



2019 Annual Groundwater Monitoring and Corrective Action Report

Oak Grove Steam Electric Station FGD Ponds - Robertson County, Texas

Prepared for:

Oak Grove Management Company LLC

Submitted by:

Golder Associates Inc.

2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664

+1 512 671-3434

January 31, 2020

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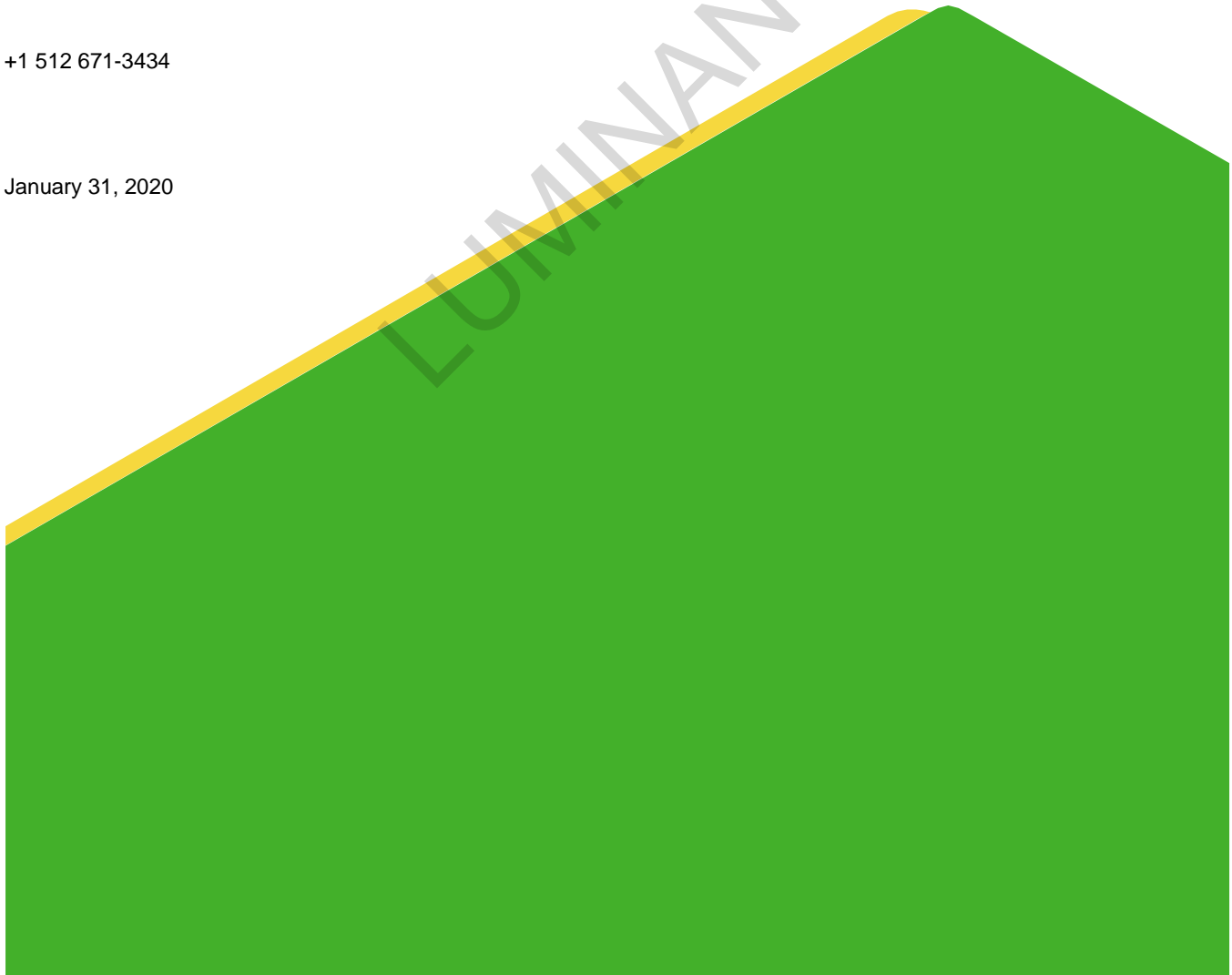


