REPORT

Annual Groundwater Report – 2019

Nebraska Public Power District – Sheldon Station

Submitted to:

Nebraska Public Power District

Sheldon Station, 4500 West Pella Road, Hallam, Nebraska 68368

Submitted by:

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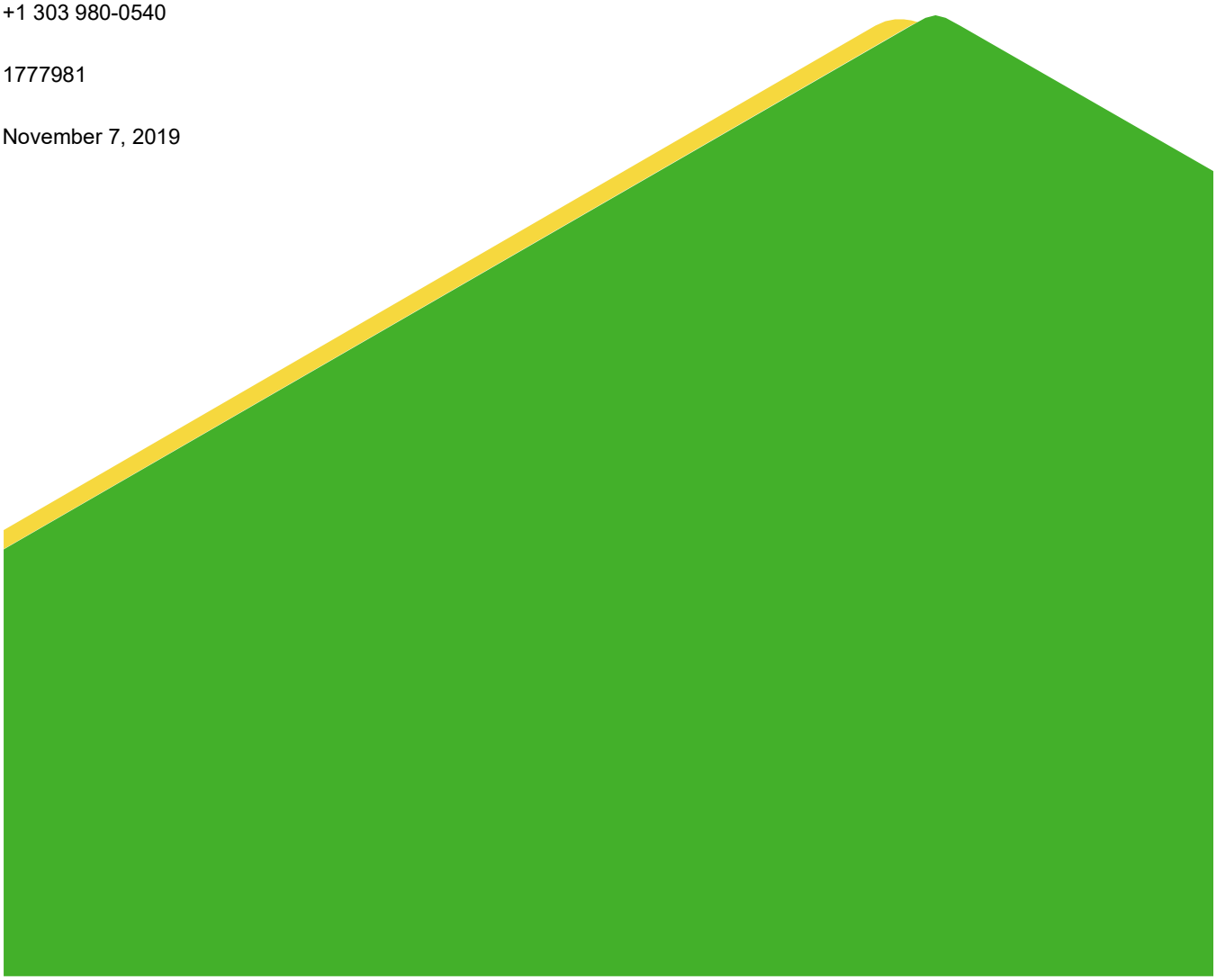

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1.0 REPORT SUMMARY

This report presents the results from groundwater monitoring events that occurred at Sheldon Station in 2019. The facility entered 2019 under a detection monitoring program and remains in detection monitoring based on the results of the 2019 sampling and analysis. No potential exceedances, false-positives, or verified statistically significant increases (SSIs) were identified based on the results of the Q1 2019 detection monitoring sampling event. No false-positives or verified SSIs were identified during the Q3 2019 sampling event. Two potential exceedances (field-measured pH at APMW-4 and APMW-5) were identified during the Q3 2019 sampling event. Verification re-sampling will occur during the Q1 2020 sampling event. No verified SSIs have been identified at Sheldon Station and therefore assessment monitoring, alternative source demonstrations, and assessment of corrective measures are not required.

As described in the Groundwater Monitoring System Certification (Golder 2017) and the Groundwater Monitoring Statistical Methods Certification (Golder 2017), the groundwater monitoring and analytical procedures meet the general requirements of the CCR rule, and modifications to the monitoring network and sampling program are not recommended at this time.

2.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this report describing the 2019 semi-annual groundwater sampling events and comparative statistical analysis for Nebraska Public Power District's (NPPD) Sheldon Station Ash Landfill No. 4 (AP4) in Hallam, Nebraska. This report was written to meet the requirements of the site's permitted sampling and analysis plan (SAP) and the Coal Combustion Residual (CCR) rule's sections on groundwater monitoring and corrective action, 40 CFR 257.90-98.

2.1 Facility Information

Sheldon Station is owned and operated by NPPD and is capable of generating 225 MW of power. The facility is located in southeastern Nebraska in Section 19, T7N; R6E; and is 18 miles south of Lincoln, in Lancaster County. The village of Hallam is the closest community to the site and is 1.5 miles south of the facility. NPPD constructed Sheldon Station in 1958, switching the facility entirely to low-sulfur coal from Wyoming's Powder River Basin in 1974. The active CCR landfill at the site contains fly ash and bottom ash.

2.2 Purpose

The Environmental Protection Agency's CCR rule established specific requirements for reporting of groundwater monitoring and corrective action in 40 CFR 257.90. Per part (e) of § 257.90, no later than January 31, 2018, and annually thereafter, owners or operators of CCR units must prepare an annual groundwater monitoring and corrective action report. The permitted SAP was developed to comply with CCR regulation. At the request of the Nebraska Department of Environmental Quality, reports are to be prepared on a semi-annual basis.

3.0 GROUNDWATER MONITORING NETWORK PROGRAM STATUS

The groundwater monitoring network for the active CCR landfill at Sheldon Station consists of seven monitoring wells, as shown on Figure 1. The two upgradient monitoring wells are MW-1 and MW-2. The five downgradient monitoring wells are MW-3, MW-4, MW-5, MW-6, and MW-7.

3.1 Completed Key Actions in 2019

The fourth and fifth detection monitoring sampling events was completed during the first and third quarters of 2019.

3.2 Installation and Decommissioning of Monitoring Wells

No monitoring wells were installed or decommissioned at Sheldon Station in 2019.

