City Water, Light & Power
Coal Combustion Residuals Surface Impoundments

Annual Groundwater Monitoring and Corrective Action Report Year Ending December 31, 2019

January 2020

Prepared for:
City Water, Light & Power
201 E. Lake Shore Drive
Springfield, Illinois

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ILLINOIS | MISSOURI | INDIANA

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1. INTRODUCTION

In accordance with 40 CFR 257.90(e), provided herein is the Annual Groundwater Monitoring and Corrective Action Report for year ending December 31, 2019.

City Water, Light and Power (CWLP) owns and operates two (2) existing coal combustion residual (CCR) surface impoundments. The CWLP CCR surface impoundments are located north and east of the former Lakeside Power Generating Station and Dallman Power Generating Station in the Eastern ½ of Section 12, Township 15 North, Range 5 West, in Springfield, Illinois (see Figure 1). These CCR surface impoundments are identified as the Lakeside Ash Pond and the Dallman Ash Pond (see Figure 2).

The former Lakeside Power Generating Station and Dallman Power Generating Station are situated on the northwestern bank of Lake Springfield in Springfield, Illinois. The Lakeside Ash Pond is immediately north of Spaulding Dam at the northern end of Lake Springfield. The Dallman Ash Pond is immediately northwest of the Lakeside Ash Pond. Placed into service prior to 1958, the Lakeside Ash Pond is primarily a diked embankment. The Lakeside Ash Pond consists of four separate ponds (i.e., three lime softening ponds and a settling pond) totaling approximately 35.0 acres. The Lakeside Ash Pond ceased receiving ash in 2009. The Dallman Ash Pond was placed into service in approximately 1976 and is also a diked embankment. The Dallman Ash Pond is approximately 34.5 acres. Fly ash and bottom ash are sluiced to the Dallman Ash Pond with raw lake water.

2. GROUNDWATER MONITORING PROGRAM

As required by §257.90(b), CWLP prepared and placed into the facility record a Groundwater Monitoring Program for the CCR surface impoundments in October 2017. The current monitoring network includes two upgradient wells (wells AP-4 and AP-5) and four downgradient wells (AP-1, AP-2, AP-3, and RW-3). The well locations are depicted in Figure 2.

Due to a potential integrity issue at Well AW-3, the well was replaced and the new well RW-3 implemented in the monitor well system prior to the sampling event in May, 2018. Replacement of the well occurred to ensure compliance with §257.91(c). The Groundwater Monitoring Program was revised to address the well replacement, placed in the site record and uploaded to the CWLP website. A Groundwater Monitoring System Certification was provided for the revised Groundwater Monitoring Program, also placed in the site record and uploaded to the aforementioned website.

The following sections of the report address the annual groundwater monitoring and corrective action report requirements outlined in 40 CFR 257.90(e).

3. 40 CFR 257.90(E): KEY ACTIONS, PROBLEMS ENCOUNTERED, AND KEY ACTIVITIES FOR 2019

3.1 Key Actions

The following items identify key actions that occurred in 2019 specifically related to the Groundwater Monitoring Program.

3.1.1 Assessment Monitoring

The first sampling event for routine detection monitoring occurred in November, 2017, which indicated statistically significant increase (SSI) over background levels for 40 CFR Part 257 Appendix III parameters boron, calcium, chloride, pH, sulfate, and total dissolved solids (TDS). In accordance with 40 CFR 257.95, an Assessment Monitoring Program was implemented in February 2018. Pursuant to §257.95(b), the Assessment Monitoring Program requires groundwater monitoring for all constituents listed in Appendix III and Appendix IV be monitored until detection monitoring resumes. Notification that an Assessment Monitoring Program had been established occurred in February, 2018. Groundwater protection standards were established for the detected Appendix IV parameters in July, 2018.

Assessment monitoring, which includes both Appendix III and IV List parameters, continued throughout 2019 for all wells in the monitor well network. The monitoring data is provided in Table 1. It must be noted that compliance with the groundwater protection standards established under §257.95(h) was achieved as no Appendix IV parameter exceeded a groundwater protection standard during the August 1, 2019 semi-annual sampling event. Therefore, assessment monitoring will continue pursuant to §257.95(f).

3.1.2 Assessment Monitoring Investigation

Subsequent to verification of the SSI of arsenic in well RW-3, an alternate source demonstration evaluation was conducted pursuant to §257.95(g)(3)(ii), from September to October 2018. The evaluation included advancement of three borings in the immediate vicinity of RW-3. Soil samples were obtained at multiple depths within the borings and analyzed for four indicator parameters. Additionally, discreet groundwater samples were collected from each boring at a depth consistent with the screened interval of RW-3. The soils and groundwater analyses were conducted to evaluate whether the arsenic present in RW-3 was naturally occurring in the geologic deposits, as is typical in unconsolidated deposits within Illinois. Additionally, trace CCR material had been detected in at least one subsurface boring on the hydraulically downgradient periphery of the permitted CCR landfill, which is in close proximity to RW-3. It was suspected that the trace CCR material may affect the quality of groundwater at RW-3. The evaluation indicated arsenic in the vicinity of RW-3 was not the result of naturally occurring minerals within the local geologic deposits, or the result of CCR material contained within the peripheral berm. Therefore, pursuant to §257.95(g)(1), an investigation to characterize the nature and extent of arsenic concentrations exceeding the background concentration at RW-3 was devised.