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ACRONYMS AND ABBREVIATIONS

CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
MCL	Maximum Concentration Level
mg/L	Milligrams per Liter
NA	Not Applicable
OGSES	Oak Grove Steam Electric Station
SSI	Statistically Significant Increase
SSL	Statistically Significant Levels
USEPA	United States Environmental Protection Agency

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1.0 INTRODUCTION

Golder Associates, Inc. (Golder) has prepared this report on behalf of Oak Grove Management Company LLC (Luminant) to satisfy annual groundwater monitoring and corrective action reporting requirements of the Coal Combustion Residuals (CCR) Rule for the FGD Ponds at the Oak Grove Steam Electric Station (OGSES) in Robertson County, Texas. The CCR units and CCR monitoring well network are shown on Figure 1.

The CCR Rule (40 CFR 257 Subpart D - *Standards for the Receipt of Coal Combustion Residuals in Landfills and Surface Impoundments*) has been promulgated by the United States Environmental Protection Agency (USEPA) to regulate the management and disposal of CCRs as solid waste under Resource Conservation and Recovery Act (RCRA) Subtitle D. For existing CCR landfills and surface impoundments, the CCR Rule requires that the owner or operator prepare an annual groundwater monitoring and corrective action report to document the status of the groundwater monitoring and corrective action program for the CCR unit for the previous calendar year. Per 40 CFR 257.90(e) of the CCR Rule, the report should 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); and
- (5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

2.0 MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

Golder collected the initial Detection Monitoring Program groundwater samples from the FGD Ponds CCR monitoring well network in October 2017. The evaluation of those data was completed in 2018 using procedures described in the Statistical Analysis Plan (PBW, 2017) to identify statistically significant increases (SSIs) of Appendix III parameters over background concentrations. The Detection Monitoring Program sampling dates and parameters are summarized in the following table:

Detection Monitoring Program Summary

Sampling Dates	Parameters	SSIs	Assessment Monitoring Program Established
October 3, 2017	Appendix III	Yes	July 16, 2018

Alternative source evaluations were inconclusive for one or more of the SSIs. Consequently, an Assessment Monitoring Program was initiated and established for the FGD Ponds CCR units in 2018 in accordance with 40 CFR § 257.94(e)(2).

Assessment Monitoring groundwater samples were collected from the CCR groundwater monitoring network in 2018, as required by the CCR Rule. Golder collected the initial Assessment Monitoring Program groundwater samples in June 2018. All CCR groundwater monitoring wells were sampled for Appendix III and Appendix IV constituents at that time. A second Assessment Monitoring Program sampling event was conducted in September 2018. During the second Assessment Monitoring Program sampling event, all CCR wells were sampled for all Appendix III parameters and for Appendix IV parameters that were detected during the first semi-annual sampling event, as required by 40 CFR § 257.95(d)(1).

The statistical background values and Groundwater Protection Standards (GWPSs) are summarized in Tables 1 and 2, respectively. Appendix III and Appendix IV analytical data are summarized in Tables 3 and 4, respectively. The initial assessment monitoring event was conducted in June 2018 and a subsequent semi-annual assessment monitoring event was conducted in September 2018 in accordance with §257.95(a) and §257.95(d). Using the Appendix IV data collected during the assessment monitoring period through September 2018, SSLs above GWPSs were initially identified in January 2019 for cobalt and lithium. Notification of these SSLs was placed in the operating record on February 6, 2019 and was subsequently placed on the public website in accordance with 40 CFR§ 257.107(d). An Assessment of Corrective Measures (ACM) was initiated on April 8, 2019 pursuant to §257.95(g). A justification letter for a 60-day extension due to site-specific circumstances that delayed work on the ACM was certified on July 3, 2019 in accordance with 40 CFR §257.96(a). A copy of the extension

justification letter is provided in Attachment 1. The ACM was completed in September 2019 (Golder 2019) for the parameters detected at SSLs above GWPSs, pursuant to 40 CFR § 257.96.