3.3 Problems and Resolutions

No problems were encountered in 2019.

3.4 Proposed Key Activities for 2020

The sixth and seventh detection monitoring events are planned to occur in 2020.

4.0 GROUNDWATER MONITORING ANALYTICAL PROGRAM STATUS

Analytical activities associated with the groundwater monitoring program are described below.

4.1 Samples Collected

Sheldon Station staff collected eight baseline samples on a quarterly basis between September 15, 2015 and May 16, 2017, at each of the two upgradient and five downgradient monitoring wells. Detection monitoring samples have been collected on a semi-annual basis beginning on September 19, 2017. This report outlines the results of the detection monitoring sampling events that occurred on March 20, 2019 and September 17, 2019. Specific dates for each sample are provided in Tables 1 through 7.

4.1.1 Groundwater Elevation and Flow Rate

Groundwater elevations were measured in each well during each sampling event prior to purging. Elevation measurements can be found in Table 8. Groundwater elevations and interpolated groundwater contours from the March 2019 (Q1 2019) and September 2019 (Q3 2019) detection monitoring sampling events are shown in Figures 1 and 2, respectively. Figure 3 shows groundwater elevations over time at the site.

The groundwater flow rate across Ash Pond 4 was estimated with the equation $V_s = k \times i/n_e$, where:

- V_s is the groundwater flow rate, in feet per day (ft/day);
- k is the hydraulic conductivity, estimated from slug testing results from system wells, in ft/day;
- i is the hydraulic gradient, calculated based on groundwater elevations for each monitoring event, in feet per feet (ft/ft);
- n_e is the effective porosity, estimated to be 0.2 for site soils.

The average groundwater flow rate for March 2019 was estimated at 8 x 10^{-4} ft/day. The average groundwater flow rate for September 2019 was estimated at 7 x 10^{-4} ft/day.

4.2 Monitoring Data (Analytical Results)

Analytical results for the CCR rule Appendix III detection monitoring results for the March 20 and September 17, 2019, monitoring events are shown in Tables 1 through 7.

4.3 Comparative Statistical Analysis

The comparative statistical analysis is summarized below, and the results are presented in Tables 9 through 15. A full description of the steps taken for the comparative statistical analysis can be found in the Groundwater Monitoring Statistical Methods Certification (Golder 2017).

4.3.1 Definitions

The following definitions are used in discussion of the comparative statistical analysis:

- SSI – is a statistically significant increase and is defined as an analytical result that exceeds the statistical limit established by the baseline statistical analysis, which has been verified by confirmation re-sampling and analysis.
- Elevated CUSUM – an elevated CUSUM occurs when the CUSUM is greater than the Shewhart-CUSUM limit established by the baseline statistical analysis, but the analytical result does not exceed the Shewhart-CUSUM limit. An elevated CUSUM is an indication that concentrations are gradually increasing and that analytical results may exceed the Shewhart-CUSUM limit in the future.
- Potential Exceedance – is defined as an initial elevated CUSUM or an analytical result that exceeds the Shewhart-CUSUM limit or non-parametric statistical limit established by the baseline statistical analysis. Confirmatory resampling will determine if the potential exceedance is a false-positive or a verified SSI. Non-detect results that exceed either the Shewhart-CUSUM limit or the non-parametric statistical limit are not considered potential exceedances.
- False-positive – is defined as an analytical result that exceeds the statistical limit that can clearly be attributed to laboratory error, changes in analytical precision, or is invalidated through confirmatory re-sampling. False-positives are not used in calculation of any subsequent CUSUMs.
- Confirmatory re-sampling – is designated as the next sampling event.
- Verified exceedance – is interpreted as two consecutive samples exceeding the statistical limit (the original sample and the confirmatory re-sample) for the same parameter at the same well.

4.3.2 Potential Exceedances

There were no potential exceedances identified for samples collected during the Q1 2019 detection monitoring event. During the Q3 2019 sampling event potential exceedances for field-measured pH have been identified at APMW-4 and APMW-5. In both cases the CUSUM has exceeded the upper statistical limit for field-measured pH. Verification re-sampling will occur during the next semi-annual sampling event.

4.3.3 False-Positives

There were no false-positives identified for samples collected during the Q1 and Q3 2019 detection monitoring events.

4.3.4 Verified Statistically Significant Increases

No verified SSIs were identified for samples collected during the Q1 and Q3 2019 detection monitoring events.

4.4 Program Transitions

Beginning in Q3 2017, the groundwater monitoring program at Sheldon Station transitioned from the baseline period to detection monitoring. During the baseline period, eight independent samples from each well within the program were collected and analyzed for the constituents listed in Appendix III and Appendix IV of the rule prior to October 17, 2017, as specified in 40 CFR 257.94(b).

4.4.1 Detection Monitoring

Samples for the detection monitoring program are collected on a semi-annual basis, beginning with the sample collected in September 2017. NPPD plans to continue to collect semi-annual samples under the detection monitoring program in 2020.

4.4.2 Assessment Monitoring

The current groundwater monitoring program at Sheldon Station is not in assessment monitoring. Assessment monitoring has not been triggered as described in 40 CFR 257.95. No alternative source demonstrations have been made. No actions are required.

4.4.3 Corrective Measures and Assessment

The current groundwater monitoring program at Sheldon Station does not indicate the need for corrective measures. An assessment of corrective measures, as described in 40 CFR 257.96, has not been required. No alternative source demonstrations have been made. No actions are required.

5.0 RECOMMENDATIONS AND CLOSING

This report presents the results from the CCR detection monitoring events that occurred on March 20, 2019 and September 17, 2019, along with associated comparative statistical analysis. No potential exceedances, false-positives, or verified SSIs were identified based on the results of the Q1 2019 detection monitoring sampling event. The Q3 2019 sampling event resulted in two potential exceedances (field-measured pH at APMW-4 and APMW-5). As described in the Groundwater Monitoring System Certification (Golder 2017) and the Groundwater Monitoring Statistical Methods Certification (Golder 2017), the groundwater monitoring and analytical procedures meet the general requirements of the CCR rule, and modifications to the monitoring network and sampling program are not recommended at this time.

6.0 REFERENCES

Golder Associates Inc. (Golder). 2017. Coal Combustion Residuals Landfill Groundwater Monitoring System Certification, October 11.

Golder Associates Inc. (Golder). 2017. Groundwater Monitoring Statistical Methods Certification, Sheldon Station Ash Landfill No. 4, October 11.

Golder Associates Inc. (Golder). 2017. Sampling and Analysis Plan, Sheldon Station Ash Landfill No. 4, October 11.

US Environmental Protection Agency (EPA). 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance*, Office of Resource Conservation and Recovery, EPA-R-09-007, March.

US Environmental Protection Agency (EPA). 2015. Code of Federal Regulations Title 40 Part 257: Hazardous and Solid Waste Management System; *Disposal of Coal Combustion Residuals from Electric Utilities*. April 17.