The investigation was implemented in two phases. The first phase (May 2019) included advancement of five direct-push borings (GP-4, GP-5, GP-6, GP-7 and GP-8) extending into the uppermost aquifer. One-inch diameter temporary wells were installed in each of the boreholes except GP-5, allowing the collection of discreet groundwater samples within the uppermost aquifer hydraulically downgradient to the impoundment. Due to the shallow occurrence of the bedrock at GP-5, the borehole was dry; no groundwater sample was available. The temporary wells were abandoned upon completion of the sampling. Due to the nature of the drilling, the samples collected were turbid, which affected the results of total metals; i.e. causes the concentrations to be artificially high due to particulate matter (silt and clay from the geologic deposits) in the sample. This is reflected in the results provided in Table 2 where several parameters exhibited exceedances of background concentrations. The boring locations are shown in Figure 3.

The second phase (July 2019) of the investigation included installation of five new wells; three wells at new locations (GP-1, GP-2 and GP-3) and two at locations sampled during the first phase (GP-6 and GP-7). The wells were advanced using 8.25-inch hollow stem augers and constructed with two-inch diameter pre-packed screens and riser pipe. The well construction significantly decreased the turbidity of the sample, allowing for a more representative sample. This is highlighted by the results comparison between samples collected from the May (one-inch well) and July (two-inch well with pre-packed screens) sampling events at GP-6 and GP-7. It was determined that arsenic was not detected at six of the seven temporary wells (GP-1, GP-3, GP-4, GP-6, GP-7 and GP-8). The concentration at the seventh temporary well (GP-2) was below the background concentration.

The presence of total arsenic in well RW-3 is low with fluctuation around the background concentration. Total arsenic at RW-3 exhibited a decreasing trend over the last three consecutive sampling events and was not detected during the most recent semi-annual sampling event (August 1, 2019). Total arsenic and has been only detected in one other well (upgradient well AP-4 during the November 2017 sampling event) since implementation of the monitoring system.

With the lack of an exceedance of a groundwater protection standard, §257.95(f) requires only that the owner or operator must continue assessment monitoring. Further activities, such as characterization of the nature and extent of any applicable parameter, assessment of corrective measures, selection of a remedy, or corrective action are not necessary unless an exceedance of a groundwater protection standard is confirmed.

3.2 Assessment of Corrective Measures

Subsequent to the assessment monitoring investigation, CWLP began assessment of potential corrective action measures, including contaminant transport modeling simulating differing cover designs. Model results show typical final cover designs will reduce surface water infiltration into the ash resulting in reduction of the liquid head levels within the ash, thereby reducing solute movement beneath the impoundments. Computer simulations show the concentrations of constituents (Appendix IV) downgradient to the impoundments respond positively to multiple cover designs.

As discussed above, the facility is currently in assessment monitoring pursuant to §257.95(f). Assessment of corrective measures is not necessary at this time.

3.3 Problems Encountered

All activities which occurred in 2019 are discussed in Section 3.1 and 3.2 above. No problems were encountered.

3.4 Key Activities for Upcoming Year (2020)

Currently there are no groundwater protection standard exceedances requiring assessments or continuation of the assessment of corrective measures process. CWLP will continue with assessment monitoring pursuant to §257.95 at all impoundment wells in 2020.

4. 40 CFR 257.90(E)(1) – (5)

Additional requirements for the Annual Groundwater Monitoring and Corrective Action Report are detailed in 40 CFR 257.90(e)(1)-(5). Each of the requirements is reproduced below along with the response.

(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.

A map of the key features required above is provided as Figure 2 to this annual report.

(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.

No wells were installed or decommissioned from the groundwater monitoring system in 2019.

(3) All data collected as part of the detection or assessment monitoring programs in 2019.

Detection monitoring and assessment monitoring data collected for the period January 1, 2019 through December 31, 2019 is provided in Table 1. The table includes the sample dates and identifies the Appendix III and Appendix IV parameters. Data from the monitoring assessment investigation are provided in Table 2.

(4) Discussion of any transition between monitoring programs including the dates of the transition and the identification of the constituent(s) that necessitated the initiation of assessment monitoring.

In accordance with §257.95, an Assessment Monitoring Program was implemented in February 2018 in response to the statistically significant increase (SSI) over background levels for one or more parameters listed in 40 CFR Part 257, Appendix III. Assessment monitoring was conducted for wells contained in the groundwater monitoring system in 2019.

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

a. Alternative monitoring frequency certification in accordance with §§257.94(d)(3) and 257.95(c)(3).

