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File No. 27218167.00

Mr. Brian Trower
Assistant Director – Electric Department
Ames Municipal Electric System
502 Carroll Avenue
Ames, Iowa 50010

Subject: 2018-2019 Annual Groundwater Monitoring and Corrective Action Report
Coal Combustion Residuals (CCR) Inactive Surface Impoundment

Dear Mr. Trower

On behalf of the City of Ames Municipal Electric System, SCS Engineers (SCS) is submitting this 2018-2019 Annual Groundwater Monitoring and Corrective Action Report for the Ames Municipal Electric System Inactive Coal Combustion Residuals (CCR) Surface Impoundment (Impoundment).

If you have any questions regarding this document, please contact the undersigned.

Sincerely,




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2018-2019 Annual Groundwater Monitoring and Corrective Action Report



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1.0 INTRODUCTION

This 2018-2019 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the “Coal Combustion Residuals (CCR) Final Rule” (Rule) published by the United States Environmental Protection Agency (USEPA) on April 17, 2015, with an update published August 5, 2016, to provide an extension of compliance deadlines for certain inactive surface impoundments. The City of Ames Municipal Electric System CCR Ash Impoundment (Impoundment) is classified as an “inactive” CCR unit and is therefore regulated by the August 5, 2016 update to the Rule subject to the new language of 40 CFR 257.100(e). Owners and operators of inactive CCR surface impoundments subject to the provisions of the new 40 CFR 257.100(e)(5)(ii) are required to prepare an annual groundwater monitoring and corrective action report no later than August 1, 2019 per 40 CFR 257.90(e).

Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e). Changes to the text of 40 CFR 257.90(e) based on the new 40 CFR 257.100(e) are shown in [brackets]. The applicable sections of the Rule are provided below in italics, followed by applicable information relative to the 2018-2019 Annual Groundwater Monitoring and Corrective Action Report for the City of Ames Municipal Electric System Inactive CCR Ash Impoundment.

2.0 §257.90(E) ANNUAL REPORT REQUIREMENTS

Annual groundwater monitoring and corrective action report. For [inactive] CCR surface impoundments, no later than [August 1, 2019], and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For [inactive] CCR surface impoundments, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than [August 1] of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility’s operating record as required by §257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

2.1 §257.90(e)(1) SITE MAP

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;

A site map with an aerial image showing the Impoundment and all background (or upgradient) and downgradient monitoring wells with identification numbers for the Impoundment groundwater monitoring program is provided as **Figure 1** in **Appendix A**.

2.2 §257.90(E)(2) MONITORING SYSTEM CHANGES

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;

The Impoundment groundwater monitoring system was initially certified on April 15, 2019. No other new monitoring wells were installed and no wells were decommissioned as part of the Impoundment groundwater monitoring program for the Impoundment in this reporting period.

2.3 §257.90(E)(3) SUMMARY OF SAMPLING EVENTS

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;

Eight background groundwater sampling events and the initial detection monitoring event were completed during the reporting period. Background sampling began on August 1, 2018. Background samples were analyzed for the Appendix III and Appendix IV monitoring constituents specified in both 40 CFR 257 and in Table 3 of the April 16, 2019 City of Ames CCR Groundwater Monitoring Sampling and Analysis Program report. Detection monitoring samples were analyzed for only the Appendix III monitoring constituents. During the April 12, 2019 first detection monitoring event, an additional background Appendix IV sample was collected, which increased the available Appendix IV background data. An analytical summary table is included in **Appendix B Table 1**. The field data is summarized in **Appendix B Table 2**. The dates of sample collection and the results of the analyses are also provided in these tables.

2.4 §257.90(e)(4) MONITORING TRANSITION NARRATIVE

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

There was no transition from detection monitoring to assessment monitoring in 2018-2019. Only detection monitoring was conducted in 2018-2019. Statistical evaluation of the data was still in progress as of July 31, 2019.

2.5 §257.90(E)(5) OTHER REQUIREMENTS

Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

A summary of potentially required information and the corresponding section of the Rule is provided in the following sections. In addition, the information, if applicable, is provided.