Signature Page

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Tables

Table 1. Data Summary Table - AP4-MW1

Analytes		9/15/2015	11/23/2015	3/15/2016	5/18/2016	8/9/2016	11/9/2016	3/7/2017	5/16/2017	9/19/2017	3/21/2018	9/11/2018	3/20/2019	9/17/2019
	Units	Background Collection								Detection Monitoring [1]				
Appendix III														
Boron, Total	mg/L	0.0784	< 0.150	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Calcium, Total	mg/L	89.8	90.4	95.1	103	93	88.3	103	92.3	91	99.6	82.4	94.2	93.7
Chloride	mg/L	22.5	7.05	5.57	6.43	6.24	11	5.37	7.48	7.47	6.52	5.61	6.15	1.18
Fluoride	mg/L	< 0.500	0.598	0.923	0.796	0.604	< 0.500	0.656	1.22	1.2	0.846	0.723	1.07	0.194
Field pH	pH units	6.95	6.94	7.46	7.26	7.19	7.19	7.32	7.19	7.17	7.36	7.23	7.59	7.6
Sulfate	mg/L	22.8	23.7	22.2	22.2	22.8	24.5	20.6	21.7	24.4	23.4	19.6	23.2	4.79
Total Dissolved Solids	mg/L	440	462	428	430	462	464	484	520	464	408	406	416	392
Appendix IV														
Antimony, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Arsenic, Total	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	---	---	---	---	---
Barium, Total	mg/L	0.23	0.258	0.221	0.199	0.193	0.209	0.269	0.231	---	---	---	---	---
Beryllium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Cadmium, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Chromium, Total	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	---	---	---	---	---
Cobalt, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Fluoride	mg/L	< 0.500	0.598	0.923	0.796	0.604	< 0.500	0.656	1.22	---	---	---	---	---
Lead, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Lithium, Total	mg/L	0.0508	0.0513	0.0504	0.0505	0.0506	0.0546	< 0.05	< 0.05	---	---	---	---	---
Mercury, Total	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	---	---	---	---	---
Molybdenum, Total	mg/L	0.00725	0.00823	0.00724	0.00647	0.00656	0.00655	0.00883	0.00739	---	---	---	---	---
Radium-226	pCi/L	0.257 ± 0.0866	0.293 ± 0.104	0.35 ± 0.097	0.314 ± 0.0878	0.417 ± 0.111	0.527 ± 0.33	0.208 ± 0.0918	0.373 ± 0.125	---	---	---	---	---
Radium-228	pCi/L	2.14 ± 0.411	2.68 ± 0.446	1.49 ± 0.319	1.19 ± 0.318	1.26 ± 0.383	2.09 ± 0.453	2.02 ± 0.392	1.88 ± 0.383	---	---	---	---	---
Radium-226 + Radium-228	pCi/L	2.397 ± 0.42	2.973 ± 0.458	1.84 ± 0.333	1.51 ± 0.33	1.67 ± 0.399	2.62 ± 0.561	2.22 ± 0.403	2.25 ± 0.403	---	---	---	---	---
Selenium, Total	mg/L	0.00901	0.0123	0.0101	0.00873	0.00826	0.00816	0.0114	0.00999	---	---	---	---	---
Thallium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---

Legend:
---. Not analyzed
mg/L, milligrams per liter
pCi/L, picocuries per liter
U, Result is less than the sample detection limit (varies by sample for radiological results).

NOTES:
1. As indicated by the CCR rule (40 CFR 257.94), the Detection Monitoring Program monitors all constituents found in Appendix III.

Table 2. Data Summary Table - AP4-MW2

Analytes	Units	9/15/2015	11/23/2015	3/15/2016	5/18/2016	8/9/2016	11/9/2016	3/7/2017	5/16/2017	9/19/2017	3/21/2018	9/11/2018	3/20/2019	9/17/2019
		Background Collection								Detection Monitoring [1]				
Appendix III														
Boron, Total	mg/L	0.0831	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Calcium, Total	mg/L	335	321	294	320	289	286	342	278	293	331	263	297	291
Chloride	mg/L	89.9	93.3	83.6	94.2	92.7	92.5	87	88.6	88.6	94.3	92	87.6	88.8
Fluoride	mg/L	< 0.500	3.1	0.596	0.666	0.558	< 0.500	< 0.500	0.935	0.677	0.687	< 0.500	0.612	0.702
Field pH	pH units	6.98	6.99	7.37	7.2	7.16	7.13	7.25	7.18	7.16	7.26	7.19	7.44	7.6
Sulfate	mg/L	884	888	797	804	901	842	774	797	894	879 E	827	923	855
Total Dissolved Solids	mg/L	1720	1840	1700	1830	1900	1790	2360	1780	2210	1650	1680	1730	1570
Appendix IV														
Antimony, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Arsenic, Total	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	---	---	---	---	---
Barium, Total	mg/L	0.0115	0.0117	0.0107	0.0102	0.00996	0.012	0.0138	0.0103	---	---	---	---	---
Beryllium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Cadmium, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Chromium, Total	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	---	---	---	---	---
Cobalt, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Fluoride	mg/L	< 0.500	3.1	0.596	0.666	0.558	< 0.500	< 0.500	0.935	---	---	---	---	---
Lead, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Lithium, Total	mg/L	0.0811	0.0754	0.0699	0.0681	0.0523	0.0705	0.0661	0.0694	---	---	---	---	---
Mercury, Total	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	---	---	---	---	---
Molybdenum, Total	mg/L	0.00543	0.00555	0.00526	0.00533	0.00519	0.00494	0.00627	0.00491	---	---	---	---	---
Radium-226	pCi/L	0.258 ± 0.0937	0.241 ± 0.0886	0.28 ± 0.0846	0.312 ± 0.0834	0.334 ± 0.097	0.778 ± 0.403	0.25 ± 0.103	0.188 ± 0.0925	---	---	---	---	---
Radium-228	pCi/L	2.02 ± 0.457	2.53 ± 0.497	2.07 ± 0.384	2.2 ± 0.449	2.41 ± 0.467	2.49 ± 0.485	2.01 ± 0.41	2.01 ± 0.405	---	---	---	---	---
Radium-226 + Radium-228	pCi/L	2.278 ± 0.467	2.771 ± 0.505	2.35 ± 0.394	2.51 ± 0.456	2.74 ± 0.477	3.27 ± 0.631	2.26 ± 0.423	2.2 ± 0.415	---	---	---	---	---
Selenium, Total	mg/L	0.714	0.697	0.634	0.706	0.628	0.628	0.779	0.657	---	---	---	---	---
Thallium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---

Legend:
---. Not analyzed
mg/L, milligrams per liter
pCi/L, picocuries per liter
U, Result is less than the sample detection limit (varies by sample for radiological results).
E, Result exceeded calibration range.

NOTES:
1. As indicated by the CCR rule (40 CFR 257.94), the Detection Monitoring Program monitors all constituents found in Appendix III.