No alternative monitoring frequency has been implemented at this time. Therefore; no certification is required.

b. Any alternate source demonstration completed in response to any statistically significant increases completed during the previous year in accordance with §257.94(e)(2) and §257.95(g)(3)(ii).

No alternate source demonstrations were conducted in 2019.

c. Assessment of corrective measures completed during the previous year in accordance with §257.96(a).

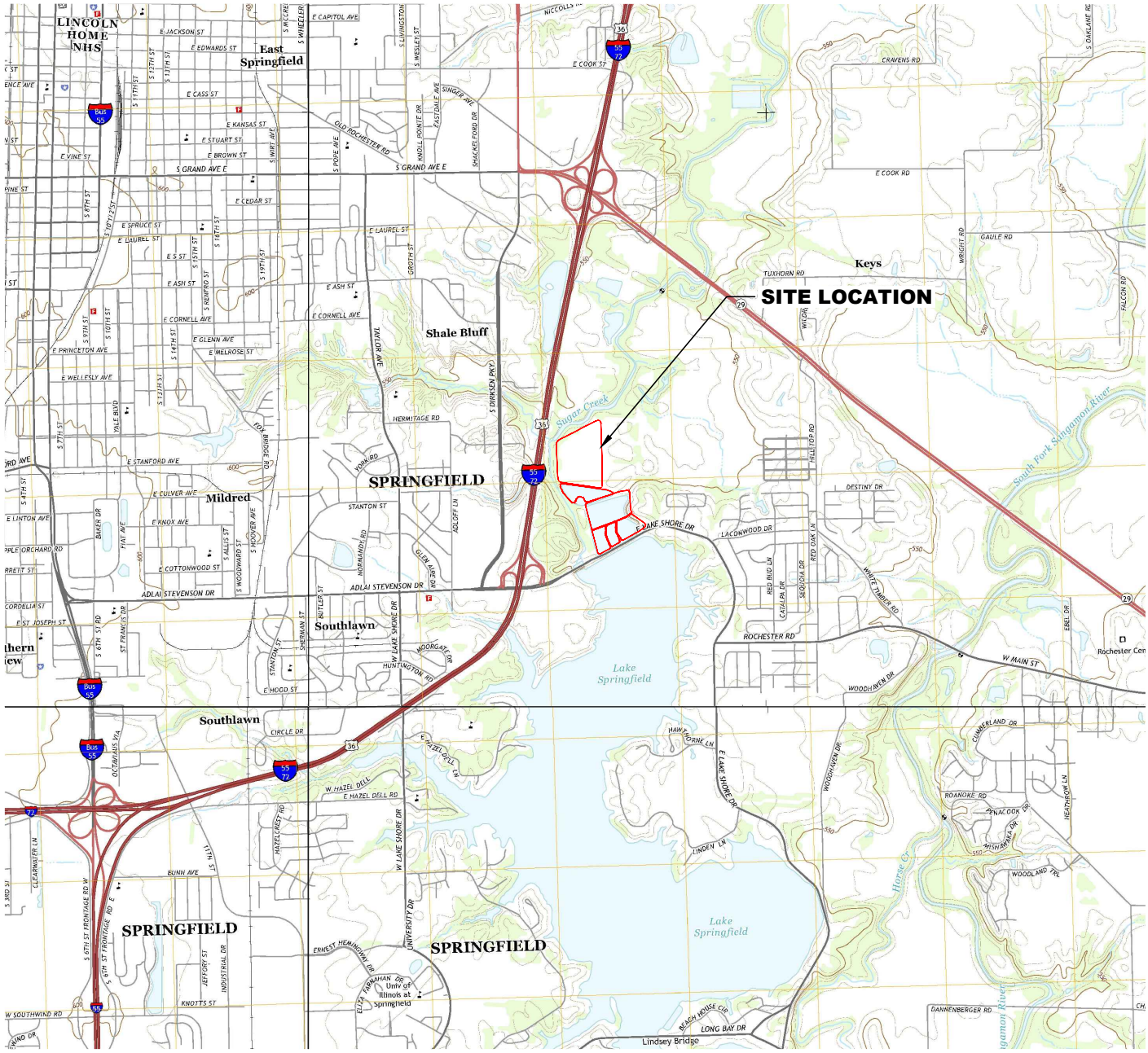
As discussed above, the facility is currently in assessment monitoring pursuant to §257.95(f). Assessment of corrective measures is not necessary at this time. However, CWLP did assess potential corrective measures, including contaminant transport modeling simulating differing cover designs. Model results show typical final cover designs will reduce surface water infiltration into the ash resulting in reduction of the liquid head levels within the ash, thereby reducing solute movement beneath the impoundments. Computer simulations show the concentrations of constituents (Appendix IV) downgradient to the impoundments respond positively to multiple cover designs.

5. CONCLUSION

This annual groundwater monitoring and corrective action report has been provided in accordance with §257.90(e). The annual report for monitoring year 2020 will be provided by January 31, 2021.

