



2019 Annual Groundwater Monitoring and Corrective Action Report

Martin Lake Steam Electric Station PDP 5 - Rusk County, Texas

Prepared for:

Luminant Generation Company LLC

Submitted by:

Golder Associates Inc.

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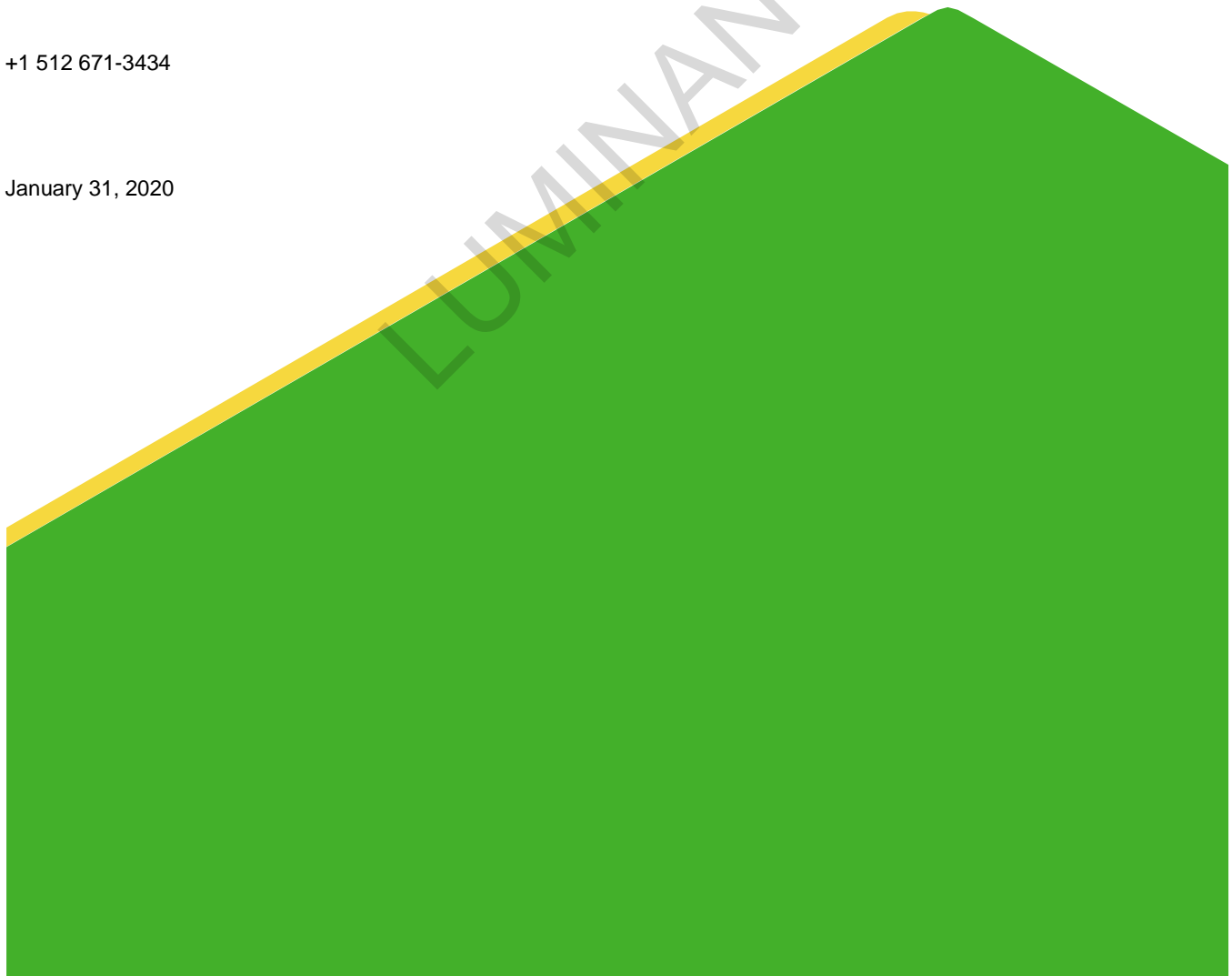