2.5.1 §257.90(e)

...For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year...

Status of Groundwater Monitoring and Corrective Action Program.

The groundwater monitoring and corrective action program is currently in detection monitoring.

Summary of Key Actions Completed.

Collection of initial background groundwater quality data was completed in March of 2019 and the initial detection monitoring sampling was completed on April 12, 2019. Laboratory analysis of the April 12, 2019 sample was completed in June of 2019. Statistical evaluation of the detection monitoring results is in progress.

Description of Any Problems Encountered.

No noteworthy problems were reported associated with the collection or analysis of groundwater samples over the reporting period.

Discussion of Actions to Resolve the Problems.

Not applicable because no noteworthy problems were encountered.

Projection of Key Activities for the Upcoming Year (August 2019- July 2020).

Completion of verification sampling and statistical evaluation of the Spring 2019 detection monitoring data. Semiannual Fall 2019 and Semiannual Spring 2020 groundwater sampling and analysis and, if required, alternative source demonstration(s).

2.5.2 §257.94(d)(3)

Demonstration providing the basis for an alternative monitoring frequency for detection monitoring and certification that it meets the requirements of this section.

Not applicable because no alternative monitoring frequency for detection monitoring and certification was pursued.

2.5.3 §257.94(e)(2)

Demonstration that an alternative source other than the CCR unit caused the statistically significant increase (SSI) over background or that the SSI was caused by an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. In addition, certification of the demonstration is to be included in the annual report.

Not applicable because no such demonstration was warranted.

2.5.4 §257.95(c)(3)

Demonstration providing the basis for an alternative monitoring frequency for assessment monitoring and certification that it meets the requirements of this section.

Not applicable.

2.5.5 §257.95(d)(3)

Include the concentrations of Appendix III and detected Appendix IV constituents from the assessment monitoring, the established background concentrations, and the established groundwater protection standards.

Not applicable because there was no assessment monitoring required.

2.5.6 §257.95(g)(3)(ii)

Demonstration that an alternative source other than the CCR unit caused the contamination, or that the SSI (during assessment monitoring) resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. In addition, certification of the demonstration is to be included in the annual report.

Not applicable because no such demonstration was warranted.

2.5.7 §257.96(a)

Demonstration of the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. In addition, certification of the demonstration is to be included in the annual report.

Not applicable because no such demonstration was warranted.

3.0 GENERAL COMMENTS

This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. The information contained in this report is a reflection of the conditions encountered at the City of Ames Municipal Electric System Inactive CCR Surface Impoundment at the time of fieldwork. This report includes a review and compilation of the required information and does not reflect any variations of the subsurface, which may occur between sampling locations. Actual subsurface conditions may vary and the extent of such variations may not become evident without further investigation.


Conclusions drawn by others from the result of this work should recognize the limitation of the methods used. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of the City of Ames Municipal Electric Systems for specific application to the Inactive CCR Surface Impoundment. No warranties, express or implied, are intended or made.

Appendix A
Figure 1: Site Map



N:\City of Ames IA\Projects\27218167.00\AutoCAD\Figure 3 CCR Ground Water Evaluation Wells.dwg Apr 10, 2019 - 9:55am Layout Name: Cross Sections By: 4470daw



 MONITORING WELL OR PIEZOMETER

NOTE: PZ-1, PZ-2, PZ-3, and MW-1 ARE UTILIZED FOR GROUNDWATER LEVELS ONLY.

SHEET TITLE CCR GROUNDWATER EVALUATION WELLS		REV. DATE - - - - -	CK BY - - - - -
PROJECT TITLE ANNUAL GRW AND CAR INACTIVE CCR SURFACE IMPOUNDMENT			
CLIENT CITY OF AMES STEAM ELECTRIC PLANT AMES, IOWA			
SCS ENGINEERS 8450 HICKMAN ROAD, SUITE 20 CLIVE, IOWA 50325 PH. (515) 631-6161		DWG. BY: DAW CHK. BY: JRR	C/A MW BY: JRR PROJ. NO: 27218167.00 DATE: 4/10/19
CADD FILE: FIGURE 3 OF GROUND WATER EVALUATION SHEETS		DATE: 4/10/19	
Figure No. 1			