Additional semi-annual Assessment Monitoring events were conducted in May 2019 and August 2019. Statistical analysis of the 2019 data was performed in accordance with the Statistical Analysis Plan for CCR Groundwater Monitoring (PBW 2017) and the USEPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities- Unified Guidance (USEPA 2009). The statistical analysis included an evaluation of confidence intervals for each of the Appendix IV parameter data sets to evaluate whether constituent concentrations were present at concentrations above GWPSs. There were no Appendix IV parameters identified at SSLs above GWPSs during the 2019 Assessment Monitoring period.

The following table provides a summary of the Assessment Monitoring Program sampling events:

Assessment Monitoring Program Summary

Sampling Dates	Analytical Data Receipt Date	Parameters Collected	SSL(s)	SSL(s) Determination Date	Corrective Measures Assessment Initiated
June 4-5, 2018	July 11, 2018	Appendix III Appendix IV	NA	NA	NA
September 5-6, 2018	October 11, 2018	Appendix III Appendix IV ¹	Co and Li	January 7, 2019	April 8, 2019
May 16, 2019	June 5, 2019	Appendix III Appendix IV	None	NA	NA
August 19, 2019	September 25, 2019	Appendix III Appendix IV	None	NA	NA

Notes:

NA: Not Applicable

1. Groundwater sample analysis was limited to Appendix IV parameters detected in previous events in accordance with 40 CFR § 257.95(d)(1).

3.0 KEY ACTIONS COMPLETED IN 2019

Assessment Monitoring Program groundwater monitoring events were conducted in May and August 2019. The number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and the analytical results for the groundwater samples are summarized in Table 3 (Appendix III parameters) and Table 4 (Appendix IV parameters). A map showing the CCR units and monitoring wells is provided as Figure 1.

As noted in Section 2.0, an ACM for the Appendix IV parameters identified at SSLs above GWPSs in 2018 was completed in September 2019. However, there were no Appendix IV parameters identified at SSLs above GWPSs during the 2019 Assessment Monitoring period.

A public meeting was held on October 29, 2019 at The Pidgeon Center in Franklin, TX to discuss the results of the ACM in accordance with 40 C.F.R. § 257.96(e) based on the 2018 sampling results.

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4.0 PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the CCR groundwater monitoring program in 2019.

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5.0 KEY ACTIVITIES PLANNED FOR 2020

The following key activities are planned for 2020:

- Continue the Assessment Monitoring Program in accordance with 40 CFR § 257.95.
- Complete statistical evaluation of Appendix IV analytical data from the downgradient wells and compare results to GWPSs to determine whether an SSL has occurred.
- If an SSL is identified, notification will be prepared as required under 40 CFR § 257.95(g) and will be placed in the operating record per 40 CFR § 257.105(h)(8), and will be subsequently placed on the public website per 40 CFR § 257.107(d). Potential alternate sources (i.e., a source other than the CCR unit caused the SSL or that the SSL resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated. If an alternate source is identified to be the cause of the SSL, a written demonstration will be completed within 90 days of SSL detection and included in the Annual Groundwater Monitoring and Corrective Action Report.
- If an alternate source is not identified to be the cause of the SSL, the applicable requirements of 40 CFR §§ 257.94 through 257.98 (e.g., assessment of corrective measures) as may apply in 2020 will be met, including associated recordkeeping/notifications required by 40 CFR §§ 257.105 through 257.108.

