GOLDER

2018 Annual Groundwater Monitoring and Corrective Action Report

Martin Lake Steam Electric Station A1 Area Landfill - Panola County, Texas

Prepared for:

Luminant Generation Company LLC

Submitted by:

Golder Associates Inc.

2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664
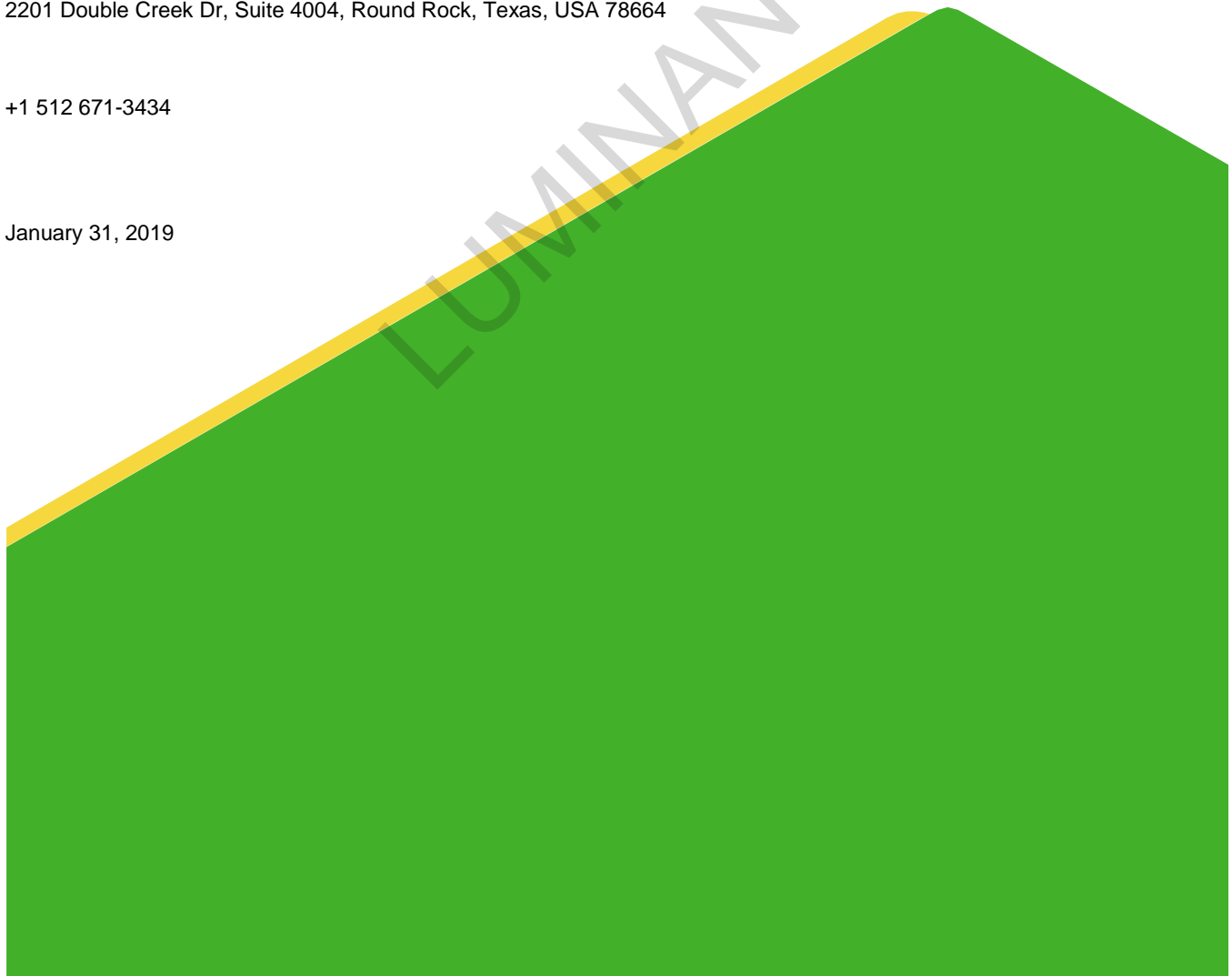
+1 512 671-3434