Appendix B

Tables

Table 1: Appendix III and Appendix IV Background Monitoring Results
and Appendix III Detection Monitoring Results

Table 2: Detection Monitoring Field Measurements

Table 1
Inactive CCR Surface Impoundment
Appendix III and Appendix IV Background and Detection Monitoring Results
City of Ames Municipal Electric System

Well Number	Sample Date	Appendix III Constituents							Appendix IV Constituents														
		Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	pH (S.U.)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Fluoride (mg/L)	Lead (mg/L)	Lithium (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Thallium (mg/L)	Radium Combined (pCi/L)
MW-101	8/1/2018	< 0.200	132.00	11.80	< 0.500	7.7	19.0	382	< 0.001	0.00293	0.1820	< 0.001	< 0.00050	< 0.00500	0.00899	< 0.500	0.00841	0.0126	< 0.0002	< 0.002	0.01330	< 0.001	1.1900
MW-101	8/30/2018	< 0.200	89.40	11.20	< 0.500	7.5	19.6	376	< 0.001	< 0.002	0.1060	< 0.001	< 0.00050	< 0.00500	0.00106	< 0.500	0.00113	< 0.0100	< 0.0002	< 0.002	0.01270	< 0.001	0.7160
MW-101	9/26/2018	< 0.200	83.10	11.10	< 0.500	7.5	18.1	354	< 0.001	< 0.002	0.0980	< 0.001	< 0.00050	< 0.00500	0.00147	< 0.500	0.00139	< 0.0100	< 0.0002	< 0.002	0.01080	< 0.001	0.5730
MW-101	10/29/2018	< 0.200	89.30	11.80	< 0.500	7.8	17.9	394	< 0.001	< 0.002	0.1090	< 0.001	< 0.00050	< 0.00500	0.00201	< 0.500	0.00213	< 0.0100	< 0.0002	< 0.002	0.01180	< 0.001	1.3300
MW-101	11/26/2018	< 0.200	92.20	13.50	< 0.500	7.4	24.5	384	< 0.001	< 0.002	0.1070	< 0.001	< 0.00050	< 0.00500	0.00122	< 0.500	0.00133	< 0.0100	< 0.0002	< 0.002	0.01090	< 0.001	0.5090
MW-101	1/7/2019	< 0.200	95.80	12.30	< 0.500	7.4	23.0	382	< 0.001	< 0.002	0.1240	< 0.001	< 0.00050	< 0.00500	0.00187	< 0.500	0.00231	< 0.0100	< 0.0002	< 0.002	0.01320	< 0.001	1.3100
MW-101	2/6/2019	< 0.200	81.30	14.60	< 0.500	7.3	27.2	322	< 0.001	< 0.002	0.0931	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	< 0.0100	< 0.0002	< 0.002	0.00936	< 0.001	0.7710
MW-101	3/13/2019	< 0.200	90.60	13.80	< 0.500	7.5	31.8	354	< 0.001	< 0.002	0.1070	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	< 0.0100	< 0.0002	< 0.002	0.01320	< 0.001	0.0788
MW-101	4/12/2019	< 0.200	86.50	12.70	< 0.500	7.4	21.0	390	< 0.001	< 0.002	0.1030	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	< 0.0100	< 0.0002	< 0.002	0.00958	< 0.001	0.3680
MW-102	8/1/2018	< 0.200	114.00	11.30	< 0.500	7.6	26.6	386	< 0.001	< 0.002	0.1270	< 0.001	< 0.00050	< 0.00500	0.00247	< 0.500	0.00285	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	1.1900
MW-102	8/30/2018	< 0.200	82.40	11.70	< 0.500	7.4	27.7	356	< 0.001	< 0.002	0.0719	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	0.000567	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	0.6250