Table 3. Data Summary Table - AP4-MW3

Analytes		9/15/2015	11/23/2015	3/15/2016	5/18/2016	8/9/2016	11/9/2016	3/7/2017	5/16/2017	9/19/2017	3/21/2018	9/11/2018	3/20/2019	9/17/2019
	Units	Background Collection								Detection Monitoring [1]				
Appendix III														
Boron, Total	mg/L	0.0687	< 0.150	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Calcium, Total	mg/L	82.4	85.9	89.8	88.5	87.5	85	95.8	86.1	83.7	92.3	74.7	88.5	87.8
Chloride	mg/L	12.4	< 5.00	< 5.00	< 5.00	6.94	5.4	< 5.00	5.18	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	mg/L	< 0.500	0.975	1.08	1.1	0.513	0.884	1.04	1.82	1.2	1.29	1.05	1.29	1.24
Field pH	pH units	7.15	7.21	7.60	7.38	7.30	7.34	7.39	7.40	7.28	7.48	7.43	7.69	7.6
Sulfate	mg/L	33.2	24.4	25.2	34.6	31.2	29	20.6	21.7	33.2	30.7	20	35	32.3
Total Dissolved Solids	mg/L	418	460	390	420	488	430	428	442	494	404	374	426	378
Appendix IV														
Antimony, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Arsenic, Total	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	---	---	---	---	---
Barium, Total	mg/L	0.218	0.235	0.225	0.222	0.206	0.232	0.271	0.238	---	---	---	---	---
Beryllium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Cadmium, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Chromium, Total	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	---	---	---	---	---
Cobalt, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Fluoride	mg/L	< 0.500	0.975	1.08	1.1	0.513	0.884	1.04	1.82	---	---	---	---	---
Lead, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Lithium, Total	mg/L	0.0502	< 0.0500	0.0519	< 0.05	< 0.05	0.0538	0.0520	0.0547	---	---	---	---	---
Mercury, Total	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	---	---	---	---	---
Molybdenum, Total	mg/L	0.00922	0.0101	0.00992	0.00873	0.00928	0.00978	0.0116	0.00983	---	---	---	---	---
Radium-226	pCi/L	0.401 ± 0.101	0.389 ± 0.106	0.384 ± 0.103	0.501 ± 0.104	0.4 ± 0.102	0.426 ± 0.292	0.318 ± 0.108	0.188 ± 0.0889	---	---	---	---	---
Radium-228	pCi/L	3.69 ± 0.576	2.87 ± 0.491	2.91 ± 0.463	3.42 ± 0.547	2.65 ± 0.477	3.19 ± 0.561	2.35 ± 0.432	2.26 ± 0.422	---	---	---	---	---
Radium-226 + Radium-228	pCi/L	4.091 ± 0.474	3.259 ± 0.502	3.3 ± 0.474	3.92 ± 0.557	3.04 ± 0.487	3.62 ± 0.632	2.67 ± 0.445	2.45 ± 0.431	---	---	---	---	---
Selenium, Total	mg/L	0.0138	0.0164	0.0165	0.0145	0.0152	0.0154	0.0201	0.0191	---	---	---	---	---
Thallium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---

Legend:
---. Not analyzed
mg/L, milligrams per liter
pCi/L, picocuries per liter
U, Result is less than the sample detection limit (varies by sample for radiological results).

NOTES:
1. As indicated by the CCR rule (40 CFR 257.94), the Detection Monitoring Program monitors all constituents found in Appendix III.

Table 4. Data Summary Table - AP4-MW4

Analytes	Units	9/15/2015	11/23/2015	3/15/2016	5/18/2016	8/9/2016	11/9/2016	3/7/2017	5/16/2017	9/19/2017	3/21/2018	9/11/2018	3/20/2019	9/17/2019
		Background Collection								Detection Monitoring [1]				
Appendix III														
Boron, Total	mg/L	0.0674	< 0.150	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Calcium, Total	mg/L	128	123	103	115	111	105	132	95.4	108	109	97.1	100	112
Chloride	mg/L	13	8.99	< 5.00	6.71	8.55	7.77	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Fluoride	mg/L	< 0.500	0.987	0.946	0.949	< 0.500	0.732	0.786	1.33	1.18	1.2	0.796	1.17	1.12
Field pH	pH units	7.02	7.17	7.40	7.25	7.15	7.22	7.23	7.31	7.23	7.32	7.29	7.60	7.75
Sulfate	mg/L	82.8	127	62.6	89.5	99.6	110	123	59.4	53.5	100	81.9	85.7	109
Total Dissolved Solids	mg/L	506	590	476	518	582	556	576	666	498	530	466	486	490
Appendix IV														
Antimony, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Arsenic, Total	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	---	---	---	---	---
Barium, Total	mg/L	0.151	0.14	0.168	0.128	0.131	0.177	0.123	0.158	---	---	---	---	---
Beryllium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Cadmium, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Chromium, Total	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	---	---	---	---	---
Cobalt, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Fluoride	mg/L	< 0.500	0.987	0.946	0.949	< 0.500	0.732	0.786	1.33	---	---	---	---	---
Lead, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Lithium, Total	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	---	---	---	---	---
Mercury, Total	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	---	---	---	---	---
Molybdenum, Total	mg/L	0.00509	0.0054	0.00493	0.00443	0.00481	0.00466	0.00642	0.00483	---	---	---	---	---
Radium-226	pCi/L	0.45 ± 0.107	0.451 ± 0.124	0.362 ± 0.104	0.471 ± 0.0996	0.36 ± 0.0976	< 0.481 U ± 0.277	0.327 ± 0.112	0.185 ± 0.0900	---	---	---	---	---
Radium-228	pCi/L	2.78 ± 0.489	1.59 ± 0.370	1.86 ± 0.360	2.62 ± 0.468	2.05 ± 0.452	1.39 ± 0.384	1.93 ± 0.397	1.9 ± 0.388	---	---	---	---	---
Radium-226 + Radium-228	pCi/L	3.23 ± 0.501	2.041 ± 0.390	2.23 ± 0.375	3.09 ± 0.478	2.41 ± 0.462	1.56 ± 0.474	2.25 ± 0.413	2.08 ± 0.399	---	---	---	---	---
Selenium, Total	mg/L	0.0259	0.0137	0.0181	0.0132	0.0198	0.0119	0.0104	0.013	---	---	---	---	---
Thallium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---

Legend:
---. Not analyzed
mg/L, milligrams per liter
pCi/L, picocuries per liter
U, Result is less than the sample detection limit (varies by sample for radiological results).

NOTES:
1. As indicated by the CCR rule (40 CFR 257.94), the Detection Monitoring Program monitors all constituents found in Appendix III.