FIGURES

J:\S\Springfield CWLP\CWLP\dwg\2018\Existing Groundwater Monitoring Network.dwg Tab: FIGURE 1



NOTE:
BACKGROUND IMAGE COURTESY OF
UNITED STATES GEOLOGICAL SURVEY.

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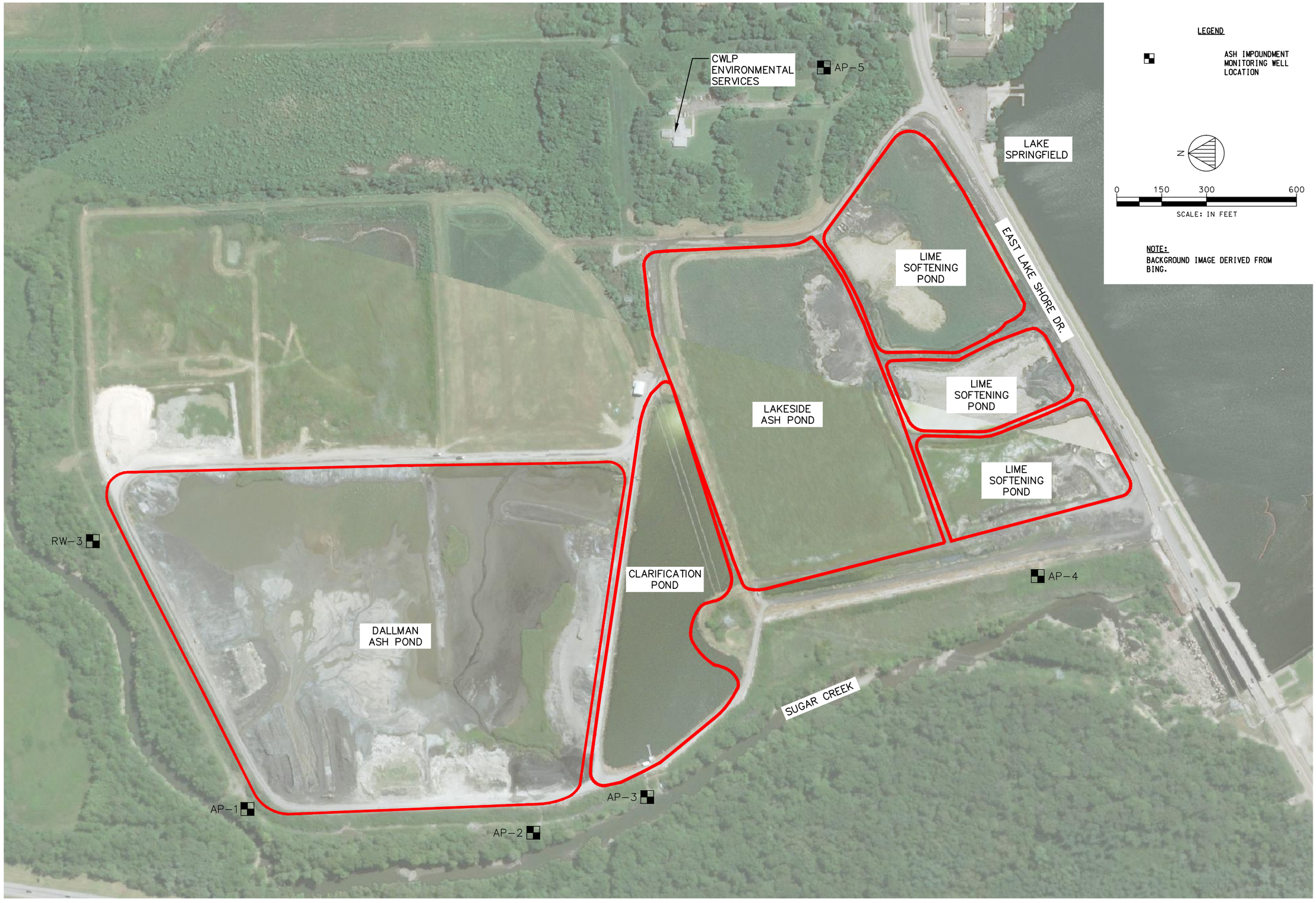
PROFESSIONAL DESIGN ENGINEERING AND LAND SURVEYING FIRM #184-001541

APPROVED BY: MTH | DESIGNED BY: MTH | DRAWN BY: RMC

SITE LOCATION

PLANS PREPARED FOR
CITY, WATER, LIGHT & POWER
SPRINGFIELD, SANGAMON COUNTY, ILLINOIS

DATE: JANUARY 2020
PROJECT ID: 170306/0001
SHEET NUMBER:
FIGURE 1



LEGEND

ASH IMPOUNDMENT MONITORING WELL LOCATION

N

0 150 300 600

SCALE: IN FEET

NOTE:
BACKGROUND IMAGE DERIVED FROM BING.