MW-102	9/26/2018	< 0.200	87.90	13.00	< 0.500	7.5	29.8	384	< 0.001	0.00263	0.0947	< 0.001	< 0.00050	< 0.00500	0.00191	< 0.500	0.00208	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	0.4690
MW-102	10/29/2018	< 0.200	89.80	9.67	< 0.500	7.6	24.5	390	< 0.001	< 0.002	0.0812	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	0.00168	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	1.4900
MW-102	11/26/2018	< 0.200	94.40	19.20	< 0.500	7.3	46.2	396	< 0.001	0.00542	0.1250	< 0.001	< 0.00050	0.00528	0.00355	< 0.500	0.00302	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	1.0900
MW-102	1/7/2019	< 0.200	82.10	21.20	< 0.500	7.4	52.0	384	< 0.001	< 0.002	0.0665	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	0.00103	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	0.4070
MW-102	2/6/2019	< 0.200	71.80	19.40	< 0.500	7.3	32.4	282	< 0.001	< 0.002	0.0594	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	0.1730
MW-102	3/13/2019	< 0.200	79.20	22.00	0.846	7.5	35.5	348	< 0.001	< 0.002	0.0633	< 0.001	< 0.00050	< 0.00500	< 0.00050	0.846	< 0.0005	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	0.0961
MW-102	4/12/2019	< 0.200	86.50	9.56	< 0.500	7.7	25.1	378	< 0.001	< 0.002	0.0742	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	0.000622	< 0.0100	< 0.0002	< 0.002	< 0.00500	< 0.001	0.2190
MW-103	8/1/2018	< 0.200	152.00	64.10	< 0.500	7.9	213.0	724	< 0.001	< 0.002	0.0217	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	0.0111	< 0.0002	0.00315	0.00552	< 0.001	0.2360
MW-103	8/30/2018	0.248	242.00	155.00	< 0.500	7.6	483.0	1270	< 0.001	< 0.002	0.0430	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	0.0190	< 0.0002	0.0096	< 0.00500	< 0.001	0.3110
MW-103	9/26/2018	0.472	245.00	208.00	< 0.500	7.4	613.0	1390	< 0.001	< 0.002	0.0770	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	0.0238	< 0.0002	0.00931	< 0.00500	< 0.001	0.7820
MW-103	10/29/2018	0.262	168.00	72.80	< 0.500	7.7	215.0	760	< 0.001	< 0.002	0.0411	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	0.0154	< 0.0002	0.00499	< 0.00500	< 0.001	0.4580
MW-103	11/26/2018	< 0.200	95.00	12.50	< 0.500	7.2	29.8	432	< 0.001	< 0.002	0.0296	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	< 0.0100	< 0.0002	0.0026	< 0.00500	< 0.001	0.2810
MW-103	1/7/2019	< 0.200	98.30	12.40	< 0.500	7.5	27.0	412	< 0.001	< 0.002	0.0281	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	< 0.0100	< 0.0002	0.00224	0.00669	< 0.001	0.3540
MW-103	2/6/2019	< 0.200	78.30	14.30	< 0.500	7.2	20.2	360	< 0.001	< 0.002	0.0234	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	< 0.0100	< 0.0002	< 0.002	0.00559	< 0.001	-0.2320
MW-103	3/13/2019	< 0.200	99.30	15.60	< 0.500	7.4	26.6	384	< 0.001	< 0.002	0.0281	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	0.000653	< 0.0100	< 0.0002	< 0.002	0.01080	< 0.001	0.2510