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ACRONYMS AND ABBREVIATIONS

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

1.0 INTRODUCTION

Golder Associates, Inc. (Golder) has prepared this report on behalf of Luminant Generation Company LLC (Luminant) to satisfy annual groundwater monitoring and corrective action reporting requirements of the Coal Combustion Residuals (CCR) Rule for the Permanent Disposal Pond 5 (PDP 5) at the Martin Lake Steam Electric Station (MLSES) in Rusk County, Texas. The CCR unit 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

The PDP 5 CCR Unit is currently in the Detection Monitoring Program. Golder collected the initial Detection Monitoring Program groundwater samples from the PDP 5 CCR monitoring well network in September 2017. Subsequent Detection Monitoring Program groundwater samples were collected on a semi-annual basis in 2018 and 2019. The evaluation of the data was completed 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
September 2017 February 2018 (re-samples)	Appendix III	Yes	No (Alternate Source Demonstration Completed)
June 2018 September 2018 November 2018 (re-samples)	Appendix III	Yes	No (Alternate Source Demonstration Completed)
May 2019 November 2019	Appendix III	Yes	TBD (Alternate Source Being Assessed)

The statistical background values and Appendix III analytical data are presented in Tables 1 and 2, respectively. SSIs of Appendix III parameters were identified for the 2017 and 2018 sampling events. An initial Alternate Source Demonstration was completed in 2018, which indicated that a source other than the CCR unit caused the SSIs observed in the 2017 sample data and 2018 re-sample data. A subsequent Alternate Source Demonstration was completed in 2019 based on the 2018 sample data. As such, PDP 5 has remained in the Detection Monitoring Program. A summary of the 2019 Alternate Source Demonstration is presented in Attachment 1.

Detection Monitoring Program groundwater samples were collected from the CCR groundwater monitoring network on a semi-annual basis in 2019, as required by the CCR Rule. The first 2019 semi-annual Detection Monitoring Program sampling event was conducted in May 2019. The second 2019 semi-annual Detection Monitoring Program sampling event was conducted in November 2019. The analytical data from the 2019 semi-annual Detection Monitoring Program sampling events were evaluated using procedures described in the Statistical Analysis Plan to identify SSIs of Appendix III parameters over background concentrations. SSIs of

Appendix III parameters over background concentrations were identified for several constituents for which SSIs had previously been attributed to alternate sources. Alternate sources for the SSIs identified in the 2019 sample data are being evaluated in accordance with 40 CFR § 257.94. If an alternate source is not identified to be the cause of the SSI, an Assessment Monitoring Program will be established in accordance with 40 CFR § 257.94(e)(2).

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3.0 KEY ACTIONS COMPLETED IN 2019

Semi-annual Detection Monitoring Program groundwater monitoring events were completed in May and November 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 2. A map showing the CCR units and monitoring wells is provided as Figure 1.

No CCR wells were installed or decommissioned in 2019.

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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 Detection Monitoring Program in accordance with 40 CFR § 257.94.
- Complete evaluation of Appendix III analytical data and compare results to statistical background values to determine whether an SSI has occurred.
- If an SSI is identified, potential alternate sources (i.e., a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated. If an alternate source is identified to be the cause of the SSI, a written demonstration will be completed within 90 days of SSI determination and included in the Annual Groundwater Monitoring and Corrective Action Report.
- If an alternate source is not identified to be the cause of the SSI, an Assessment Monitoring Program will be established in accordance with 40 CFR § 257.94(e)(2).

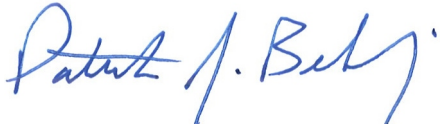
6.0 REFERENCES

Pastor, Behling & Wheeler, LLC, 2017. Coal Combustion Residual Rule Statistical Analysis Plan, Martin Lake Steam Electric Station, PDP 5, Rusk County, Texas.

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Signature Page

Golder Associates Inc.