Table 5. Data Summary Table - AP4-MW5

Analytes		9/15/2015	11/23/2015	3/15/2016	5/18/2016	8/9/2016	11/9/2016	3/7/2017	5/16/2017	9/19/2017	3/21/2018	9/11/2018	3/20/2019	9/17/2019
	Units	Background Collection								Detection Monitoring [1]				
Appendix III														
Boron, Total	mg/L	0.0934	< 0.150	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Calcium, Total	mg/L	358	520	439	460	523	517	608	310	488	537	146	541	504
Chloride	mg/L	8.98	8.99	5.77	6.97	7.98	10	5.69	6.76	< 5.00	6.59	< 5.00	5.1	5.43
Fluoride	mg/L	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	1.27	0.658	0.601	< 0.500	0.664	0.610
Field pH	pH units	6.75	7.05	7.08	6.89	6.81	6.82	6.90	6.90	6.82	6.97	7.27	7.23	7.26
Sulfate	mg/L	1420	1480	969	1410	1620	1570	1350	740	784	1630	468	1470	1370
Total Dissolved Solids	mg/L	2540	2740	1950	2620	2860	2920	3010	1490	1710	2690	1020	2390	2210
Appendix IV														
Antimony, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Arsenic, Total	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	---	---	---	---	---
Barium, Total	mg/L	0.017	0.00903	0.0117	0.00926	0.00843	0.00795	0.00756	0.0124	---	---	---	---	---
Beryllium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Cadmium, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Chromium, Total	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	---	---	---	---	---
Cobalt, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Fluoride	mg/L	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	1.27	---	---	---	---	---
Lead, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Lithium, Total	mg/L	0.0948	0.1330	0.1210	0.1280	0.1480	0.1680	0.1660	0.1080	---	---	---	---	---
Mercury, Total	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	---	---	---	---	---
Molybdenum, Total	mg/L	0.00444	0.00329	0.0035	0.00274	0.00263	0.00284	0.00373	0.00344	---	---	---	---	---
Radium-226	pCi/L	0.167 ± 0.0816	0.156 ± 0.103	0.267 ± 0.084	0.176 ± 0.0734	0.217 ± 0.0891	< 0.397 U ± 0.253	0.105 ± 0.068	< 0.109 U ± 0.058	---	---	---	---	---
Radium-228	pCi/L	2.08 ± 0.432	< 0.471 U ± 0.297	2 ± 0.392	1.02 ± 0.317	1.36 ± 0.373	0.972 ± 0.383	0.934 ± 0.294	< 0.361 U ± 0.234	---	---	---	---	---
Radium-226 + Radium-228	pCi/L	2.247 ± 0.44	0.505 ± 0.314	2.27 ± 0.40	1.19 ± 0.325	1.57 ± 0.384	1.21 ± 0.459	1.04 ± 0.302	< 0.361 U ± 0.241	---	---	---	---	---
Selenium, Total	mg/L	0.0563	< 0.00500	0.0286	0.0236	0.00561	< 0.00500	< 0.00500	0.0562	---	---	---	---	---
Thallium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---

Legend:
---. Not analyzed
mg/L, milligrams per liter
pCi/L, picocuries per liter
U, Result is less than the sample detection limit (varies by sample for radiological results).

NOTES:
1. As indicated by the CCR rule (40 CFR 257.94), the Detection Monitoring Program monitors all constituents found in Appendix III.

Table 6. Data Summary Table - AP4-MW6

Analytes		9/15/2015	11/23/2015	3/15/2016	5/18/2016	8/9/2016	11/9/2016	3/7/2017	5/16/2017	9/19/2017	3/21/2018	9/11/2018	3/20/2019	9/17/2019
	Units	Background Collection								Detection Monitoring [1]				
Appendix III														
Boron, Total	mg/L	0.0862	< 0.150	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Calcium, Total	mg/L	103	105	101	104	106	101	118	94.1	106	106	92.7	90.6	101
Chloride	mg/L	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	5.28	< 5.00	< 5.00	< 5.00
Fluoride	mg/L	0.87	0.85	1.37	1.61	1.21	1.45	1.35	1.62	1.62	2.19	1.31	1.5	1.46
Field pH	pH units	6.92	7.21	7.46	7.19	7.11	7.21	7.35	7.33	7.16	7.40	7.32	7.63	7.22
Sulfate	mg/L	58.5	96.6	51.3	50.7	70.6	69.1	59.3	53.4	50	60.5	46.7	57.7	65.2
Total Dissolved Solids	mg/L	468	506	506	436	514	530	584	550	498	432	396	440	458
Appendix IV														
Antimony, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Arsenic, Total	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	---	---	---	---	---
Barium, Total	mg/L	0.0725	0.0611	0.0622	0.0589	0.0605	0.0629	0.0672	0.0568	---	---	---	---	---
Beryllium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Cadmium, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Chromium, Total	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	---	---	---	---	---
Cobalt, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Fluoride	mg/L	0.869	0.845	1.37	1.61	1.21	1.45	1.35	1.62	---	---	---	---	---
Lead, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Lithium, Total	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	---	---	---	---	---
Mercury, Total	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	---	---	---	---	---
Molybdenum, Total	mg/L	0.00329	0.0039	0.00393	0.00344	0.00281	0.00397	0.00455	0.00411	---	---	---	---	---
Radium-226	pCi/L	0.287 ± 0.0872	0.232 ± 0.0917	0.227 ± 0.0771	0.261 ± 0.073	0.361 ± 0.113	0.545 ± 0.358	0.163 ± 0.0907	0.17 ± 0.0861	---	---	---	---	---
Radium-228	pCi/L	0.983 ± 0.307	0.766 ± 0.31	0.672 ± 0.243	0.699 ± 0.279	1.27 ± 0.439	0.735 ± 0.378	0.451 ± 0.245	0.752 ± 0.244	---	---	---	---	---
Radium-226 + Radium-228	pCi/L	1.27 ± 0.319	0.998 ± 0.323	0.899 ± 0.254	0.961 ± 0.288	1.63 ± 0.454	1.28 ± 0.521	0.614 ± 0.261	0.921 ± 0.259	---	---	---	---	---
Selenium, Total	mg/L	0.0103	0.00883	0.0109	0.00974	0.00984	0.0098	0.0112	0.0104	---	---	---	---	---
Thallium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---

Legend:
---. Not analyzed
mg/L, milligrams per liter
pCi/L, picocuries per liter
U, Result is less than the sample detection limit (varies by sample for radiological results).

NOTES:
1. As indicated by the CCR rule (40 CFR 257.94), the Detection Monitoring Program monitors all constituents found in Appendix III.