REVISIONS			
NO.	DATE	DESCRIPTION	BY

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PROFESSIONAL DESIGN ENGINEERING AND LAND SURVEYING FIRM #184-001541

APPROVED BY: MTH | DESIGNED BY: MTH | DRAWN BY: RMC

GROUNDWATER MONITORING SYSTEM

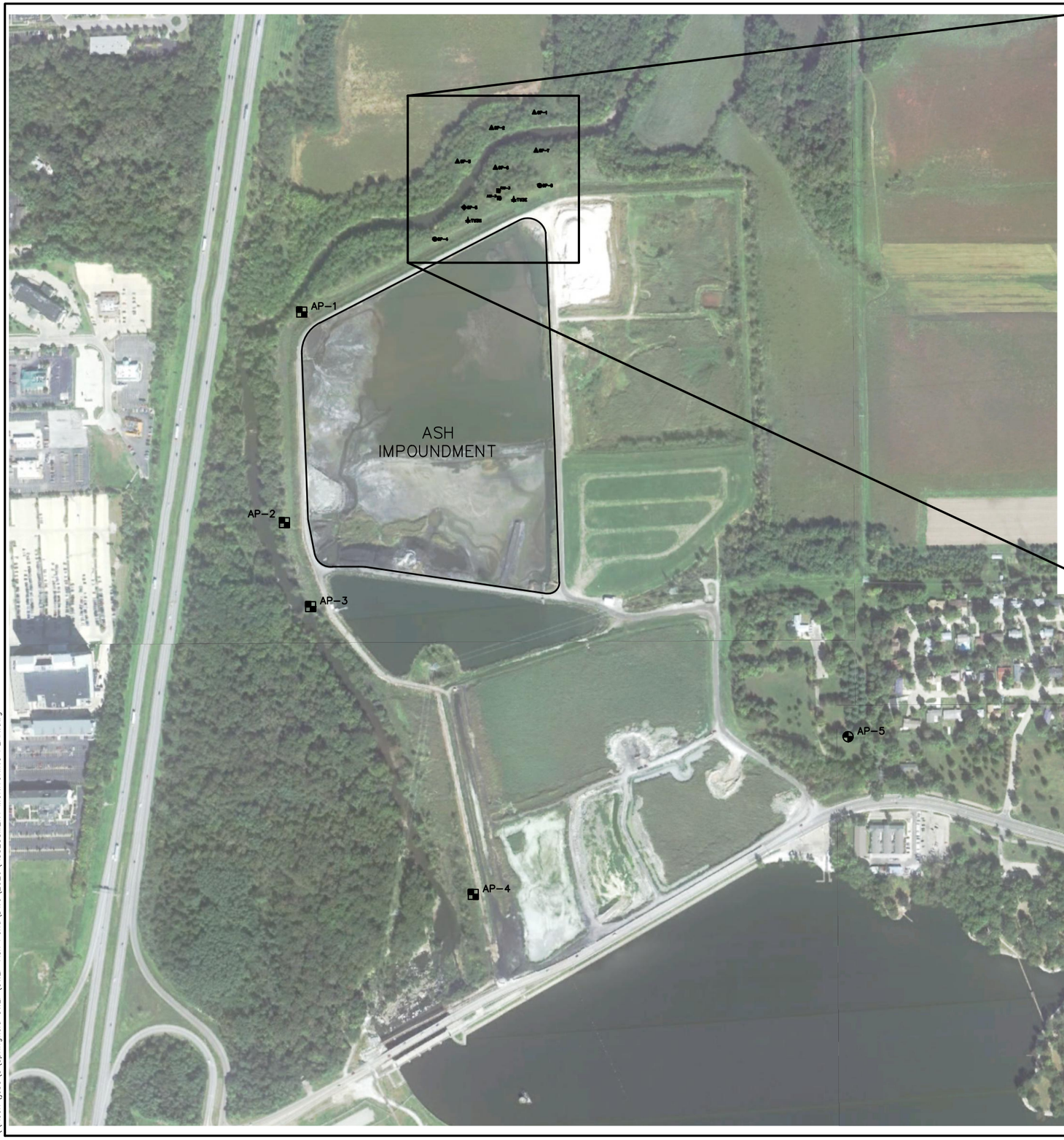
PLANS PREPARED FOR
CITY, WATER, LIGHT & POWER
SPRINGFIELD, SANGAMON COUNTY, ILLINOIS