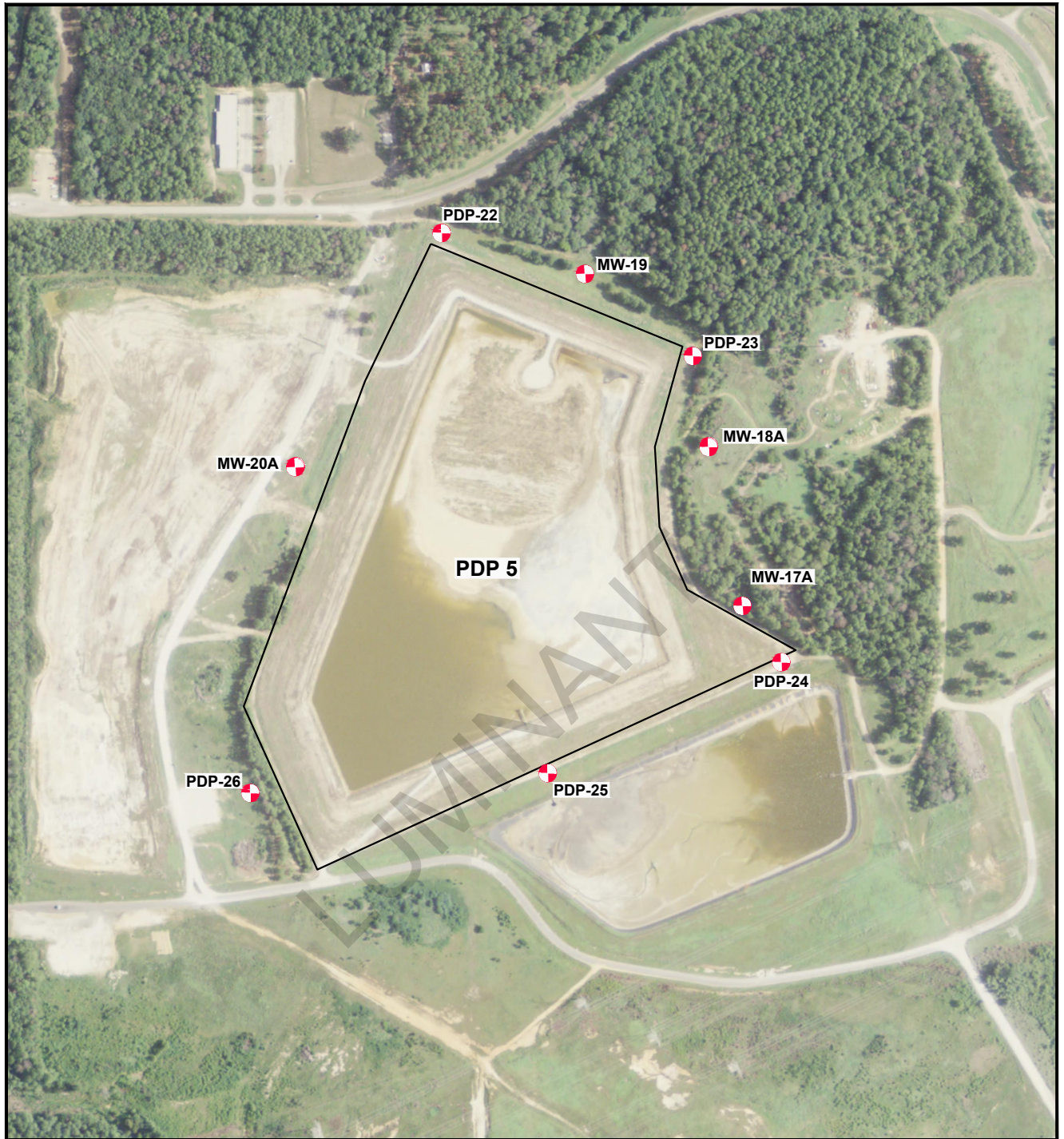


Pat Behling
Principal Engineer



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FIGURES

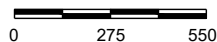


EXPLANATION

 CCR Monitoring Well



Scale in Feet



SOURCE:
Imagery from www.tnris.gov, Rusk County, aerial photographs, 2012.

