



# 2018 Annual Groundwater Monitoring and Corrective Action Report

*Martin Lake Steam Electric Station Ash Pond Area - Rusk County, Texas*

Prepared for:

**Luminant Generation Company LLC**

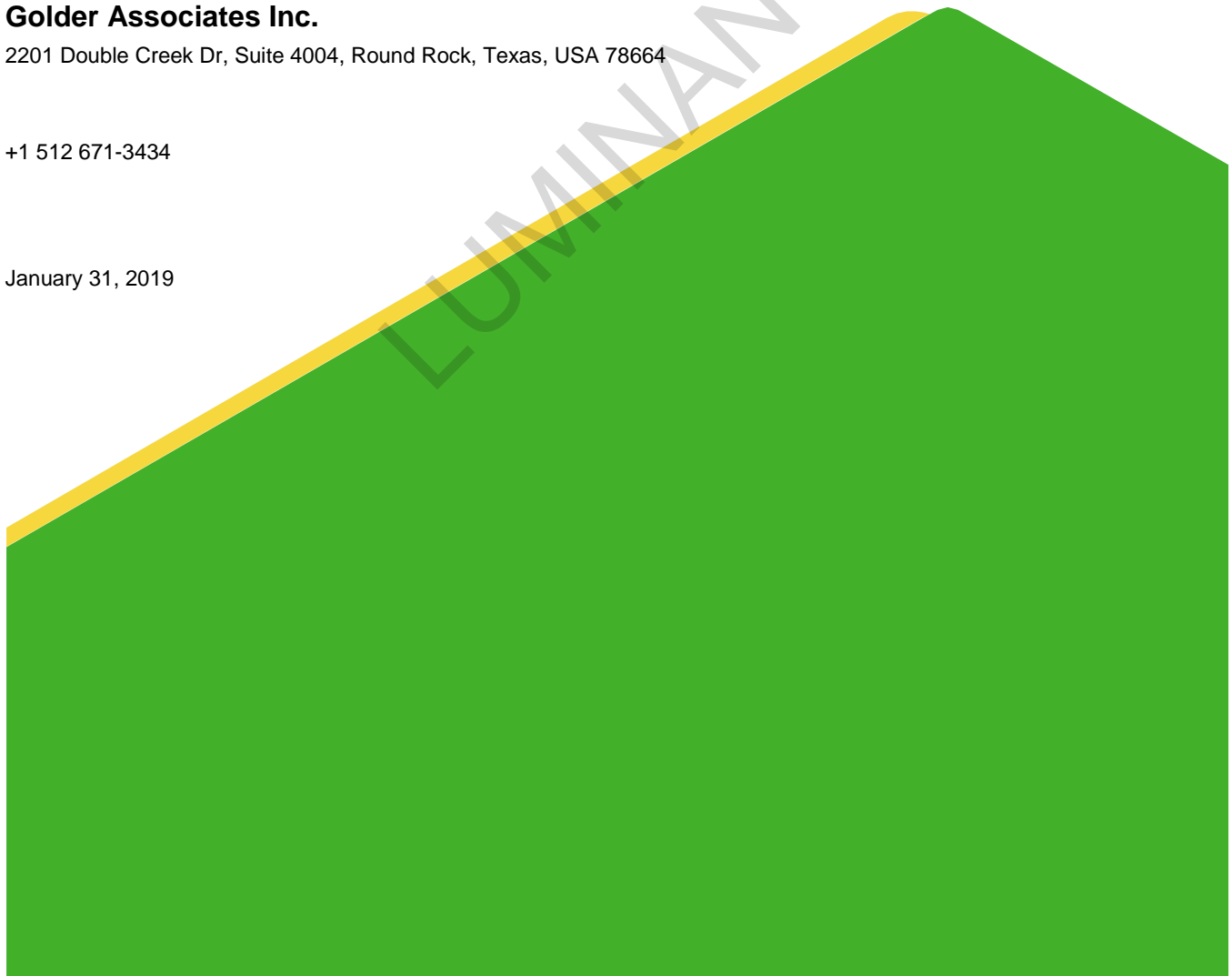
Submitted by:

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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                                |
| 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 Ash Pond Area 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 Ash Pond Area 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 |
|----------------|--------------|------|---|
| 09/21/2017     | 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 Ash Pond Area 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 sampling event, all CCR wells were sampled for all Appendix III parameters and for Appendix IV parameters that were detected during the first 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        |
|----------------|--------------|------------------|
| 06/12-13/2018  | Appendix III | Not Applicable   |
|                | Appendix IV  |                  |
| 09/07/2018     | 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 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 January 2019, the results of that evaluation will be presented in the 2019 Annual Groundwater Monitoring and Corrective Action Report.

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### 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.

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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 2018.