Table 7. Data Summary Table - AP4-MW7

Analytes		9/15/2015	11/23/2015	3/15/2016	5/18/2016	8/9/2016	11/9/2016	3/7/2017	5/16/2017	9/19/2017	3/21/2018	9/11/2018	3/20/2019	9/17/2019
	Units	Background Collection								Detection Monitoring [1]				
Appendix III														
Boron, Total	mg/L	0.0758	< 0.150	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Calcium, Total	mg/L	67.7	68.7	72	66.2	69.4	66.9	79	67.6	67.5	64.3	65.5	66.4	69.4
Chloride	mg/L	16.1	11.8	11.4	11.2	13	11.7	10.6	12.9	13.3	12.5	12.1	12.9	11.3
Fluoride	mg/L	< 0.500	< 0.500	0.738	< 0.500	< 0.500	< 0.500	< 0.500	1.02	< 0.500	0.52	< 0.500	< 0.500	0.589
Field pH	pH units	7.20	7.45	7.65	7.39	7.40	7.48	7.57	7.52	7.46	7.56	7.54	7.94	7.15
Sulfate	mg/L	46	39.8	40.4	43.3	40.7	45.6	36.8	35.2	42.7	41.6	34.5	44.2	51.1
Total Dissolved Solids	mg/L	546	548	516	558	588	616	534	538	598	476	480	536	504
Appendix IV														
Antimony, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Arsenic, Total	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	---	---	---	---	---
Barium, Total	mg/L	0.165	0.161	0.154	0.137	0.146	0.159	0.177	0.159	---	---	---	---	---
Beryllium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---
Cadmium, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Chromium, Total	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	---	---	---	---	---
Cobalt, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Fluoride	mg/L	< 0.500	< 0.500	0.738	< 0.500	< 0.500	< 0.500	< 0.500	1.02	---	---	---	---	---
Lead, Total	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	---	---	---	---	---
Lithium, Total	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	---	---	---	---	---
Mercury, Total	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	---	---	---	---	---
Molybdenum, Total	mg/L	0.00841	0.00827	0.00823	0.0069	0.00785	0.00788	0.00955	0.00768	---	---	---	---	---
Radium-226	pCi/L	0.189 ± 0.0807	0.206 ± 0.865	0.277 ± 0.0928	0.25 ± 0.0781	0.29 ± 0.0907	< 0.404 U ± 0.271	0.357 ± 0.112	0.227 ± 0.092	---	---	---	---	---
Radium-228	pCi/L	1.2 ± 0.313	1.92 ± 0.396	1.58 ± 0.322	1.52 ± 0.342	1.60 ± 0.415	2.52 ± 0.481	1.91 ± 0.372	1.67 ± 0.358	---	---	---	---	---
Radium-226 + Radium-228	pCi/L	1.389 ± 0.323	2.126 ± 0.405	1.86 ± 0.335	1.77 ± 0.350	1.89 ± 0.425	2.83 ± 0.552	2.27 ± 0.389	1.89 ± 0.369	---	---	---	---	---
Selenium, Total	mg/L	0.00812	0.00846	0.00898	0.00834	0.00926	0.00764	0.00995	0.0103	---	---	---	---	---
Thallium, Total	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	---	---	---	---

Legend:
---. Not analyzed
mg/L, milligrams per liter
pCi/L, picocuries per liter
U, Result is less than the sample detection limit (varies by sample for radiological results).

NOTES:
1. As indicated by the CCR rule (40 CFR 257.94), the Detection Monitoring Program monitors all constituents found in Appendix III.

Table 8 - Sheldon Station Ash Landfill No. 4 Groundwater Levels (ft amsl)

Sample Period	Upgradient Wells		Downgradient Wells				
	AP4MW-1	AP4MW-2	AP4MW-3	AP4MW-4	AP4MW-5	AP4MW-6	AP4MW-7
MP Elev.	**1425.95**	**1445.03**	**1411.72**	**1396.10**	**1403.10**	**1386.61**	**1424.29**
QTR-2002-4	1410.90	1422.78	1392.14	1375.99	1385.78	1374.15	1401.53
QTR-2003-1	1409.36	1421.35	1390.20	1374.01	1383.07	1374.06	1399.28
QTR-2003-2	1412.99	1421.11	1396.11	1376.52	1387.68	1376.90	1398.78
QTR-2003-3	1411.22	1421.87	1390.91	1372.66	1382.35	1369.46	1401.34
QTR-2003-4	1410.02	1422.24	1390.31	1373.48	1382.30	1369.10	1401.38
QTR-2004-1	1411.81	1420.78	1393.01	1377.92	1384.12	1377.59	1398.98
QTR-2004-2	1412.04	1420.72	1394.77	1375.64	1383.75	1374.83	1400.70
QTR-2004-3	1411.24	1421.22	1393.89	1375.55	1384.18	1373.85	1408.14
QTR-2004-4	1409.40	1421.39	1391.65	1373.40	1381.88	1374.65	1407.23
QTR-2005-1	1409.32	1420.12	1390.66	1372.78	1381.29	1374.62	1401.20
QTR-2005-2	1410.36	1419.77	1388.86	1372.63	1381.27	1374.55	1399.82
QTR-2005-3	1425.95	1445.03	1411.72	1396.10	1403.10	1386.61	1424.29
QTR-2005-4	1407.83	1419.58	1387.67	1372.52	1380.80	1369.44	1399.32
QTR-2006-1	1406.35	1418.91	1387.02	1372.42	1380.15	1371.76	1397.99
QTR-2006-2	1408.37	1418.43	1387.52	1372.42	1383.05	1372.36	1397.48
QTR-2006-3	1403.26	1417.13	1386.38	1372.30	1379.83	1370.22	1399.99
QTR-2006-4	1404.91	1419.42	1386.32	1372.25	1380.51	1369.90	1399.89
QTR-2007-1	1407.21	1417.13	1390.63	1372.89	1382.85	1374.67	1397.74
QTR-2007-3	1409.61	1417.42	1391.60	1373.85	1382.19	1370.84	1409.74
QTR-2008-2	1415.33	1417.33	1406.98	1385.69	1395.04	1379.15	1414.16
QTR-2008-3	1412.64	1418.64	1393.61	1376.05	1385.14	1373.43	1413.10
QTR-2009-2	1409.86	1417.98	1390.72	1374.15	1381.58	1374.49	1403.78
QTR-2009-3	1408.87	1417.88	1389.01	1372.47	1380.60	1370.31	1407.03
QTR-2010-2	1413.98	1418.11	1405.12	1381.85	1390.80	1375.51	1414.59
QTR-2010-3	1411.22	1419.23	1392.72	1374.81	1383.50	1374.39	1413.39
QTR-2011-2	1409.32	1418.12	1389.92	1374.80	1382.48	1374.55	1403.83
QTR-2011-3	1411.24	1418.58	1391.87	1373.60	1382.88	1373.56	1411.18
QTR-2012-2	1412.85	1418.13	1399.77	1377.74	1388.74	1375.41	1413.29
QTR-2012-3	1408.70	1418.58	1390.03	1372.72	1381.35	1369.47	1410.77
QTR-2013-2	1411.47	1416.93	1391.01	1375.34	1388.23	1375.31	1402.57
QTR-2013-4	1410.46	1417.32	1391.21	1373.05	1382.79	1370.11	1407.27
QTR-2014-2	1407.80	1416.98	1387.42	1372.03	1383.19	1374.23	1400.05
QTR-2014-4	1407.74	1417.08	1387.30	1372.10	1381.27	1371.75	1404.99
QTR-2015-2	1412.00	1415.13	1405.17	1379.63	1394.50	1375.75	1409.78
QTR-2015-3	1412.05	1418.38	1393.87	1376.77	1386.49	1371.86	1412.67
QTR-2015-4	1410.50	1418.89	1391.46	1374.49	1383.76	1372.41	1408.79
QTR-2016-1	1412.60	1420.38	1394.97	1377.65	1387.59	1374.66	1405.38
QTR-2016-2	1414.94	1418.83	1406.92	1384.72	1395.85	1376.79	1410.62
QTR-2016-3	1412.06	1419.51	1393.22	1375.65	1386.20	1373.11	1414.29
QTR-2016-4	1410.10	1419.93	1390.81	1373.60	1382.98	1372.41	1408.39
QTR-2017-1	1408.24	1419.54	1389.29	1372.83	1381.40	1373.83	1403.49
QTR-2017-2	1410.15	1419.00	1389.52	1373.35	1386.96	1373.96	1402.41
QTR-2017-3	1410.40	1419.35	1392.04	1372.70	1383.00	1372.12	1409.31
QTR-2018-1	1408.01	1418.76	1389.65	1372.37	1381.38	1374.21	1402.92
QTR-2018-3	1410.46	1417.88	1397.84	1375.90	1389.87	1374.85	1410.27
QTR-2019-1	1413.80	1418.53	1400.72	1383.19	1391.10	1377.89	1411.27
QTR-2019-3	1412.07	1422.34	1399.14	1377.58	1390.40	1374.46	1415.12
Mean	1410.66	1419.65	1393.25	1375.58	1385.09	1373.82	1406.16
SD	3.31	4.13	5.91	4.50	4.85	3.04	6.11
Maximum	1425.95	1445.03	1411.72	1396.10	1403.10	1386.61	1424.29
Minimum	1403.26	1415.13	1386.32	1372.03	1379.83	1369.10	1397.48
Range	22.69	29.90	25.40	24.07	23.27	17.51	26.81
	Hydraulic Gradient		0.03				