MARTIN LAKE STEAM ELECTRIC STATION TATUM, TEXAS

Figure 1

PDP 5 AREA DETAILED SITE PLAN

PROJECT: 5164B

BY: AJD

REVISIONS

DATE: SEPT., 2017

CHECKED: PJB

TABLES

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Table 1
Statistical Background Values
MLSES - PDP 5

Sample Location	Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	field pH (s.u.)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
MW-17A	0.538	6.73	10.4	0.4	2.5 9.19	51.9	170
MW-18A	0.20	3.1	10.4	0.4	4.88 7.92	9.1	157
MW-19	0.782	237	57.7	0.512	4.6 8.08	672	1,380
MW-20A	0.213	25.7	12.3	0.954	3.06 8.76	148	381
PDP-22	0.411	306	32.7	1.07	4.08 8.63	216	1,780
PDP-23	0.0678	2	7.52	0.4	3.38 8.45	3.27	143
PDP-24	4.92	45.9	22.6	1.03	1.33 9.97	533	894
PDP-25	0.136	41.3	197	0.4	4.65 7.93	118	705
PDP-26	0.111	4.74	14.6	0.577	5.35 7.57	64.6	438

Table 2
Appendix III Analytical Results
MLSES - PDP 5

Sample Location	Date Sampled	B (mg/L)	Ca (mg/L)	Cl (mg/L)	FI (mg/L)	field pH (s.u.)	SO ₄ (mg/L)	TDS (mg/L)
MW-17A	09/22/17	0.402	3.1	8.3	<0.1	6.78	31.2	111
	06/14/18	0.485	6.48	9.16	<0.1	6.87	45.9	129
	09/11/18	0.523	5.06	8.82	0.179 J	5.03	43.1	137
	05/13/19	0.497	4.88	9.18	<0.1	6.79	44.7	145
	11/07/19	0.52	5.05	8.81	<0.100	6.44	43.9	127
MW-18A	09/21/17	0.0654	1.04	5.27	<0.1	6.94	3.23	45
	06/14/18	0.102	2	6.56	<0.1	6.92	3.48	71
	09/12/18	0.211	3.23	9.06	<0.1	5.69	4.82	150
	11/7/2018 re-sample	0.128	--	--	--	--	--	--
	05/13/19	0.117	1.01	6.17	0.138 J	6.64	3.23	73
	11/07/19	0.127	11.5	6.34	<0.100	6.23	3.67	68
MW-19	09/22/17	0.0677	2.74	5.36	<0.1	6.94	1.46 J	98
	06/14/18	0.577	133	24.4	0.216 J	6.78	328	758
	09/11/18	0.243	38	65.1	0.228 J	6.04	166	597
	11/7/2018 re-sample	--	--	5.22	--	--	--	--
	05/13/19	0.429	122	26.8	0.229 J	6.72	349	813
	11/08/19	0.529	77.8	49.3	0.189 J	6.87	310	844
MW-20A	09/22/17	0.0807	17.4	12.6	0.175 J	6.71	74.2	237
	02/21/18 re-sample	--	--	10.7	--	--	--	--
	06/13/18	0.171	24	10.9	0.672	6.72	132	250
	09/11/18	0.141	7.16	11	0.235 J	4.70	39.1	154
	05/13/19	0.239	37.4	10.2	0.731	6.81	178	328
	11/08/19	0.132	9.9	10.2	0.465	6.51	88	205
PDP-22	09/22/17	0.221	92.5	12.3	0.321 J	6.98	178	558
	06/14/18	0.115	7.78	11.8	0.239	6.63	186	491
	09/12/18	0.164	61.1	10.9	0.216 J	5.88	143	476
	05/13/19	0.158	98.2	10.1	0.303 J	6.86	184	615
	11/12/19	0.226	34.3	12.6	0.218 J	6.93	215	482