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## 5.0 KEY ACTIVITIES PLANNED FOR 2019

The following key activities are planned for 2019:

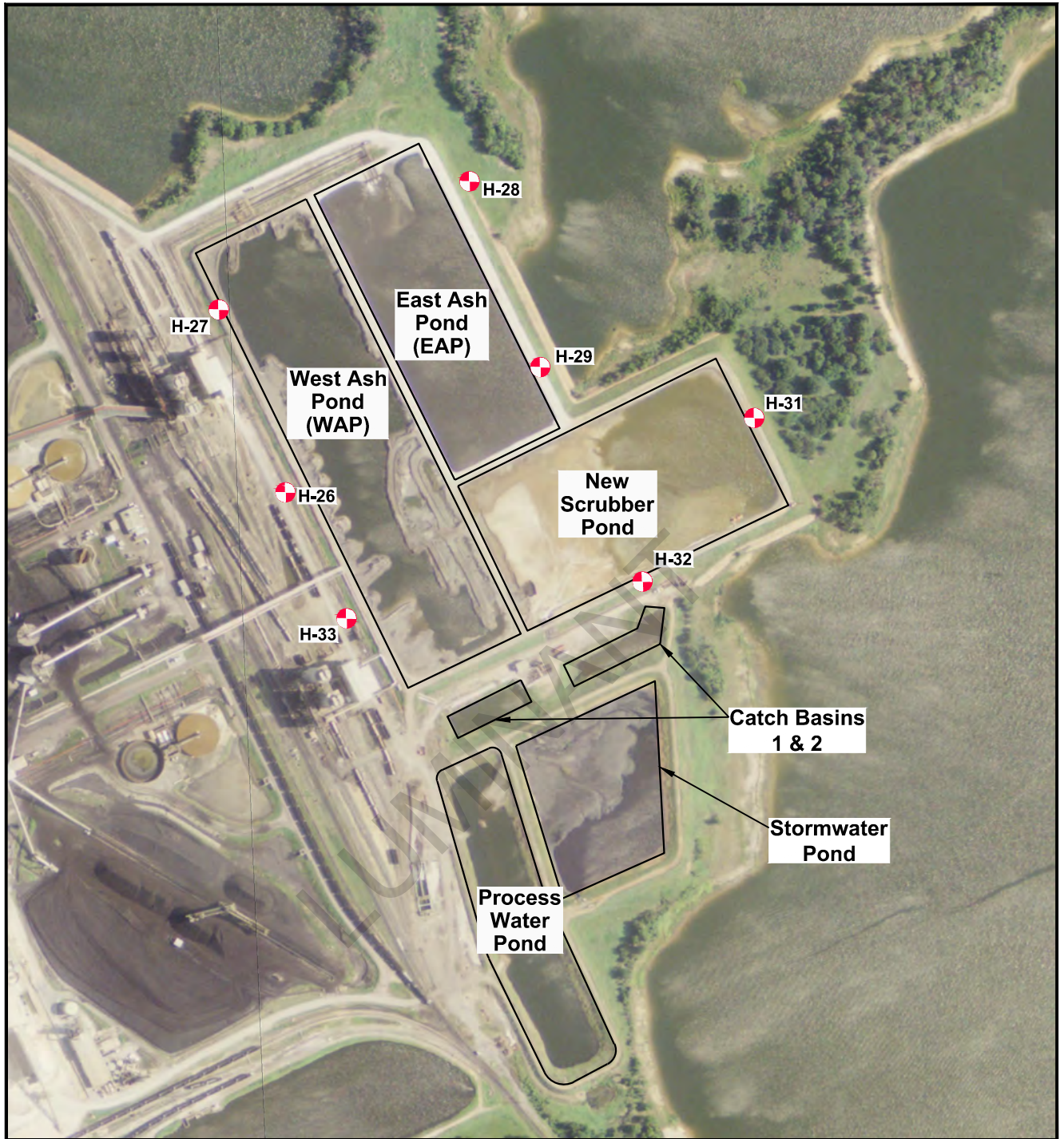
- Continue the Assessment Monitoring Program in accordance with 40 CFR § 257.95.
- Complete statistical evaluation of Appendix IV analytical data from the downgradient wells and compare results to GWPSs to determine whether an SSL has occurred.
- If an SSL is identified, notification will be prepared as required under 40 CFR § 257.95(g) and will 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 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, Ash Ponds, Rusk County, Texas.