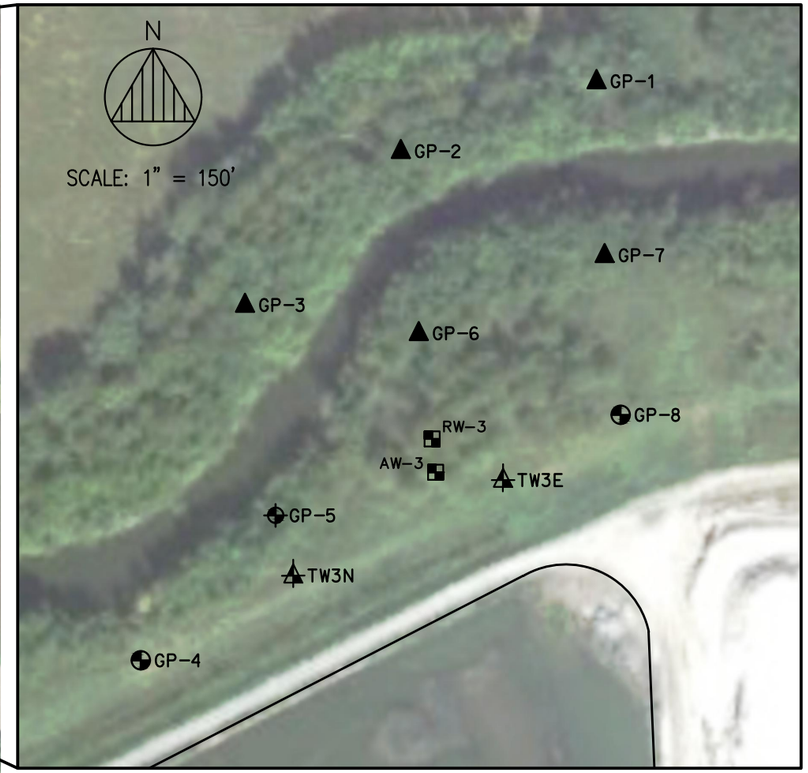
DATE:
JANUARY 2018

PROJECT ID:
170306/0001

SHEET NUMBER:
FIGURE
2

\\Aeei1\jobs\S\Springfield CWLP\CWLP\dwg\2018\Existing Groundwater Monitoring Network.dwg Tab: FIGURE 3 Last Saved: January 17, 2020, by William Ulewicz Plotted: Friday, January 17, 2020 1:41:51 PM





LEGEND:

- EXISTING MONITORING WELL LOCATION
- GEOPROBE BORING LOCATION
- TEMPORARY WELL LOCATION (2018)
- TEMPORARY WELL LOCATION (MAY 2019)
- TEMPORARY WELL LOCATION (JULY 2019)

NOTES

1. BORINGS GP-6 AND GP-7 CONTAINED TEMPORARY WELLS FROM BOTH THE MAY AND JULY 2019 INVESTIGATION.
2. AW-3 WAS REPLACED BY RW-3.

N

0 500 1000

SCALE: IN FEET

NO.	DATE	REVISION DESCRIPTION	BY

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DRAWN BY: MPN | DESIGNED BY: BJH | APPROVED BY: BJH

ASSESSMENT MONITORING INVESTIGATION

PREPARED FOR
CITY WATER, LIGHT, AND POWER
SPRINGFIELD, SANGAMON COUNTY, ILLINOIS

DATE: JANUARY 2020

PROJECT ID: 170306/0001

SHEET NUMBER:

FIGURE 3

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TABLES

Table 1
City Water, Light and Power
Power Plant Ash Impoundment
2019 Detection and Assessment Monitoring Results

Well	Parameter	Units	MCL EPA 40 CFR 141	Background AP-4 & AP-5	2/13/2019	8/1/2019
Appendix III						
AP-1	Boron, total	mg/l	na	0.787	5.03	21
AP-2	Boron, total	mg/l	na	0.787	4.21	5.62
AP-3	Boron, total	mg/l	na	0.787	20.7	18.7
AP-4	Boron, total	mg/l	na	0.787	0.11	0.0677
AP-5	Boron, total	mg/l	na	0.787	0.0275	0.116
RW-3	Boron, total	mg/l	na	0.787	0.191	1.6
AP-1	Calcium, total	mg/l	na	176.63	98.1	243
AP-2	Calcium, total	mg/l	na	176.63	322	335
AP-3	Calcium, total	mg/l	na	176.63	180	166
AP-4	Calcium, total	mg/l	na	176.63	146	97.2
AP-5	Calcium, total	mg/l	na	176.63	95.1	132
RW-3	Calcium, total	mg/l	na	176.63	84.1	175
AP-1	Chloride, total	mg/l	na	24.2	40.9	52.1
AP-2	Chloride, total	mg/l	na	24.2	39.2	37.2
AP-3	Chloride, total	mg/l	na	24.2	36	36.3
AP-4	Chloride, total	mg/l	na	24.2	12.8	1.9
AP-5	Chloride, total	mg/l	na	24.2	4.45	< 12.5
RW-3	Chloride, total	mg/l	na	24.2	28.1	25.5
AP-1	Fluoride, total	mg/l	4	0.62	< 0.25	0.26
AP-2	Fluoride, total	mg/l	4	0.62	< 0.25	0.28
AP-3	Fluoride, total	mg/l	4	0.62	< 0.25	0.28
AP-4	Fluoride, total	mg/l	4	0.62	< 0.25	0.43
AP-5	Fluoride, total	mg/l	4	0.62	0.3	< 0.25
RW-3	Fluoride, total	mg/l	4	0.62	0.54	< 0.25
AP-1	pH (field)	units	na	6.76-7.63	7.07	6.68
AP-2	pH (field)	units	na	6.76-7.63	6.59	6.57
AP-3	pH (field)	units	na	6.76-7.63	6.76	6.77
AP-4	pH (field)	units	na	6.76-7.63	7.01	7.07
AP-5	pH (field)	units	na	6.76-7.63	7.42	7.32
RW-3	pH (field)	units	na	6.76-7.63	7.52	7.34
AP-1	Sulfate, total	mg/l	na	84.5	179	673
AP-2	Sulfate, total	mg/l	na	84.5	725	816
AP-3	Sulfate, total	mg/l	na	84.5	402	354
AP-4	Sulfate, total	mg/l	na	84.5	< 1.5	44.7
AP-5	Sulfate, total	mg/l	na	84.5	60.8	< 1.5
RW-3	Sulfate, total	mg/l	na	84.5	8.45	215
AP-1	Total Dissolved Solids	mg/l	na	597.94	550	1510
AP-2	Total Dissolved Solids	mg/l	na	597.94	1720	1860
AP-3	Total Dissolved Solids	mg/l	na	597.94	1090	913
AP-4	Total Dissolved Solids	mg/l	na	597.94	536	416
AP-5	Total Dissolved Solids	mg/l	na	597.94	420	518
RW-3	Total Dissolved Solids	mg/l	na	597.94	412	871