6.0 REFERENCES

Golder, 2019. CCR Assessment of Corrective Measures, Oak Grove Steam Electric Station – FGD Ponds, Robertson County, Texas. September.

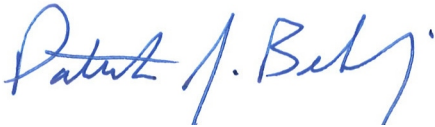
Pastor, Behling & Wheeler, LLC, 2017. Coal Combustion Residual Rule Statistical Analysis Plan, Oak Grove Steam Electric Station, FGD Pond Area, Robertson County, Texas.

USEPA, 2009. Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, EPA 530-R-09-007, March 2009.

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Signature Page

Golder Associates Inc.



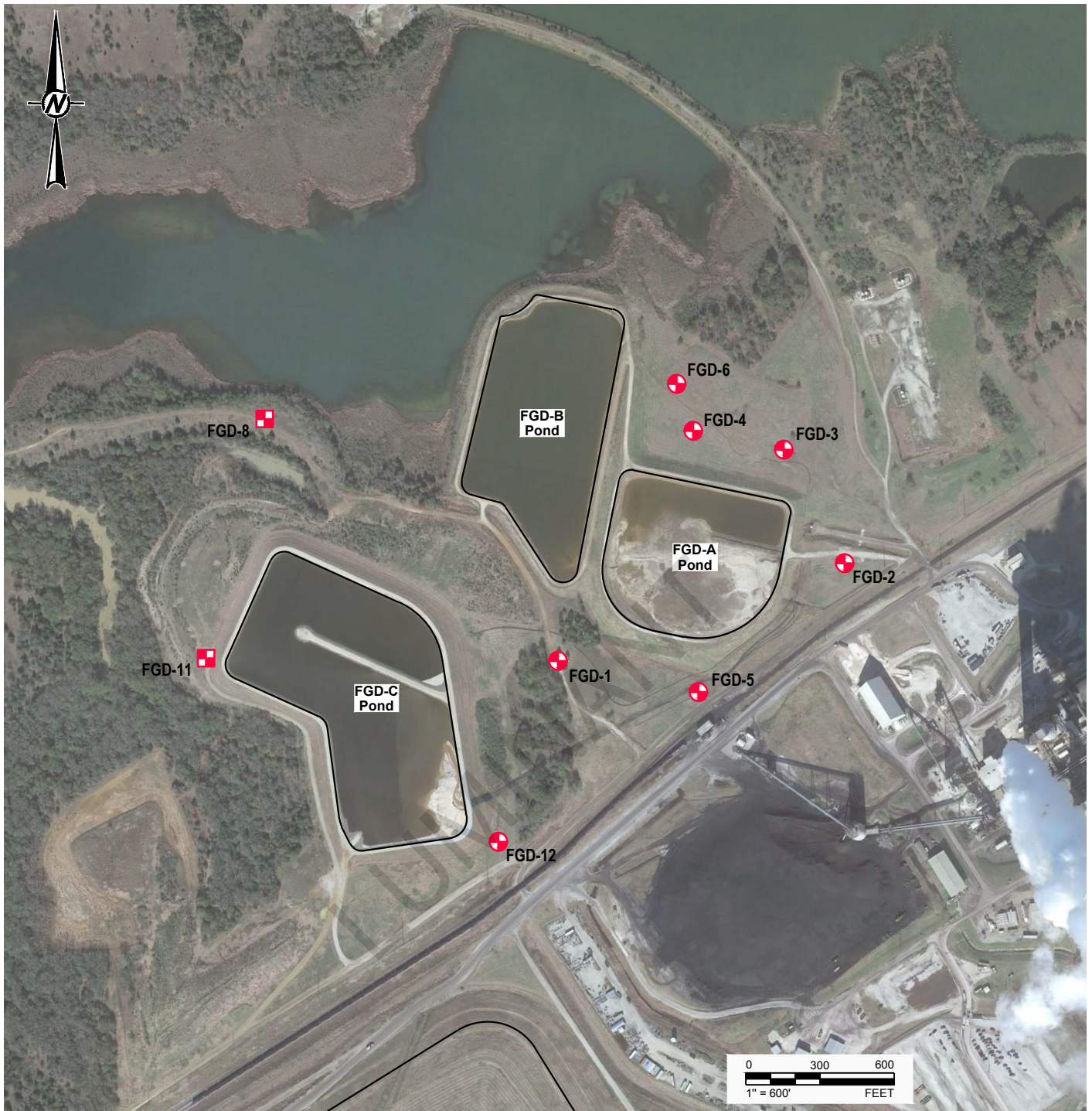
Pat Behling
Principal Engineer





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FIGURES

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LEGEND

-  DOWNGRADIENT CCR MONITORING WELL
-  BACKGROUND CCR MONITORING WELL

CLIENT
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PROJECT
**OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS**

TITLE
DETAILED SITE PLAN - FGD POND AREA

CONSULTANT	YYYY-MM-DD	2020-01-23