MW-103	4/12/2019	< 0.200	83.80	15.10	< 0.500	7.6	18.1	410	< 0.001	< 0.002	0.0226	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	< 0.0100	< 0.0002	< 0.002	0.00771	< 0.001	0.4600
MW-104	8/1/2018	0.767	415.00	287.00	< 0.500	7.5	992.0	2200	< 0.001	< 0.002	0.0720	< 0.001	< 0.00050	< 0.00500	0.00215	< 0.500	0.00134	0.0266	< 0.0002	0.0583	< 0.00500	< 0.001	0.8460
MW-104	8/30/2018	0.586	375.00	277.00	< 0.500	7.3	942.0	2060	< 0.001	< 0.002	0.0580	< 0.001	< 0.00050	< 0.00500	0.00115	< 0.500	< 0.0005	0.0218	< 0.0002	0.0521	< 0.00500	< 0.001	0.8600
MW-104	9/26/2018	0.634	362.00	285.00	< 0.500	7.4	987.0	1890	< 0.001	< 0.002	0.0549	< 0.001	< 0.00050	< 0.00500	0.00113	< 0.500	0.000643	0.0261	< 0.0002	0.0565	< 0.00500	< 0.001	0.8810
MW-104	10/29/2018	0.674	388.00	271.00	< 0.500	7.4	1110.0	1840	< 0.001	< 0.002	0.0533	< 0.001	< 0.00050	< 0.00500	0.00078	< 0.500	< 0.0005	0.0218	< 0.0002	0.0597	< 0.00500	< 0.001	1.0200
MW-104	11/26/2018	0.665	336.00	264.00	0.605	7.1	850.0	1780	< 0.001	< 0.002	0.0544	< 0.001	< 0.00050	< 0.00500	0.00144	0.605	0.00103	0.0230	< 0.0002	0.0599	< 0.00500	< 0.001	0.7440
MW-104	1/7/2019	0.792	365.00	256.00	0.582	7.5	841.0	1920	< 0.001	< 0.002	0.0566	< 0.001	0.00059	< 0.00500	0.00123	0.582	0.00119	0.0293	< 0.0002	0.0493	< 0.00500	< 0.001	0.8800
MW-104	2/6/2019	0.877	288.00	246.00	0.696	7.1	777.0	1680	< 0.001	< 0.002	0.0432	< 0.001	< 0.00050	< 0.00500	0.00068	0.696	< 0.0005	0.0211	< 0.0002	0.0379	< 0.00500	< 0.001	0.6510
MW-104	3/13/2019	0.911	358.00	232.00	< 0.500	7.2	761.0	1730	< 0.001	< 0.002	0.0528	< 0.001	< 0.00050	< 0.00500	0.00081	< 0.500	< 0.0005	0.0282	< 0.0002	0.0552	< 0.00500	< 0.001	0.4140
MW-104	4/12/2019	1.020	340.00	224.00	0.558	7.5	687.0	1700	< 0.001	< 0.002	0.0482	< 0.001	< 0.00050	< 0.00500	0.00081	0.558	< 0.0005	0.0313	< 0.0002	0.0542	< 0.00500	< 0.001	0.5640
MW-105	8/1/2018	0.369	400.00	247.00	0.641	7.6	914.0	2010	< 0.001	0.00392	0.0830	< 0.001	0.00054	< 0.00500	0.00511	0.641	0.00389	0.0290	< 0.0002	0.0466	< 0.00500	< 0.001	1.2600
MW-105	8/30/2018	0.446	309.00	226.00	< 0.500	7.6	766.0	1650	< 0.001	0.00425	0.1710	< 0.001	< 0.00050	< 0.00500	0.00395	< 0.500	0.00254	0.0251	< 0.0002	0.0767	< 0.00500	< 0.001	1.2300
MW-105	9/26/2018	0.619	273.00	239.00	0.702	7.7	760.0	1550	< 0.001	0.00368	0.1100	< 0.001	< 0.00050	< 0.00500	0.00272	0.702	0.00162	0.0303	< 0.0002	0.0729	< 0.00500	< 0.001	1.6300
MW-105	10/29/2018	0.758	301.00	226.00	0.846	7.6	760.0	1680	< 0.001	0.00299	0.0552	< 0.001	< 0.00050	< 0.00500	0.00202	0.846	0.00185	0.0355	< 0.0002	0.0724	< 0.00500	< 0.001	1.6100
MW-105	11/26/2018	0.761	260.00	227.00	0.960	7.5	702.0	1500	< 0.001	0.00255	0.0806	<											