City Water, Light and Power
Power Plant Ash Impoundment
2019 Detection and Assessment Monitoring Results

Well	Parameter	Units	MCL EPA 40 CFR 141	Background AP-4 & AP-5	2/13/2019	8/1/2019
Appendix IV						
AP-1	Antimony, total	mg/l	0.006	0.016	< 0.016	< 0.016
AP-2	Antimony, total	mg/l	0.006	0.016	< 0.016	< 0.016
AP-3	Antimony, total	mg/l	0.006	0.016	< 0.016	< 0.016
AP-4	Antimony, total	mg/l	0.006	0.016	< 0.016	< 0.016
AP-5	Antimony, total	mg/l	0.006	0.016	< 0.016	< 0.016
RW-3	Antimony, total	mg/l	0.006	0.016	< 0.016	< 0.016
AP-1	Arsenic, total	mg/l	0.01	0.0724	< 0.025	< 0.025
AP-2	Arsenic, total	mg/l	0.01	0.0724	< 0.025	< 0.025
AP-3	Arsenic, total	mg/l	0.01	0.0724	< 0.025	< 0.025
AP-4	Arsenic, total	mg/l	0.01	0.0724	< 0.025	< 0.025
AP-5	Arsenic, total	mg/l	0.01	0.0724	< 0.025	< 0.025
RW-3	Arsenic, total	mg/l	0.01	0.0724	0.124	< 0.025
AP-1	Barium, total	mg/l	2	5.24	0.188	0.579
AP-2	Barium, total	mg/l	2	5.24	0.155	0.203
AP-3	Barium, total	mg/l	2	5.24	0.123	0.129
AP-4	Barium, total	mg/l	2	5.24	0.416	0.0842
AP-5	Barium, total	mg/l	2	5.24	0.06	0.428
RW-3	Barium, total	mg/l	2	5.24	0.221	0.3
AP-1	Beryllium, total	mg/l	0.004	0.0164	< 0.0025	< 0.016
AP-2	Beryllium, total	mg/l	0.004	0.0164	< 0.0025	< 0.016
AP-3	Beryllium, total	mg/l	0.004	0.0164	< 0.0025	< 0.016
AP-4	Beryllium, total	mg/l	0.004	0.0164	< 0.0025	< 0.016
AP-5	Beryllium, total	mg/l	0.004	0.0164	< 0.0025	< 0.016
RW-3	Beryllium, total	mg/l	0.004	0.0164	< 0.0025	< 0.016
AP-1	Cadmium, total	mg/l	0.005	0.0128	< 0.0025	< 0.012
AP-2	Cadmium, total	mg/l	0.005	0.0128	< 0.0025	< 0.012
AP-3	Cadmium, total	mg/l	0.005	0.0128	< 0.0025	< 0.012
AP-4	Cadmium, total	mg/l	0.005	0.0128	< 0.0025	< 0.012
AP-5	Cadmium, total	mg/l	0.005	0.0128	< 0.0025	< 0.012
RW-3	Cadmium, total	mg/l	0.005	0.0128	< 0.0025	< 0.012
AP-1	Chromium, total	mg/l	0.1	0.811	< 0.025	< 0.025
AP-2	Chromium, total	mg/l	0.1	0.811	< 0.025	< 0.025
AP-3	Chromium, total	mg/l	0.1	0.811	< 0.025	< 0.025
AP-4	Chromium, total	mg/l	0.1	0.811	< 0.025	< 0.025
AP-5	Chromium, total	mg/l	0.1	0.811	< 0.025	< 0.025
RW-3	Chromium, total	mg/l	0.1	0.811	< 0.025	< 0.025
AP-1	Cobalt, total	mg/l	na	0.297	< 0.025	< 0.025
AP-2	Cobalt, total	mg/l	na	0.297	< 0.025	< 0.025
AP-3	Cobalt, total	mg/l	na	0.297	< 0.025	< 0.025
AP-4	Cobalt, total	mg/l	na	0.297	< 0.025	< 0.025
AP-5	Cobalt, total	mg/l	na	0.297	< 0.025	< 0.025
RW-3	Cobalt, total	mg/l	na	0.297	< 0.025	< 0.025
AP-1	Lead, total	mg/l	na	0.638	< 0.025	< 0.025
AP-2	Lead, total	mg/l	na	0.638	< 0.025	< 0.025
AP-3	Lead, total	mg/l	na	0.638	< 0.025	< 0.025
AP-4	Lead, total	mg/l	na	0.638	< 0.025	< 0.025
AP-5	Lead, total	mg/l	na	0.638	< 0.025	< 0.025
RW-3	Lead, total	mg/l	na	0.638	< 0.025	< 0.025
AP-1	Lithium	mg/l	na	0.05	< 0.05	< 0.05
AP-2	Lithium	mg/l	na	0.05	< 0.05	< 0.05
AP-3	Lithium	mg/l	na	0.05	< 0.05	< 0.05
AP-4	Lithium	mg/l	na	0.05	< 0.05	< 0.05
AP-5	Lithium	mg/l	na	0.05	< 0.05	< 0.05
RW-3	Lithium	mg/l	na	0.05	< 0.05	< 0.05