	DESIGNED	AJD
	PREPARED	AJD
	REVIEWED	WFV
	APPROVED	WFV



REFERENCE(S)
BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 12/9/18.

PROJECT NO.
19122262

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FIGURE
1

TABLES

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Table 1
Statistical Background Values
OGSES FGD Ponds

Parameter	Statistical Background Value
Boron (mg/L)	0.141
Calcium (mg/L)	471
Chloride (mg/L)	6,340
Fluoride (mg/L)	0.781
field pH (s.u.)	6.10 7.23
Sulfate (mg/L)	409
Total Dissolved Solids (mg/L)	13,000

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Table 2
Groundwater Protection Standards
OGSES FGD Ponds

Parameter	Groundwater Protection Standard
Antimony (mg/L)	0.006
Arsenic (mg/L)	0.0146
Barium (mg/L)	2
Beryllium (mg/L)	0.004
Cadmium (mg/L)	0.005
Chromium (mg/L)	0.1
Cobalt (mg/L)	0.0158
Fluoride (mg/L)	4
Lead (mg/L)	0.015
Lithium (mg/L)	0.149
Mercury (mg/L)	0.002
Molybdenum (mg/L)	0.1
Selenium (mg/L)	0.05
Thallium (mg/L)	0.002
Radium 226+228 (pCi/L)	11.2