MP = Measuring Point
MSL = Mean Sea Level (measured to nearest 0.01')

Table 9: Comparative Statistics - AP4-MW1

		Statistical Method	Statistical Limit	Q1 2019 Detection Monitoring Result	Q1 2019 CUSUM Value	Q1 2019 - Within Limit?	Q3 2019 Detection Monitoring Result	Q3 2019 CUSUM Value	Q3 2019 - Within Limit?
Appendix III Analytes	**Unit**			3/20/2019			9/17/2019		
Boron, Total	mg/L	NPPL	0.200	< 0.200	---	Yes	< 0.200	---	Yes
Calcium, Total	mg/L	CUSUM	120.1	94.2	94.36	Yes	93.7	94.36	Yes
Chloride	mg/L	NPPL	22.50	6.15	---	Yes	1.18	---	Yes
Fluoride	mg/L	CUSUM	1.835	1.07	0.8233	Yes	0.194	0.725	Yes
pH, Field	pH units	CUSUM	6.40, 7.98	7.59	7.19, 7.42	Yes	7.6	7.19, 7.65	Yes
Sulfate	mg/L	CUSUM	28.0	23.2	22.56	Yes	4.79	22.56	Yes
Total Dissolved Solids	mg/L	CUSUM	599	416	461	Yes	392	461	Yes

Notes:

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 10: Comparative Statistics - AP4-MW2

		Statistical Method	Statistical Limit	Q1 2019 Detection Monitoring Result	Q1 2019 CUSUM Value	Q1 2019 - Within Limit?	Q3 2019 Detection Monitoring Result	Q3 2019 CUSUM Value	Q3 2019 - Within Limit?
Appendix III Analytes	**Unit**			3/20/2019			9/17/2019		
Boron, Total	mg/L	NP-PL	0.500	< 0.200	---	Yes	< 0.200	---	Yes
Calcium, Total	mg/L	CUSUM	418	297	308	Yes	291	308	Yes
Chloride	mg/L	CUSUM	106.7	87.6	90.2	Yes	88.8	90.2	Yes
Fluoride	mg/L	NP-PL	3.100	0.612	---	Yes	0.702	---	Yes
pH, Field	pH units	CUSUM	6.57, 7.74	7.44	7.16, 7.31	Yes	7.6	7.16, 7.63	Yes
Sulfate	mg/L	CUSUM	1059	923	874	Yes	855	843	Yes
Total Dissolved Solids	mg/L	NP-PL	2360	1730	---	Yes	1570	---	Yes

Notes:

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

E = Results exceeded calibration range

Table 11: Comparative Statistics - AP4-MW3

		Statistical Method	Statistical Limit	Q1 2019 Detection Monitoring Result	Q1 2019 CUSUM Value	Q1 2019 - Within Limit?	Q3 2019 Detection Monitoring Result	Q3 2019 CUSUM Value	Q3 2019 - Within Limit?
Appendix III Analytes	**Unit**			3/20/2019			9/17/2019		
Boron, Total	mg/L	NP-PL	0.200	< 0.200	---	Yes	< 0.200	---	Yes
Calcium, Total	mg/L	CUSUM	105.6	88.5	87.6	Yes	87.8	87.6	Yes
Chloride	mg/L	NP-PL	12.40	< 5.00	---	Yes	< 5.00	---	Yes
Fluoride	mg/L	CUSUM	2.85	1.29	0.99	Yes	1.24	0.99	Yes
pH, Field	pH units	CUSUM	6.73, 7.96	7.69	7.35, 7.55	Yes	7.6	7.35, 7.67	Yes
Sulfate	mg/L	CUSUM	51.2	35.0	29.7	Yes	32.3	29.3	Yes
Total Dissolved Solids	mg/L	CUSUM	567	426	435	Yes	378	435	Yes

Notes:

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 12: Comparative Statistics - AP4-MW4

		Statistical Method	Statistical Limit	Q1 2019 Detection Monitoring Result	Q1 2019 CUSUM Value	Q1 2019 - Within Limit?	Q3 2019 Detection Monitoring Result	Q3 2019 CUSUM Value	Q3 2019 - Within Limit?
Appendix III Analytes	**Unit**			3/20/2019			9/17/2019		
Boron, Total	mg/L	NP-PL	0.200	< 0.200	---	Yes	< 0.200	---	Yes
Calcium, Total	mg/L	CUSUM	172.0	100	114.1	Yes	112	114.1	Yes
Chloride	mg/L	NP-PL	13.00	< 5.00	---	Yes	< 5.00	---	Yes
Fluoride	mg/L	CUSUM	2.080	1.170	0.895	Yes	1.12	0.898	Yes
pH, Field	pH units	CUSUM	6.71, 7.73	7.6	7.22, 7.49	Yes	7.75	7.22, 7.91	No
Sulfate	mg/L	CUSUM	208.9	85.7	94.2	Yes	109	94.2	Yes
Total Dissolved Solids	mg/L	CUSUM	825.6	486.0	558.8	Yes	490	558.8	Yes

Notes:

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 13: Comparative Statistics - AP4-MW5

		Statistical Method	Statistical Limit	Q1 2019 Detection Monitoring Result	Q1 2019 CUSUM Value	Q1 2019 - Within Limit?	Q3 2019 Detection Monitoring Result	Q3 2019 CUSUM Value	Q3 2019 - Within Limit?
Appendix III Analytes	**Unit**			3/20/2019			9/17/2019		
Boron, Total	mg/L	NP-PL	0.200	< 0.200	---	Yes	< 0.200	---	Yes
Calcium, Total	mg/L	CUSUM	903	541	467	Yes	504	467	Yes
Chloride	mg/L	CUSUM	14.82	5.1	7.64	Yes	5.43	7.64	Yes
Fluoride	mg/L	NP-PL	1.270	0.664	---	Yes	0.610	---	Yes
pH, Field	pH units	CUSUM	6.38, 7.42	7.23	6.90, 7.37	Yes	7.26	6.90, 7.62	No
Sulfate	mg/L	CUSUM	2698	1470	1320	Yes	1370	1320	Yes
Total Dissolved Solids	mg/L	CUSUM	4898	2390	2516	Yes	2210	2516	Yes