ATTACHMENT 1
ALTERNATE SOURCE DEMONSTRATION

ALTERNATE SOURCE DEMONSTRATION SUMMARY

MARTIN LAKE STEAM ELECTRIC STATION – PDP 5

Introduction

This Alternative Source Demonstration Summary was prepared to document that a source other than the Permanent Disposal Pond 5 (PDP 5) (the Site) caused the statistically significant increases (SSIs) over background levels observed during the 2018 Detection Monitoring Program sampling events as required by 40 CFR 257.94(e)(2). A detailed Site plan of the Coal Combustion Residual (CCR) groundwater monitoring network is shown on Figure 1. The Detection Monitoring Program groundwater data are summarized in Table 1.

2018 Semi-Annual Detection Monitoring Results and Discussion

Detection Monitoring Program groundwater samples were collected on a semi-annual basis from the Site CCR monitoring well network in 2018 in accordance with 40 CFR 257.94. Golder collected the initial 2018 Detection Monitoring Program groundwater samples in June 2018 and the second semi-annual Detection Monitoring Program groundwater samples in September 2018. In accordance with procedures described in the Statistical Analysis Plan (PBW, 2017), several verification re-samples were collected in November 2018 to verify the September 2018 sample results. Based on the semi-annual and re-sample results, SSIs were identified for boron in wells PDP-23 and PDP-25 during the second semi-annual and November 2018 re-sampling events. Additional potential SSIs were identified for other wells and Appendix III constituents (boron, calcium and chloride) during the second 2018 semi-annual sampling event; however, all verification sample results for these wells and constituents were below prediction limits. Therefore, in accordance with procedures outlined in the Statistical Analysis Plan, SSIs are not indicated for these wells and constituents.

The boron concentrations in wells PDP-23 and PDP-25 (maximum sample concentrations of 0.076 and 0.167 mg/L, respectively) are significantly lower than the boron concentrations observed at other Site wells where SSIs were not observed. For example, six of the seven other CCR monitoring wells (MW-17A, MW-18A, MW-19, MW-20A, PDP-22, and PDP-24) have had Detection Monitoring Program boron sample concentrations that were higher than those observed in the PDP-23 and PDP-25 SSI samples. As such, the boron sample concentrations observed at PDP-23 and PDP-25 are similar or less than those observed in other Site wells, and could be attributed to variability caused by the heterogeneity of the uppermost aquifer at the Site.

PDP 5 is built on top of three closed and capped landfills (PDP 1, PDP 2, and PDP 3). PDP 4, which is located adjacent to PDP 5 to the south, is also a closed and capped landfill. PDP 1 through PDP 4 are not considered regulated units under the CCR Rule. In addition to the natural variability caused by the heterogeneity of the groundwater system at the Site, sample concentrations identified as SSIs may also be attributed to potential historical effects to groundwater caused by the closed landfills in the vicinity of PDP 5.

Conclusion

SSIs were identified for boron during the 2018 Detection Monitoring Program sampling events at PDP 5. All observed SSIs are attributed to natural variation in groundwater quality due to the heterogeneity of the groundwater system and to potential effects from the closed landfills in the vicinity of PDP 5 (PDP 1 through PDP 4), and are not considered evidence of a release from the CCR unit. In accordance with Section 257.94(e)(2), Luminant should continue the Detection Monitoring Program. Initiation of an Assessment Monitoring Program is not required at this time.

References

Pastor, Behling & Wheeler, LLC (PBW), 2017. Coal Combustion Residual Rule, Statistical Analysis Plan, PDP 5, Rusk County, Texas. October 11, 2017.

PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Golder Associates Inc. under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that the alternative source demonstration at the referenced facility meets the requirements of Section 257.94(e)(2) of the CCR Rule.