Table 1
Inactive CCR Surface Impoundment
Appendix III and Appendix IV Background and Detection Monitoring Results
City of Ames Municipal Electric System

Well Number	Sample Date	Appendix III Constituents							Appendix IV Constituents														
		Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	pH (S.U.)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Fluoride (mg/L)	Lead (mg/L)	Lithium (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Thallium (mg/L)	Radium Combined (pCi/L)
MW-107	8/1/2018	0.337	146.00	54.20	< 0.500	7.3	117.0	640	< 0.001	< 0.002	0.0627	< 0.001	< 0.00050	< 0.00500	0.00136	< 0.500	0.00234	0.0116	< 0.0002	< 0.002	< 0.00500	< 0.001	0.8650
MW-107	8/30/2018	0.300	112.00	58.50	< 0.500	7.2	106.0	558	< 0.001	< 0.002	0.0503	< 0.001	< 0.00050	< 0.00500	0.00086	< 0.500	0.000637	< 0.0100	< 0.0002	0.00303	< 0.00500	< 0.001	0.9300
MW-107	9/26/2018	0.276	109.00	64.60	< 0.500	7.7	115.0	546	< 0.001	< 0.002	0.0470	< 0.001	< 0.00050	< 0.00500	0.00091	< 0.500	0.00114	0.0100	< 0.0002	0.00226	< 0.00500	< 0.001	1.0700
MW-107	10/29/2018	0.252	99.20	63.20	1.060	7.3	114.0	514	< 0.001	< 0.002	0.0412	< 0.001	< 0.00050	< 0.00500	< 0.00050	1.060	< 0.0005	< 0.0100	< 0.0002	0.0024	< 0.00500	< 0.001	0.6970
MW-107	11/26/2018	0.255	114.00	76.30	0.578	7.2	174.0	884	< 0.001	< 0.002	0.0551	< 0.001	< 0.00050	< 0.00500	0.00100	0.578	0.00131	0.0105	< 0.0002	0.00279	< 0.00500	< 0.001	1.0400
MW-107	1/7/2019	0.332	120.00	96.30	< 0.500	7.2	242.0	790	< 0.001	< 0.002	0.0670	< 0.001	< 0.00050	< 0.00500	0.00067	< 0.500	0.000702	0.0151	< 0.0002	0.00349	< 0.00500	< 0.001	1.1100
MW-107	2/6/2019	0.305	97.90	79.80	0.534	7.2	188.0	632	< 0.001	< 0.002	0.0461	< 0.001	< 0.00050	< 0.00500	< 0.00050	0.534	< 0.0005	0.0109	< 0.0002	0.00283	< 0.00500	< 0.001	0.5290
MW-107	3/13/2019	0.277	134.00	78.20	0.567	7.0	181.0	756	< 0.001	< 0.002	0.0630	< 0.001	< 0.00050	< 0.00500	< 0.00050	0.567	< 0.0005	0.0128	< 0.0002	0.00266	< 0.00500	< 0.001	0.7100
MW-107	4/12/2019	0.399	206.00	151.00	0.633	7.3	464.0	1190	< 0.001	< 0.002	0.0934	< 0.001	< 0.00050	< 0.00500	0.00085	0.633	0.000741	0.0197	< 0.0002	0.00482	< 0.00500	< 0.001	0.5900
MW-108	8/1/2018	< 0.200	120.00	53.10	< 0.500	8.0	155.0	666	< 0.001	0.0027	0.1230	< 0.001	< 0.00050	< 0.00500	0.00488	< 0.500	0.00525	0.0169	< 0.0002	< 0.002	< 0.00500	< 0.001	2.1300
MW-108	8/30/2018	< 0.200	66.10	25.00	< 0.500	7.7	67.2	420	< 0.001	< 0.002	0.0950	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	0.0123	< 0.0002	0.00307	< 0.00500	< 0.001	0.5030
MW-108	9/26/2018	< 0.200	89.70	55.80	< 0.500	8.3	188.0	658	< 0.001	0.00235	0.1070	< 0.001	< 0.00050	< 0.00500	0.00233	< 0.500	0.00216	0.0158	< 0.0002	0.00693	< 0.00500	< 0.001	1.0300
MW-108	10/29/2018	< 0.200	97.50	46.50	< 0.500	7.8	143.0	554	< 0.001	< 0.002	0.0944	< 0.001	< 0.00050	< 0.00500	0.00248	< 0.500	0.00486	0.0151	< 0.0002	< 0.002	< 0.00500	< 0.001	1.3500
MW-108	11/26/2018	< 0.200	71.70	29.90	< 0.500	7.7	88.7	660	< 0.001	< 0.002	0.0943	< 0.001	< 0.00050	< 0.00500	0.00174	< 0.500	0.00193	0.0154	< 0.0002	0.00376	< 0.00500	< 0.001	0.6300
MW-108	1/7/2019	< 0.200	58.50	26.40	< 0.500	7.5	88.1	480	< 0.001	< 0.002	0.0856	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	0.0151	< 0.0002	0.00301	< 0.00500	< 0.001	0.6590
MW-108	2/6/2019	< 0.200	68.10	23.20	< 0.500	7.6	75.4	434	< 0.001	< 0.002	0.0917	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	0.0153	< 0.0002	0.00234	< 0.00500	< 0.001	0.9050
MW-108	3/13/2019	< 0.200	82.20	21.90	< 0.500	7.6	75.3	454	< 0.001	< 0.002	0.1070	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	< 0.0005	0.0166	< 0.0002	0.0026	< 0.00500	< 0.001	0.7660
MW-108	4/12/2019	< 0.200	94.30	53.70	< 0.500	7.7	195.0	654	< 0.001	< 0.002	0.1570	< 0.001	< 0.00050	< 0.00500	< 0.00050	< 0.500	0.000517	0.0161	< 0.0002	0.00851	< 0.00500	< 0.001	0.6970