Notes:

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 14: Comparative Statistics - AP4-MW6

		Statistical Method	Statistical Limit	Q1 2019 Detection Monitoring Result	Q1 2019 CUSUM Value	Q1 2019 - Within Limit?	Q3 2019 Detection Monitoring Result	Q3 2019 CUSUM Value	Q3 2019 - Within Limit?
Appendix III Analytes	**Unit**			3/20/2019			9/17/2019		
Boron, Total	mg/L	NP-PL	0.200	< 0.200	---	Yes	< 0.200	---	Yes
Calcium, Total	mg/L	CUSUM	134.3	90.6	104.0	Yes	101	104	Yes
Chloride	mg/L	NP-PL	5.00	< 5.00	---	Yes	< 5.00	---	Yes
Fluoride	mg/L	CUSUM	2.64	1.5	1.55	Yes	1.46	1.42	Yes
pH, Field	pH units	CUSUM	6.48, 7.96	7.63	7.22, 7.47	Yes	7.22	7.22, 7.30	Yes
Sulfate	mg/L	CUSUM	132.4	57.7	63.7	Yes	65.2	63.7	Yes
Total Dissolved Solids	mg/L	CUSUM	718	440	512	Yes	458	512	Yes

Notes:

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 15: Comparative Statistics - AP4-MW7

		Statistical Method	Statistical Limit	Q1 2019 Detection Monitoring Result	Q1 2019 CUSUM Value	Q1 2019 - Within Limit?	Q3 2019 Detection Monitoring Result	Q3 2019 CUSUM Value	Q3 2019 - Within Limit?
Appendix III Analytes	**Unit**			3/20/2019			9/17/2019		
Boron, Total	mg/L	NP-PL	0.200	< 0.200	---	Yes	< 0.200	---	Yes
Calcium, Total	mg/L	NP-PL	79.0	66.4	---	Yes	69.4	---	Yes
Chloride	mg/L	CUSUM	20.1	12.9	12.3	Yes	11.3	12.3	Yes
Fluoride	mg/L	NP-PL	1.020	< 0.500	---	Yes	0.589	---	Yes
pH, Field	pH units	CUSUM	6.85, 8.07	7.94	7.46, 7.81	Yes	7.15	7.29, 7.46	Yes
Sulfate	mg/L	CUSUM	58.4	44.2	41.0	Yes	51.1	47.23	Yes
Total Dissolved Solids	mg/L	CUSUM	700	536	556	Yes	504	556	Yes

Notes:

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Figures

GOLDER

0 75 150
1" = 150' FEET

FIGURE 1
ASH LANDFILL NO. 4
GROUNDWATER CONTOURS
MARCH 2019

Path: \\Denver\acad\08\083-81799\SS\ | File Name: SS GW Maps 2019 Q1.dwg

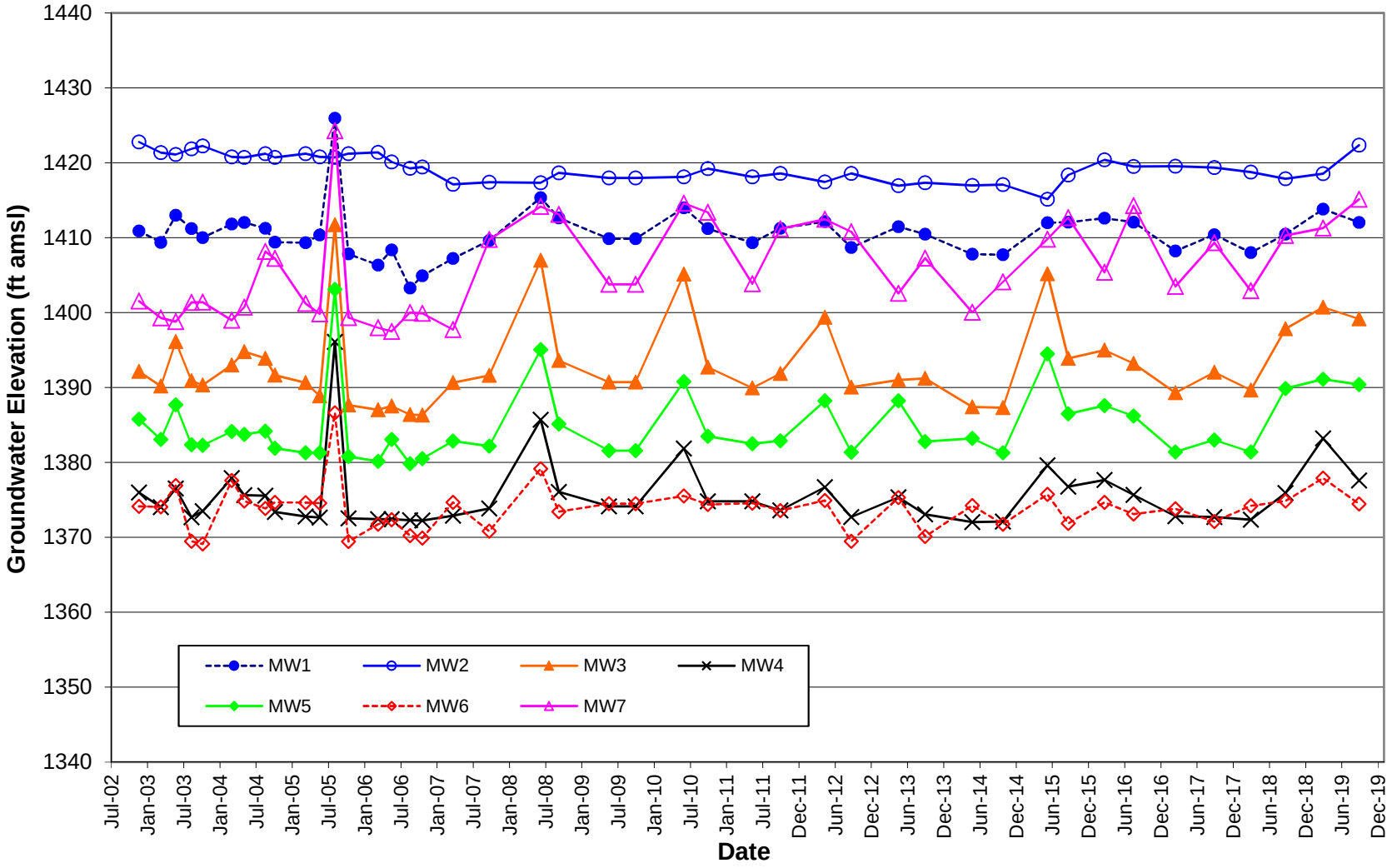
GOLDER

0 75 150
1" = 150' FEET

FIGURE 2
ASH LANDFILL NO. 4
GROUNDWATER CONTOURS
SEPTEMBER 2019

Path: \\Denver\acad\08083-81799\SS\ | File Name: SS GW Maps 2019 03.dwg

FIGURE 3
Sheldon Station Ash Landfill No. 4
Groundwater Elevations



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