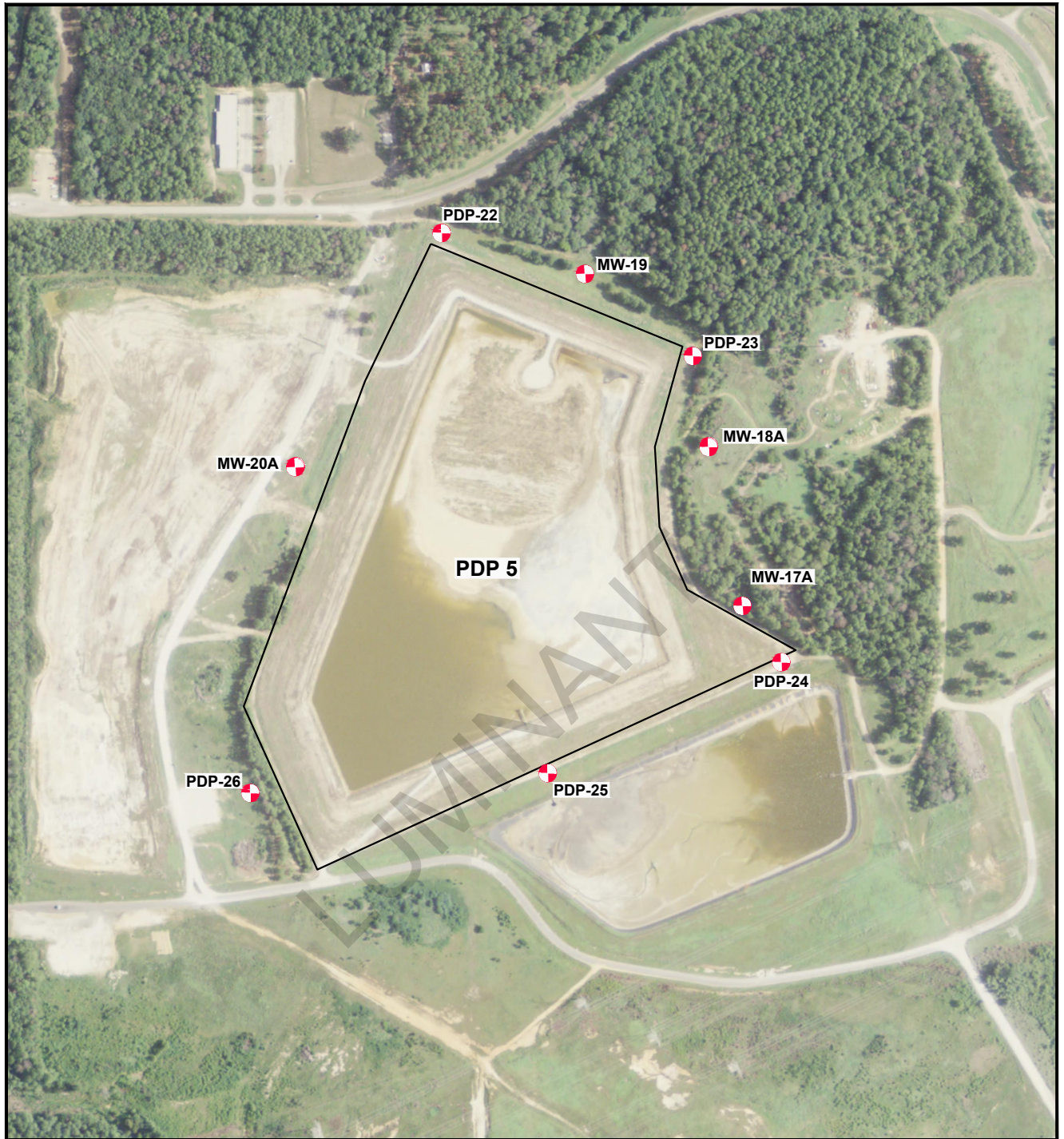

Patrick J. Behling, P.E.
Principal Engineer
GOLDER ASSOCIATES INC.