mg/L - milligrams per liter
pCi/L - Picouries per liter
- Standard Units

Table 2
Inactive CCR Surface Impoundment
Background and Detection Monitoring Field Measurements
City of Ames Municipal Electric System

Well Number	Sample Date	pH (S.U.)	Specific Conductivity (µs)	Temperature (°C)	Turbidity (NTU)	Water Level (ft btoc)	Groundwater Elevation (ft NGVD)
MW-101	08/01/18	7.21	671	13.47	43.8	22.02	878.43
MW-101	08/30/18	7.35	738	14.29	47.9	21.80	878.65
MW-101	09/26/18	7.05	668	13.26	5.0	19.62	880.83
MW-101	10/29/18	7.75	728	11.41	209	20.31	880.14
MW-101	11/26/18	7.20	413	11.29	140	21.87	878.58
MW-101	01/07/19	6.73	431	11.37	14.6	21.83	878.62
MW-101	02/06/19	7.04	434	10.42	36.8	22.23	878.22
MW-101	03/13/19	6.46	429	11.46	41.3	22.33	878.12
MW-101	04/12/19	7.10	659	9.76	94.7	21.33	879.12
MW-102	08/01/18	7.10	676	12.24	75.2	21.66	878.18
MW-102	08/30/18	6.48	714	13.87	30.4	21.23	878.61
MW-102	09/26/18	6.94	667	12.95	23.9	19.21	880.63
MW-102	10/29/18	7.66	734	11.65	59.6	20.00	879.84
MW-102	11/26/18	7.21	401	11.33	430	21.47	878.37
MW-102	01/07/19	6.63	415	11.21	28.1	21.41	878.43
MW-102	02/06/19	6.91	400	8.76	9.50	21.82	878.02
MW-102	03/13/19	6.48	404	10.93	12.3	21.88	877.96
MW-102	04/12/19	7.18	694	9.71	60.3	20.79	879.05
MW-103	08/01/18	7.11	1,020	13.07	1.0	22.53	878.00
MW-103	08/30/18	7.26	1,970	14.42	3.4	21.83	878.70
MW-103	09/26/18	7.03	1,960	14.18	1.8	20.32	880.21
MW-103	10/29/18	7.78	1,300	11.19	22.6	20.94	879.59
MW-103	11/26/18	6.28	439	10.78	0.80	22.28	878.25
MW-103	01/07/19	6.20	462	12.44	0.42	22.20	878.33
MW-103	02/06/19	6.83	462	10.54	0.67	22.49	878.04
MW-103	03/13/19	6.23	434	11.25	46.3	22.63	877.90
MW-103	04/12/19	7.08	678	9.95	25.9	21.49	879.04
MW-104	08/01/18	7.11	2,680	15.48	43.1	22.77	877.38
MW-104	08/30/18	7.21	2,900	15.96	59.3	21.59	878.56
MW-104	09/26/18	7.09	2,680	14.79	17.1	20.08	880.07
MW-104	10/29/18	7.39	22	12.20	113	21.20	878.95
MW-104	11/26/18	7.00	1,560	12.46	41.4	22.43	877.72
MW-104	01/07/19	6.44	1,523	10.67	12.1	22.32	877.83
MW-104	02/06/19	6.86	1,750	11.69	3.85	22.51	877.64
MW-104	03/13/19	6.55	1,607	12.65	3.18	22.47	877.68
MW-104	04/12/19	7.04	2,312	11.65	46.8	21.45	878.70
MW-105	08/01/18	7.49	2,540	15.39	957	23.56	876.91
MW-105	08/30/18	7.57	2,520	15.67	230	22.25	878.22
MW-105	09/26/18	7.45	2,270	14.44	49.5	20.77	879.70
MW-105	10/29/18	7.91	2,360	12.62	351	21.91	878.56
MW-105	11/26/18	7.28	1,367	12.90	151	23.14	877.33
MW-105	01/07/19	6.59	1,453	11.81	8.32	23.09	877.38
MW-105	02/06/19	7.03	1,523	12.69	40.3	23.22	877.25
MW-105	03/13/19	7.00	1,521	15.13	2.38	23.13	877.34
MW-105	04/12/19	7.08	837	10.88	111	22.00	878.47
MW-106	08/01/18	7.09	2,610	15.34	5.6	23.77	877.21
MW-106	08/30/18	6.97	1,980	15.83	2.7	22.70	878.28
MW-106	09/26/18	6.83	2,620	14.85	3.6	21.02	879.96
MW-106	10/29/18	7.46	2,770	13.15	1.2	22.08	878.90
MW-106	11/26/18	6.93	1,649	12.04	20.7	23.43	877.55
MW-106	01/07/19	6.58	1,666	11.88	3.21	23.40	877.58
MW-106	02/06/19	6.81	1,775	11.20	3.11	23.65	877.33
MW-106	03/13/19	6.76	1,604	13.03	30.0	23.56	877.40