TABLE 3
APPENDIX III ANALYTICAL RESULTS
OGSES - FGD POND AREA

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	Fl (mg/L)	pH (s.u.)	SO ₄ (mg/L)	TDS (mg/L)
Upgradient Wells								
FGD-8	11/04/15	0.0843	69.2	271	0.173 J	6.92	24.4	803
	12/17/15	0.0791	65.2	248	0.361 J	6.67	50.1	721
	02/09/16	0.0721	296	1,910	0.331 J	6.14	110	5,100
	04/14/16	0.0805	323	1920	0.218	6.39	68	6,210
	06/14/16	0.0869	336	2070	<0.100	6.57	476	6,130
	08/24/16	0.119	21.1	107	0.186 J	6.92	41.6	400
	10/05/16	0.0794	394	1,890	0.413	6.68	184	4,470
	12/23/16	0.069	340	1,990	<0.100	6.83	144	4,330
	10/03/17	0.1	378	1,140	<0.100	6.83	9.72	2,550
	06/05/18	0.0826	409	2,180	<0.100	6.12	538	4,450
	09/06/18	0.635	395	2,330	0.362 J	5.93	670	4,910
	05/16/19	0.0687	314	2,040	<0.100	6.67	173	3,970
08/19/19	0.0756	427	2,260	<0.100	6.89	452	4,600	
FGD-11	11/04/15	0.048	9.57	15	<0.100	6.58	9.96	145
	12/17/15	0.0544	10.7	9.85	0.13 J	6.74	11	115
	02/09/16	0.0912	71.5	438	0.548	6.9	37.5	1,160
	04/14/16	0.0963	72.5	393	0.671	6.34	32.9	1,120
	06/15/16	0.0979	55.1	356	0.331 J	6.57	32.4	900
	08/25/16	0.103	154	759	0.128 J	6.76	68.8	1,960
	10/04/16	0.127	181	894	0.579	6.78	71.8	2,130
	12/22/16	0.125	201	1,150	0.127 J	6.85	89.5	2,870
	10/03/17	0.155	254	1,830	<0.100	6.85	142	4,010
	06/05/18	0.162	170	954	0.836	6.28	82.2	2,240
	09/06/18	0.149	194	1,140	1.09	6.43	93.9	2,770
	05/16/19	0.108	85	566	0.38 J	6.83	50.9	1,350
	08/19/19	0.12	92.5	535	0.63	6.71	44.7	1,430
Downgradient Wells								
FGD-1	11/03/15	0.065	11	36.4	0.363 J	6.31	32	245
	12/17/15	0.0706	10.6	37.7	0.384 J	6.33	33.3	224
	02/09/16	0.0539	11.4	38.9	0.383 J	6.81	36.3	235
	04/14/16	0.0867	12.2	38.6	0.229	6.24	35.7	77
	06/15/16	0.066	12	39	0.302 J	6.75	41.2	258
	08/24/16	0.0601	13.5	42.1	0.225 J	6.58	46.6	193
	10/05/16	0.0629	14.2	38.7	0.483	6.78	44.2	266
	12/22/16	0.058	13.7	42.6	0.326 J	5.79	49.3	271
	10/03/17	0.0973	18.5	40	0.276 J	6.91	64.7	239
	06/05/18	0.0686	18.3	44.7	0.206 J	5.58	68.6	277
	09/06/18	0.0738	19.9	52.5	0.228 J	5.78	80.8	281
	05/15/19	0.0803	19.5	62.4	0.362 J	6.63	78.7	320
	08/19/19	0.0864	26.1	69.3	0.486	6.49	80.9	328