Table 1
CCR Groundwater Detection Monitoring Data Summary
PDP 5
Martin Lake Steam Electric Station


Sample Location	Date Sampled	B		Ca		Cl		FI		field pH		SO ₄		TDS	
		Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data	Prediction Limit	Sample Data
Downgradient Wells															
MW-17A	09/22/17	0.538	0.402	6.73	3.1	10.4	8.3	0.4	<0.1	2.5 9.19	6.78	51.9	31.2	170	111
	06/14/18		0.485		6.48		9.16		<0.1		6.87		45.9		129
	09/11/18		0.523		5.06		8.82		0.179 J		5.03		43.1		137
MW-18A	09/21/17	0.20	0.0654	3.1	1.04	10.4	5.27	0.4	<0.1	4.88 7.92	6.94	9.1	3.23	157	45
	06/14/18		0.102		2		6.56		<0.1		6.92		3.48		71
	09/12/18		0.211		3.23		9.06		<0.1		5.69		4.82		150
	11/07/18		0.128		--		--		--		--		--		--
MW-19	09/22/17	0.782	0.0677	237	2.74	57.7	5.36	0.512	<0.1	4.6 8.08	6.94	672	1.46 J	1,380	98
	06/14/18		0.577		133		24.4		0.216 J		6.78		328		758
	09/11/18		0.243		38		65.1		0.228 J		6.04		166		597
	11/07/18		--		--		5.22		--		--		--		--
MW-20A	09/22/17	0.213	0.0807	25.7	17.4	12.3	12.6	0.954	0.175 J	3.06 8.76	6.71	148	74.2	381	237
	02/21/18 re-sample		--		--		10.7		--		--		--		--
	06/13/18		0.171		24		10.9		0.672		6.72		132		250
	09/11/18		0.141		7.16		11		0.235 J		4.70		39.1		154
PDP-22	09/22/17	0.411	0.221	306	92.5	32.7	12.3	1.07	0.321 J	4.08 8.63	6.98	216	178	1,780	558
	06/14/18		0.115		7.78		11.8		0.239		6.63		186		491
	09/12/18		0.164		61.1		10.9		0.216 J		5.88		143		476
PDP-23	09/22/17	0.0678	0.0463	2	2.34	7.52	4.48	0.4	0.147 J	3.38 8.45	6.77	3.27	1.47 J	143	111
	02/21/18 re-sample		--		2.37		--		--		--		--		--
	06/13/18		0.0357		2.29		6.21		<0.1		6.82		1.26 J		98
	09/11/18		0.0760		1.96		6.38		<0.1		5.32		1.52 J		98
	11/07/18		0.0683		--		--		--		--		--		--
PDP-24	09/22/17	4.92	3.01	45.9	25.8	22.6	17.5	1.03	0.898	1.33 9.97	6.95	533	231	894	440
	06/14/18		2.71		23.9		21.1		0.629		6.82		284		481
	09/11/18		4.08		41.6		19.4		0.832		4.20		460		760
PDP-25	09/22/17	0.136	0.133	41.3	36.8	197	130	0.4	0.157 J	4.65 7.93	6.81	118	89.1	705	481
	06/14/18		0.119		40.4		111		<0.1		6.78		73.4		439
	09/11/18		0.167		36.2		135		0.115 J		5.87		90.3		469
	11/07/18		0.142		--		--		--		--		--		--
PDP-26	09/22/17	0.111	0.0343	4.74	2.32	14.6	5.24	0.577	0.157 J	5.35 7.57	6.84	64.6	5.88	438	107
	06/14/18		0.0225 J		2.93		4.8		<0.1		6.89		4.27		100
	09/12/18		0.0371		2.37		4.88		<0.1		6.07		2.66 J		107

Notes:

1. All concentrations in mg/L. pH in standard units.
2. J - concentration is below sample quantitation limit; result is an estimate.
3. Highlighted sample results exceed the prediction limit.



EXPLANATION

 CCR Monitoring Well



Scale in Feet

0 275 550

SOURCE:
Imagery from www.tnris.gov, Rusk County, aerial photographs, 2012.

MARTIN LAKE STEAM ELECTRIC STATION TATUM, TEXAS

Figure 1

PDP 5 AREA DETAILED SITE PLAN

PROJECT: 5164B

BY: AJD

REVISIONS

DATE: SEPT., 2017

CHECKED: PJB

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golder.com