Table 2
Inactive CCR Surface Impoundment
Background and Detection Monitoring Field Measurements
City of Ames Municipal Electric System

Well Number	Sample Date	pH (S.U.)	Specific Conductivity (µs)	Temperature (°C)	Turbidity (NTU)	Water Level (ft btoc)	Groundwater Elevation (ft NGVD)
MW-106	04/12/19	7.18	1,167	8.00	4.69	22.26	878.72
MW-107	08/01/18	6.79	93	17.88	325	22.90	877.45
MW-107	08/30/18	7.03	1,030	16.81	24.6	22.17	878.18
MW-107	09/26/18	6.88	928	15.10	30.9	20.11	880.24
MW-107	10/29/18	7.62	927	13.66	26.8	21.15	879.20
MW-107	11/26/18	7.05	618	11.14	121	22.60	877.75
MW-107	01/07/19	6.80	776	11.27	44.1	22.62	877.73
MW-107	02/06/19	6.81	716	9.93	4.21	22.95	877.40
MW-107	03/13/19	7.01	794	12.31	3.70	23.66	876.69
MW-107	04/12/19	6.91	1,698	10.67	60.3	21.82	878.53
MW-108	08/01/18	7.76	965	14.53	927	23.56	877.84
MW-108	08/30/18	7.59	842	15.28	28.6	23.25	878.15
MW-108	09/26/18	7.60	1,030	13.81	66.2	20.96	880.44
MW-108	10/29/18	8.15	946	13.66	316	21.77	879.63
MW-108	11/26/18	7.53	500	11.47	121	23.38	878.02
MW-108	01/07/19	6.79	516	11.11	8.12	23.32	878.08
MW-108	02/06/19	7.39	521	10.89	3.49	23.76	877.64
MW-108	03/13/19	7.38	501	11.59	16.9	23.66	877.74
MW-108	04/12/19	7.21	1,044	10.70	34.9	22.92	878.48