TABLE 3
APPENDIX III ANALYTICAL RESULTS
OGSES - FGD POND AREA

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	FI (mg/L)	pH (s.u.)	SO ₄ (mg/L)	TDS (mg/L)
FGD-2	11/03/15	0.1	77.1	460	0.224 J	6.47	147	1,370
	12/17/15	0.0636	24.8	133	0.347 J	6.77	53.2	515
	02/09/16	0.0885	44.6	250	0.315 J	7.06	98.9	750
	04/14/16	0.136	53.8	285	0.192	6.54	103	924
	06/14/16	0.0729	26.8	138	0.122 J	6.73	62.2	564
	08/24/16	0.219	79.9	421	<0.100	6.75	158	1,060
	10/05/16	0.182	58.3	310	0.243 J	6.76	114	910
	12/22/16	0.251	95.3	570	<0.100	6.70	174	1,450
	10/03/17	0.362	151	813	<0.100	6.81	222	1,920
	06/05/18	0.352	91.6	465	0.185 J	6.06	148	1,190
	09/06/18	0.35	154	902	0.32 J	6.11	196	1,860
	05/16/19	0.105	38.9	260	0.383 J	6.86	70.7	729
08/19/19	0.192	167	863	0.413	6.88	218	1,890	
FGD-3	11/03/15	0.343	108	439	0.505	6.51	479	1,950
	12/17/15	0.255	109	399	<0.100	6.64	478	1,640
	02/09/16	0.214	91.4	326	0.74	6.76	474	1,610
	04/14/16	0.231	98.1	314	0.69	6.59	396	1,980
	06/14/16	0.207	80.1	267	0.173 J	6.59	338	1,440
	08/24/16	0.112	90.4	279	0.463	6.89	357	1,490
	10/05/16	0.212	88.1	264	0.723	6.85	324	1,370
	12/22/16	0.196	82.6	290	1.32	6.07	392	1,490
	10/03/17	0.244	97	245	0.457	6.75	317	1,190
	06/05/18	0.199	82.7	234	1.06	5.99	319	1,260
	09/05/18	0.0379	73.9	227	1.03	6.21	306	1,260
	05/16/19	0.117	60.1	117	0.776	6.73	182	1,100
08/19/19	0.134	51.1	84.9	0.874	6.72	150	882	
FGD-4	11/03/15	0.0694	46.1	200	0.294 J	6.71	37.8	679
	12/17/15	0.0777	47.8	211	0.295 J	6.44	38.2	647
	02/09/16	0.0581	45.3	195	0.32 J	6.85	45	653
	04/14/16	0.0726	50.3	182	0.323	6.59	55.4	726
	06/14/16	0.0728	47.5	210	<0.100	6.68	37.9	689
	08/24/16	0.343	52.5	208	0.148 J	6.74	53.3	704
	10/05/16	0.0672	48.1	182	0.376 J	6.85	56	672
	12/22/16	0.0628	44.5	181	0.251 J	6.29	65.4	676
	10/03/17	0.225	54.9	182	0.219 J	6.82	69.8	659
	06/05/18	0.0839	49.4	200	0.297 J	6.15	46.6	648
	09/05/18	0.108	40.9	193	0.353 J	6.29	55.8	672
	05/16/19	0.0733	41.7	205	0.327 J	6.57	41.7	651
08/19/19	0.085	42.5	188	0.67	6.69	5.4	681	
FGD-5	11/04/15	0.0719	30.2	230	0.334 J	6.92	54.7	1,040
	12/17/15	0.0798	32.5	254	0.333 J	6.74	56.1	845
	02/09/16	0.0926	89.5	356	0.495	6.6	62.8	942
	04/14/16	0.107	101	359	0.491	6.71	50.8	1,510
	06/15/16	0.11	88.9	368	0.284 J	6.73	55.1	735
	08/24/16	0.0394	102	372	0.168 J	6.89	58.8	770
	10/05/16	0.0995	99.9	344	0.38 J	6.92	57.3	1,260
	12/22/16	0.0982	90.6	301	0.291 J	6.06	65.5	893
	10/03/17	0.211	100	309	0.211 J	6.76	60.2	826
	06/05/18	0.11	100	303	0.511	6.13	61.2	795
	09/06/18	0.215	93.1	317	0.548	6.17	64.8	840
	05/16/19	0.108	77.7	287	0.579	6.46	67.2	801
08/19/19	0.114	90.7	283	0.863	6.76	70.7	816	