January 31, 2019

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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
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 A1 Area Landfill at the Martin Lake Steam Electric Station (MLSES) in Rusk 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 A1 Area Landfill CCR monitoring well network in September 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
09/25-26/2017	Appendix III	Yes	July 16, 2018

Alternate source evaluations were inconclusive for one or more of the SSIs. Consequently, an Assessment Monitoring Program was initiated and established for the A1 Area Landfill 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 Assessment Monitoring Program sampling event, as required by 40 CFR § 257.95(d)(1). The Assessment Monitoring Program sampling dates and parameters are summarized in the following table:

Assessment Monitoring Program Summary

Sampling Dates	Parameters	SSIs/SSLs
06/11-12/2018	Appendix III	Not Applicable
	Appendix IV	
09/13-14/2018	Appendix III	To Be Determined
	Appendix IV	

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 analytical data from the 2018 Assessment Monitoring sampling events were evaluated in 2019 using procedures described in the Statistical Analysis Plan to identify SSIs of Appendix III parameters over background concentrations and statistically significant levels (SSLs) of Appendix IV parameters over GWPSs. Since the Assessment Monitoring Program data evaluation was completed in 2019, the results of that evaluation will be presented in the 2019 Annual Groundwater Monitoring and Corrective Action Report.

3.0   KEY ACTIONS COMPLETED IN 2018

Assessment Monitoring Program groundwater monitoring events were completed in June and September 2018. Statistical background values were established for Appendix III parameters and are summarized in Table 1. GWPSs were established for Appendix IV parameters and are summarized in Table 2. Analytical results for the groundwater samples collected in 2018 are summarized in Table 3 (Appendix III parameters) and Table 4 (Appendix IV parameters). A map showing the CCR units and all upgradient and downgradient monitoring wells for the CCR units is provided as Figure 1.

No CCR wells were installed or decommissioned in 2018.

4.0   PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the CCR groundwater monitoring program in 2018.

5.0   KEY ACTIVITIES PLANNED FOR 2019

The following key activities are planned for 2019:

- 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 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 demonstrated to be the cause of the SSL, a written demonstration will be completed within 90 days of SSL detection and included in the 2019 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 2019 will be met, including associated recordkeeping/notifications required by 40 CFR §§ 257.105 through 257.108.

6.0   REFERENCES

Pastor, Behling & Wheeler, LLC (PBW), 2017. Coal Combustion Residual Rule Statistical Analysis Plan, Martin Lake Steam Electric Station, A1 Area Landfill, Rusk County, Texas.

