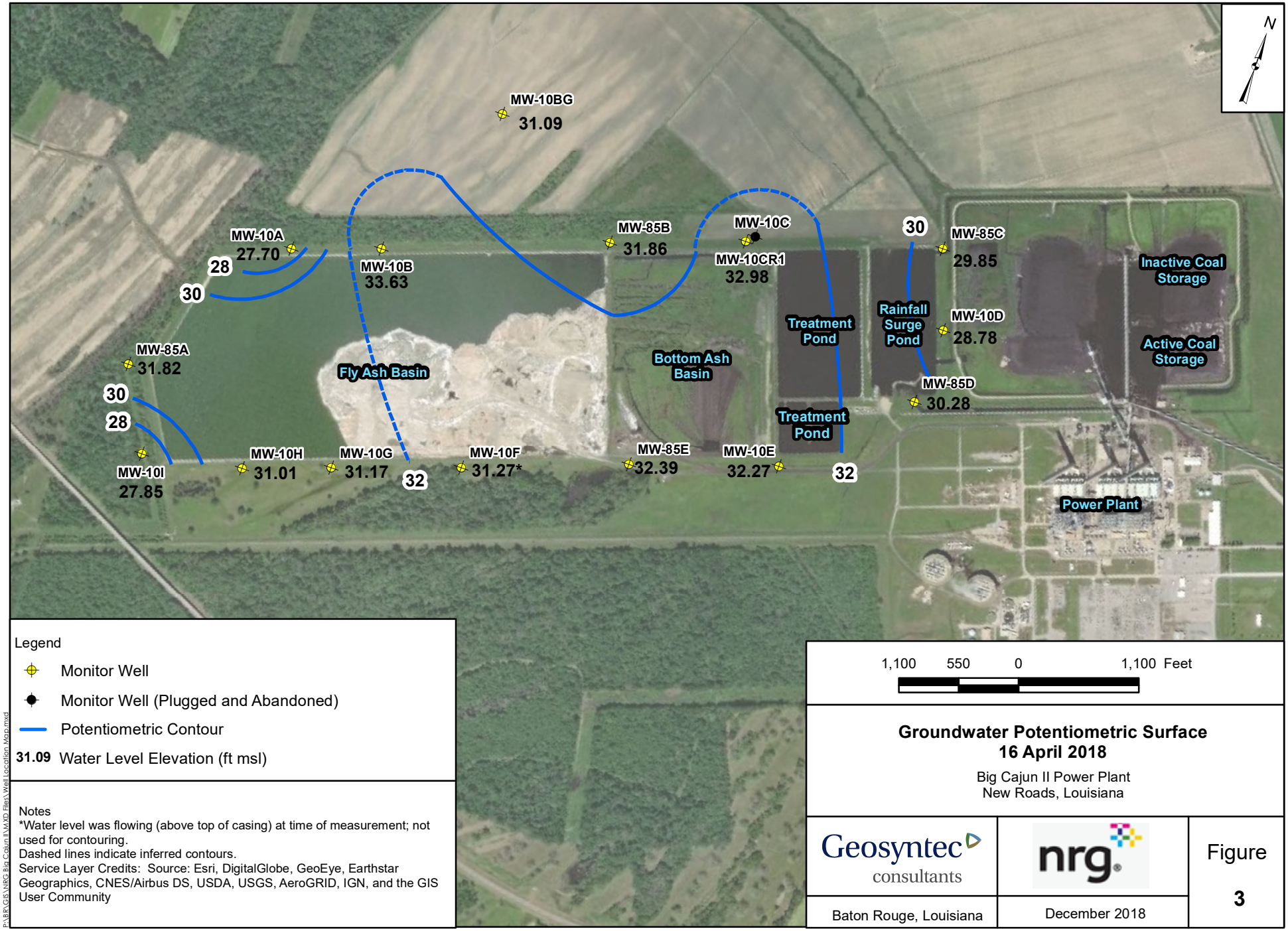
Geosyntec consultants

Baton Rouge, Louisiana

nrg

December 2018

Figure 2


N
MW-10BG
31.09
MW-10A
27.70
MW-10B
33.63
MW-85B
31.86
MW-10C
MW-10CR1
32.98
MW-85C
29.85
MW-10D
28.78
MW-85D
30.28
MW-85A
31.82
MW-10I
27.85
MW-10H
31.01
MW-10G
31.17
MW-10F
31.27*
MW-85E
32.39
MW-10E
32.27
28
30
32
Fly Ash Basin
Bottom Ash Basin
Treatment Pond
Rainfall Surge Pond
Treatment Pond
Inactive Coal Storage
Active Coal Storage
Power Plant
Legend
Monitor Well
Monitor Well (Plugged and Abandoned)
Potentiometric Contour
31.09 Water Level Elevation (ft msl)
Notes
*Water level was flowing (above top of casing) at time of measurement; not used for contouring.
Dashed lines indicate inferred contours.
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
1,100 550 0 1,100 Feet
Groundwater Potentiometric Surface
16 April 2018
Big Cajun II Power Plant
New Roads, Louisiana
Geosyntec consultants
Baton Rouge, Louisiana
nrg
December 2018
Figure
3
P:\BR\GIS\NRG Big Cajun II\MXD Files\Well Location Map.mxd

Legend

- Monitor Well
- Monitor Well (Plugged and Abandoned)
- Potentiometric Contour
- **23.74** Water Level Elevation (ft msl)

Notes
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
ft msl - feet above sea level (NGVD)
* indicates data not used to generate contours
Dashed lines indicate inferred contours

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Groundwater Potentiometric Surface 15 October 2018

Big Cajun II Power Plant
New Roads, Louisiana

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December 2018

Figure 4