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## FIGURES



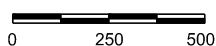
### EXPLANATION



CCR Monitoring Well Location



Scale in Feet



## MARTIN LAKE STEAM ELECTRIC STATION TATUM, TEXAS

Figure 1

### ASH POND AREA DETAILED SITE PLAN

PROJECT: 5164B

BY: AJD

REVISIONS

DATE: SEPT., 2017

CHECKED: PJB

## TABLES

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**Table 1**  
**Background Statistical Values**  
**MLSES Ash Pond Area**

| <b>Parameter</b>              | <b>Statistical<br/>Background<br/>Value</b> |
|-------------------------------|---|
| Boron (mg/L)                  | 0.602                                       |
| Calcium (mg/L)                | 57.2  |
| Chloride (mg/L)               | 153   |
| Fluoride (mg/L)               | 0.4   |
| field pH (s.u.)               | 4.63<br>7.6                                 |
| Sulfate (mg/L)                | 365   |
| Total Dissolved Solids (mg/L) | 1,110                                       |

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**Table 2**  
**Appendix IV Analytical Results**  
**MLSES Ash Pond Area**

| <b>Parameter</b>       | <b>Groundwater Protection Standard</b> |
|------------------------|--|
| Antimony (mg/L)        | 0.006                                  |
| Arsenic (mg/L)         | 0.01                                   |
| Barium (mg/L)          | 2                                      |
| Beryllium (mg/L)       | 0.004                                  |
| Cadmium (mg/L)         | 0.005                                  |
| Chromium (mg/L)        | 0.1                                    |
| Cobalt (mg/L)          | 0.0564                                 |
| Fluoride (mg/L)        | 4                                      |
| Lead (mg/L)            | 0.015                                  |
| Lithium (mg/L)         | 0.177                                  |
| 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) | 5                                      |

**Table 3**  
**Appendix III Analytical Results**  
**MLSES Ash Pond Area**

| Sample Location           | Date Sampled | B      | Ca   | Cl   | Fl      | field pH | SO <sub>4</sub> | TDS   |
|---------------------------|--------------|--------|------|------|---------|----------|-----------------|-------|
| <b>Upgradient Wells</b>   |              |        |      |      |         |          |                 |       |
| H-26                      | 09/21/17     | 0.579  | 13.1 | 67.8 | <0.100  | 6.88     | 69.6            | 288   |
|                           | 06/13/18     | 0.512  | 17   | 66.1 | <0.100  | 6.74     | 67.0            | 313   |
|                           | 09/07/18     | 0.606  | 11.3 | 65.1 | <0.100  | 6.85     | 60.7            | 265   |
| H-27                      | 09/21/17     | 0.480  | 61.1 | 122  | <0.100  | 6.87     | 378             | 852   |
|                           | 06/13/18     | 0.404  | 57.0 | 110  | 0.208 J | 6.52     | 372             | 850   |
|                           | 09/07/18     | 0.347  | 6.96 | 58.3 | 0.140 J | 6.72     | 188             | 716   |
| H-33                      | 09/21/17     | 0.0452 | 13.7 | 67.9 | <0.100  | 7.02     | 107             | 412   |
|                           | 06/13/18     | 0.114  | 24   | 65.5 | 0.105 J | 6.72     | 93.8            | 447   |
|                           | 09/07/18     | 0.112  | 22.4 | 66.2 | 0.135 J | 6.73     | 96.8            | 489   |
| <b>Downgradient Wells</b> |              |        |      |      |         |          |                 |       |
| H-28                      | 09/21/17     | 6.06   | 74.1 | 88.5 | <0.100  | 6.77     | 702             | 1,220 |
|                           | 06/13/18     | 6.97   | 92.1 | 96.5 | 0.126 J | 6.59     | 826             | 1,490 |
|                           | 09/07/18     | 4.54   | 60.5 | 93.4 | <0.100  | 6.84     | 679             | 1,330 |
| H-29                      | 09/21/17     | 1.40   | 147  | 42   | 0.304   | 6.78     | 170             | 782   |
|                           | 06/13/18     | 5.89   | 81.1 | 84.1 | 0.123 J | 6.75     | 713             | 1,240 |
|                           | 09/07/18     | 3.21   | 46.7 | 78.6 | <0.100  | 6.77     | 544             | 1,030 |
| H-31                      | 09/21/17     | 23.8   | 260  | 227  | 0.308 J | 6.87     | 2,870           | 4,570 |
|                           | 06/12/18     | 16.6   | 246  | 205  | 0.646   | 6.61     | 2,390           | 4,100 |
|                           | 09/07/18     | 0.838  | 12.2 | 17.7 | <0.275  | 6.77     | 136             | 457   |
| H-32                      | 09/21/17     | 2.07   | 52.8 | 129  | 0.519   | 6.82     | 337             | 807   |
|                           | 06/12/18     | 1.82   | 52.6 | 126  | 1.02    | 6.75     | 339             | 793   |
|                           | 09/07/18     | 0.292  | 10.9 | 17.8 | 0.551   | 6.79     | 53.8            | 283   |