FIGURES

GOLDER
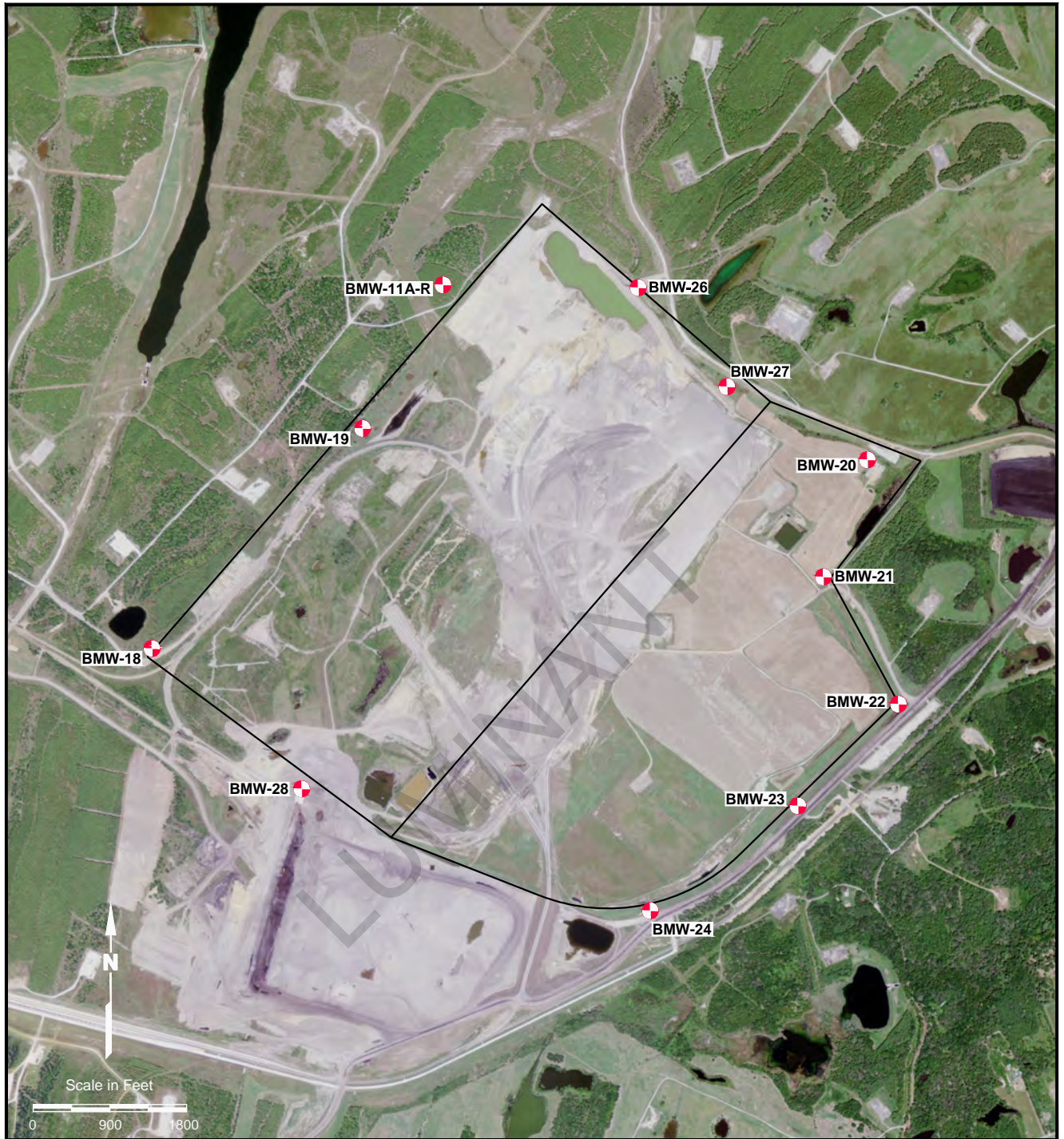
EXPLANATION

⊕ CCR Monitoring Well

MARTIN LAKE STEAM ELECTRIC STATION
A1 Area Landfill

Figure 1

**A1 AREA LANDFILL
DETAILED SITE MAP**

PROJECT: 5164B	BY: AJD	REVISIONS
DATE: SEPT., 2017	CHECKED: PJB	

TABLES

Table 1
Statistical Background Values
MLSES A1 Area Landfill

Parameter	Statistical Background Value
Boron (mg/L)	0.546
Calcium (mg/L)	276
Chloride (mg/L)	35.5
Fluoride (mg/L)	0.4
field pH (s.u.)	5.81 7.58
Sulfate (mg/L)	1,100
Total Dissolved Solids (mg/L)	2,850

Table 2
Groundwater Protection Standards
MLSES A1 Area Landfill

Parameter	Groundwater Protection Standard
Antimony (mg/L)	0.006
Arsenic (mg/L)	0.0164
Barium (mg/L)	2
Beryllium (mg/L)	0.004
Cadmium (mg/L)	0.005
Chromium (mg/L)	0.1
Cobalt (mg/L)	0.0124
Fluoride (mg/L)	4
Lead (mg/L)	0.015
Lithium (mg/L)	0.103
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)	10.7