TABLE 3
APPENDIX III ANALYTICAL RESULTS
OGSES - FGD POND AREA

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	Fl (mg/L)	pH (s.u.)	SO ₄ (mg/L)	TDS (mg/L)
FGD-6	11/03/15	0.0968	79.3	355	0.227 J	6.92	33.8	1,070
	12/17/15	0.103	89.9	342	0.469	6.52	65.9	940
	02/09/16	0.0791	31.8	252	0.354 J	7.12	59.5	940
	04/14/16	0.0936	36.4	259	0.442	6.71	57.9	1,140
	06/14/16	0.0955	33.9	237	<0.100	6.48	49.8	813
	08/24/16	0.0355	35.6	285	0.147 J	6.95	64.7	750
	10/05/16	0.102	35.3	275	0.364 J	6.94	60.2	1,010
	12/22/16	0.0847	35.6	286	0.204 J	6.34	64.4	905
	10/03/17	0.139	40.4	255	0.143 J	6.64	58.4	855
	06/05/18	0.0948	36.3	246	0.361 J	6.35	51.7	895
	09/05/18	0.0824	30.4	230	0.405	6.4	51.4	833
	05/16/19	0.116	20.3	170	0.669	6.85	51.3	710
09/19/19	0.102	23.6	158	0.741	6.72	60.3	754	
FGD-12	11/04/15	0.0651	16.6	19.4	<0.100	6.68	20	217
	12/17/15	0.0671	13.2	15.5	0.159 J	6.47	16.6	161
	2/9/2016	0.065	11.1	13.5	0.157 J	6.99	14.1	179
	04/14/16	0.0753	14.7	25.4	0.109	6.47	15.8	163
	06/15/16	0.0711	11.2	19.5	0.101 J	6.52	13.4	253
	08/25/16	0.0858	52.8	296	<0.100	6.86	33.8	817
	10/04/16	0.0682	12.5	17.8	0.129 J	6.74	10.5	142
	12/23/16	0.0512	260	1,250	0.112 J	6.95	174	3,270
	10/03/17	0.0731	10.4	10	0.154 J	6.76	10.8	134
	06/05/18	0.0812	8.74	12	0.137 J	6.37	13.7	196
	09/06/18	0.0698	6.78	14	<0.100	5.6	13.1	134
	05/16/19	0.0723	6.79	16	<0.100	6.52	15	140
	08/19/19	0.0794	10.5	16	0.145 J	6.71	17.1	209

Notes:

1. Abbreviations: mg/L - milligrams per liter; TDS - total dissolved solids; s.u. - standard units.
2. J - result is an estimate.

ATTACHMENT 1

JUSTIFICATION FOR EXTENSION TO COMPLETE ASSESSMENT OF CORRECTIVE MEASURES

LUMINANT

July 3, 2019

Project No. 19122434

Kim Mireles

Sr. Director, Environmental Services
Luminant
200 West John Carpenter Freeway
Irving, TX 75039

**RE: JUSTIFICATION FOR EXTENSION TO COMPLETE ASSESSMENT OF CORRECTIVE MEASURES
UNDER 40 C.F.R. § 257.96
FGD PONDS – OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS**

Dear Ms. Mireles,

Golder Associates, Inc. (Golder) is providing Luminant with this letter certifying that, based on our knowledge of the status of the groundwater monitoring and assessment of corrective measure activities at the FGD Pond coal combustion residual (CCR) units at the Oak Grove Steam Electric Station, a 60-day extension to complete the assessment of corrective measures is justified and valid.

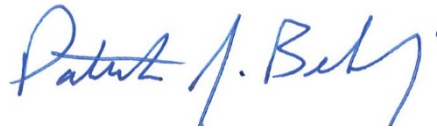
Golder understands the assessment of corrective measures was initiated on April 8, 2019, following identification of a groundwater protection standard exceedance under 40 C.F.R. § 257.95. Activities for the assessment of corrective measures are ongoing, and due to Site-specific circumstances, the assessment of corrective measures cannot be completed within 90-days. Accordingly, 60 additional days are warranted based on the following site-specific circumstances:

- Abnormally wet weather has limited the access for heavy drilling equipment. The site has received approximately 28 inches of rainfall during the second quarter of 2019, which is >15 inches above average for the same period historically.
- A 29-day delay in mobilization to perform required fieldwork due to limited driller availability;
- An extended laboratory analytical schedule due to monitored natural attenuation parameter analyses (e.g., standard extraction procedure (SEP) analyses) taking 38 days or longer to complete.

As used herein, the word “certification” or “certifying” shall mean an expression of the Engineer’s professional opinion to the best of his or her information, knowledge, and belief, and does not constitute a warranty or guarantee by the Engineer.

PROFESSIONAL CERTIFICATION

I hereby certify that a 60-day extension to the 90-day completion timeframe for the assessment of corrective measures is justified and valid pursuant to 40 CFR § 257.96(a).



Patrick J. Behling, P.E.

Principal Engineer

GOLDER ASSOCIATES INC.



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