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 Ash Pond Area**

| 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 |
|---------------------------|--------------|---------|-----------|--------|----------|------------|-----------|-----------|---------|------------|--------|----------|--------|-----------|---------|--------|--------|---------------------|
| <b>Upgradient Wells</b>   |              |         |           |        |          |            |           |           |         |            |        |          |        |           |         |        |        |                     |
| H-26                      | 06/13/18     | <0.0008 | <0.002    | 0.0659 | 0.0016   | <0.0003    | 0.00213 J | 0.0261    | <0.100  | <0.0003    | 0.032  | <0.00008 | <0.002 | <0.002    | <0.0005 | <0.297 | 3.72   | 4.017               |
|                           | 09/07/18     | NA      | <0.002    | 0.0470 | 0.00155  | <0.0003    | 0.00319 J | 0.0247    | <0.100  | <0.0003    | 0.0489 | NA       | NA     | <0.002    | NA      | <0.473 | <0.665 | <1.138              |
| H-27                      | 06/13/18     | <0.0008 | <0.002    | 0.0237 | <0.0003  | <0.0003    | 0.00964   | <0.003    | 0.208 J | <0.0003    | 0.108  | <0.00008 | <0.002 | <0.002    | <0.0005 | 0.267  | <1.4   | 1.667               |
|                           | 09/07/18     | NA      | <0.002    | 0.0196 | <0.0003  | <0.0003    | 0.0453    | <0.003    | 0.140 J | <0.0003    | 0.306  | NA       | NA     | 0.00773   | NA      | <0.285 | 1.43   | 1.715               |
| H-33                      | 06/13/18     | <0.0008 | 0.00283 J | 0.0741 | 0.0004 J | <0.0003    | 0.0182    | 0.0266    | 0.105 J | 0.0009 J   | 0.183  | <0.00008 | <0.002 | <0.002    | <0.0005 | 0.795  | <0.712 | 1.507               |
|                           | 09/07/18     | NA      | 0.00239 J | 0.0757 | 0.0003 J | <0.0003    | 0.0105    | 0.0288    | 0.135 J | <0.0003    | 0.160  | NA       | NA     | <0.002    | NA      | 0.334  | <0.645 | 0.979               |
| <b>Downgradient Wells</b> |              |         |           |        |          |            |           |           |         |            |        |          |        |           |         |        |        |                     |
| H-28                      | 06/13/18     | <0.0008 | <0.002    | 0.0186 | 0.00393  | 0.0038     | <0.002    | 0.169     | 0.126 J | 0.000448 J | 0.18   | <0.00008 | <0.002 | <0.002    | <0.0005 | 0.327  | <1.56  | 1.887               |
|                           | 09/07/18     | NA      | <0.002    | 0.0192 | 0.00704  | 0.00115    | <0.002    | 0.162     | <0.100  | 0.00118 J  | 0.203  | NA       | NA     | 0.00281 J | NA      | <0.243 | 0.845  | 1.088               |
| H-29                      | 06/13/18     | <0.0008 | <0.002    | 0.0157 | 0.00345  | 0.00318    | <0.002    | 0.153     | 0.123 J | 0.000779 J | 0.153  | <0.00008 | <0.002 | <0.002    | <0.0005 | <0.274 | <1.62  | <1.894              |
|                           | 09/07/18     | NA      | <0.002    | 0.0374 | 0.00513  | 0.000938   | <0.002    | 0.119     | <0.100  | 0.00172    | 0.145  | NA       | NA     | 0.00374 J | NA      | <0.371 | <0.71  | <1.081              |
| H-31                      | 06/12/18     | <0.0008 | 0.00532   | 0.0194 | 0.00545  | <0.0003    | 0.003 J   | 0.236     | 0.646   | <0.0003    | 0.214  | <0.00008 | <0.002 | 0.00475 J | <0.0005 | <0.26  | <0.597 | <0.857              |
|                           | 09/07/18     | NA      | <0.002    | 0.0287 | <0.0003  | <0.0003    | <0.002    | 0.00353 J | 0.275 J | <0.0003    | 0.0187 | NA       | NA     | 0.00424 J | NA      | <0.261 | <0.567 | <0.828              |
| H-32                      | 06/12/18     | <0.0008 | <0.002    | 0.0175 | 0.00681  | 0.000586 J | <0.002    | 0.215     | 1.02    | 0.000701 J | 0.0957 | <0.00008 | <0.002 | <0.002    | <0.0005 | <0.275 | 0.917  | 1.192               |
|                           | 09/07/18     | NA      | <0.002    | 0.0404 | <0.0003  | <0.0003    | <0.002    | 0.00347 J | 0.551   | <0.0003    | 0.0195 | NA       | NA     | 0.0157    | NA      | 0.343  | 1.25   | 1.593               |

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.

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