Table 3
Appendix III Analytical Summary
MLSES A1 Area Landfill

Sample Location	Date Sampled	B	Ca	Cl	Fl	field pH	SO$_4$	TDS
Upgradient Wells								
BMW-11AR	09/25/17	0.448	199	15.2	<0.100	6.97	561	1,620
	06/12/18	0.634	173	8.37	0.323 J	6.82	320	1,080
	09/14/18	0.455	175	19.7	0.353 J	5.86	538	1,720
Downgradient Wells								
BMW-18	09/25/17	0.437	6.49	16.9	0.128 J	6.87	87.2	476
	06/12/18	0.636	14.4	18.2	0.176 J	6.82	87.2	464
	09/14/18	0.423	6.06	18.6	0.201 J	5.70	81.3	476
BMW-19	09/25/17	0.481	496	6.11	<0.100	6.95	2,360	3,670
	06/12/18	0.667	539	6.08	<0.100	6.92	2,080	3,660
	09/13/18	0.460	514	6.86	0.404	6.26	2,330	4,010
BMW-20	09/26/17	0.0973	116	33.5	<0.100	6.73	472	986
	06/11/18	0.0912	149	35.9	0.144 J	6.67	654	1,160
	09/13/18	0.0773	91.1	48.8	<0.100	5.26	831	1,360
BMW-21	09/26/17	1.02	138	364	<0.100	6.76	417	1,850
	06/11/18	1.01	168	402	0.233 J	6.75	457	1,990
	09/13/18	0.987	151	418	0.136 J	6.64	474	2,100
BMW-22	09/26/17	3.53	209	270	<0.100	6.82	860	2,250
	06/11/18	3.49	219	280	0.312 J	6.85	883	2,180
	09/13/18	3.28	188	296	0.205 J	6.34	919	2,310
BMW-23	09/26/17	1.46	99.6	223	<0.100	6.65	482	1,550
	06/12/18	1.49	104	236	0.204 J	6.72	490	1,530
	09/13/18	1.34	91.7	236	0.190 J	6.25	482	1,560
BMW-24	09/26/17	0.656	66.8	229	<0.100	6.82	242	940
	06/11/18	0.469	70.6	336	0.466	6.76	117	970
	09/13/18	0.197	59.5	488	0.769	6.45	40	1,090
BMW-26	09/25/17	0.514	71	112	<0.100	6.95	606	1,510
	06/12/18	0.726	96.5	120	<0.100	6.61	633	1,550
	09/13/18	0.474	230	125	<0.100	5.32	671	2,020
BMW-27	09/25/17	0.336	128	126	0.254 J	6.89	1,160	2,110
	06/12/18	0.478	96.1	98.4	<0.100	6.87	522	1,420
	09/13/18	0.398	143	132	0.750	5.6	1,230	2,380
BMW-28	09/25/17	1.35 J	262	130	<0.100	6.85	1,430	3,060
	06/12/18	1.41	262	139	0.529	6.92	1,470	3,100
	09/13/18	1.35	243	143	0.445	5.71	1,420	3,180

Notes:

1. All concentrations in mg/L except pH, which is in standard units.

2. J - concentration is below sample quantitation limit; result is an estimate.

Table 4
Appendix IV Analytical Results
MLSES A1 Area Landfill

Sample Location	Date Sampled	Sb	As	Ba	Be	Cd	Cr	Co	Fl	Pb	Li	Hg	Mo	Se	Th	Ra 226	Ra 228	Ra 226/228 Combined
Upgradient Wells																		
BMW-11AR	06/12/18	<0.0008	0.00444 J	0.0692	<0.0003	<0.0003	0.00295 J	<0.003	0.323 J	0.0017	0.0686	<0.00008	0.00340 J	<0.002	<0.0005	0.996	1.7	2.696
	09/14/18	NA	0.0056	0.0735	NA	NA	<0.002	<0.003	0.353 J	0.00147	0.0196	NA	0.00299 J	NA	NA	1.52	1.11	2.63
Downgradient Wells																		
BMW-18	06/12/18	<0.0008	<0.002	0.0412	<0.0003	<0.0003	<0.002	<0.003	0.176 J	0.0013	0.0185	<0.00008	<0.002	<0.002	<0.0005	0.232	0.706	0.938
	09/14/18	NA	<0.002	0.0277	NA	NA	<0.002	<0.003	0.201 J	<0.0003	0.0165	NA	<0.002	NA	NA	<0.509	<0.589	<1.098
BMW-19	06/12/18	<0.0008	0.0428	0.0243	<0.0003	<0.0003	0.00267	0.0115	<0.100	0.00183	0.0734	<0.00008	<0.002	<0.002	<0.0005	<0.395	1.17	1.565
	09/13/18	NA	0.00491 J	0.0132	NA	NA	<0.002	0.0125	0.404 J	<0.0003	0.0845	NA	<0.002	NA	NA	<0.376	1.46	1.836
BMW-20	06/11/18	<0.0008	0.00473 J	0.0515	<0.0003	<0.0003	<0.002	0.0681	0.144 J	0.000476	<0.005	<0.00008	<0.002	<0.002	<0.0005	0.74	0.865	1.605
	09/13/18	NA	0.00473 J	0.0258	NA	NA	<0.002	0.0645	<0.100	0.000368 J	<0.005	NA	<0.002	NA	NA	0.519	0.711	1.23
BMW-21	06/11/18	<0.0008	0.00373 J	0.0438	<0.0003	<0.0003	<0.002	<0.003	0.233 J	<0.0003	0.07	<0.00008	<0.002	<0.002	<0.0005	<0.239	<0.939	<1.178
	09/13/18	NA	0.00353 J	0.0412	NA	NA	<0.002	<0.003	0.136 J	<0.0003	0.0646	NA	<0.002	NA	NA	0.562	1.49	2.052
BMW-22	06/11/18	<0.0008	<0.002	0.0638	<0.0003	<0.0003	<0.002	<0.003	0.312 J	<0.0003	0.089	<0.00008	<0.002	<0.002	<0.0005	0.522	<1.020	1.54
	09/13/18	NA	<0.002	0.063	NA	NA	<0.002	<0.003	0.205 J	<0.0003	0.0882	NA	<0.002	NA	NA	1.29	2.89	4.18
BMW-23	06/11/18	<0.0008	<0.002	0.0381	<0.0003	<0.0003	<0.002	<0.003	0.204 J	<0.0003	0.106	<0.00008	<0.002	<0.002	<0.0005	0.442	1.79	2.23
	09/13/18	NA	<0.002	0.0414	NA	NA	<0.002	<0.003	0.190 J	<0.0003	0.0915	NA	<0.002	NA	NA	0.774	1.23	2.00
BMW-24	06/11/18	<0.0008	0.00266 J	0.487	<0.0003	<0.0003	<0.002	0.00633	0.466	<0.0003	0.0198	<0.00008	<0.002	<0.002	<0.0005	0.668	0.975	1.643
	09/13/18	NA	<0.002	2.19	NA	NA	<0.002	0.00304 J	0.769	<0.0003	0.00764 J	NA	<0.002	NA	NA	1.82	1.45	3.27
BMW-26	06/12/18	<0.0008	0.00316 J	0.0222	<0.0003	<0.0003	0.00231 J	<0.003	<0.100	0.00152	0.111	<0.00008	0.0029 J	<0.002	<0.0005	<0.251	<0.508	<0.759
	09/13/18	NA	0.0165	0.0360	NA	NA	<0.002	<0.003	<0.100	<0.0003	0.11	NA	<0.002	NA	NA	<0.426	0.826	1.252
BMW-27	06/12/18	<0.0008	0.00223 J	0.0182	<0.0003	<0.0003	<0.002	<0.003	<0.100	0.00097 J	0.0721	<0.00008	<0.002	<0.002	<0.0005	0.305	<0.5860	0.891
	09/13/18	NA	0.00467 J	0.0250	NA	NA	0.002 J	0.190	0.750	<0.0003	0.0531	NA	<0.002	NA	NA	0.691	1.04	1.731
BMW-28	06/12/18	<0.0008	<0.002	0.0505	<0.0003	<0.0003	<0.002	<0.003	0.529	0.00122	0.116	<0.00008	0.00764	<0.002	<0.0005	0.197	1.12	1.32
	09/14/18	NA	<0.002	0.0419	NA	NA	<0.002	<0.003	0.445	<0.0003	0.114	NA	0.00782	NA	NA	0.35	1.15	1.50

Notes:

1. All concentrations in mg/L except Ra 226, Ra 228, and Ra 226/228 Combined, which are in pCi/L.

2. J - concentration is below sample quantitation limit; result is an estimate.

3. Non-detect Ra isotope results were assigned a value equal to the minimum detectable concentration.

4. NA - Not analyzed.

GOLDER

golder.com