City Water, Light and Power
Power Plant Ash Impoundment
2019 Detection and Assessment Monitoring Results

Well	Parameter	Units	MCL EPA 40 CFR 141	Background AP-4 & AP-5	2/13/2019	8/1/2019
AP-1	Mercury, total	mg/l	0.002	0.0008	< 0.0005	< 0.0005
AP-2	Mercury, total	mg/l	0.002	0.0008	< 0.0005	< 0.0005
AP-3	Mercury, total	mg/l	0.002	0.0008	< 0.0005	< 0.0005
AP-4	Mercury, total	mg/l	0.002	0.0008	< 0.0005	< 0.0005
AP-5	Mercury, total	mg/l	0.002	0.0008	< 0.0005	< 0.0005
RW-3	Mercury, total	mg/l	0.002	0.0008	< 0.0005	< 0.0005
AP-1	Molybdenum	mg/l	na	0.025	< 0.025	< 0.025
AP-2	Molybdenum	mg/l	na	0.025	< 0.025	< 0.025
AP-3	Molybdenum	mg/l	na	0.025	< 0.025	< 0.025
AP-4	Molybdenum	mg/l	na	0.025	< 0.025	< 0.025
AP-5	Molybdenum	mg/l	na	0.025	< 0.025	< 0.025
RW-3	Molybdenum	mg/l	na	0.025	< 0.025	< 0.025
AP-1	Radium-226	pCi/l	Note 2	7.1	0.34	0.3
AP-2	Radium-226	pCi/l	Note 2	7.1	0.91	0.374
AP-3	Radium-226	pCi/l	Note 2	7.1	0.68	0.769
AP-4	Radium-226	pCi/l	Note 2	7.1	0.77	0.39
AP-5	Radium-226	pCi/l	Note 2	7.1	0.29	0.892
RW-3	Radium-226	pCi/l	Note 2	7.1	0.6	0.487
AP-1	Radium-228	pCi/l	Note 2	5.1	0.59	1.55
AP-2	Radium-228	pCi/l	Note 2	5.1	1.7	0.76
AP-3	Radium-228	pCi/l	Note 2	5.1	1.8	0.741
AP-4	Radium-228	pCi/l	Note 2	5.1	1.8	0.2
AP-5	Radium-228	pCi/l	Note 2	5.1	0.54	0.358
RW-3	Radium-228	pCi/l	Note 2	5.1	0.5	0.307
AP-1	Radium-226 + Radium-228	pCi/l	5	Note 2	0.93	1.85
AP-2	Radium-226 + Radium-228	pCi/l	5	Note 2	2.61	1.134
AP-3	Radium-226 + Radium-228	pCi/l	5	Note 2	2.48	1.51
AP-4	Radium-226 + Radium-228	pCi/l	5	Note 2	2.57	0.59
AP-5	Radium-226 + Radium-228	pCi/l	5	Note 2	0.83	1.25
RW-3	Radium-226 + Radium-228	pCi/l	5	Note 2	1.1	0.794
AP-1	Selenium, total	mg/l	0.05	0.0079	< 0.025	< 0.025
AP-2	Selenium, total	mg/l	0.05	0.0079	< 0.025	< 0.025
AP-3	Selenium, total	mg/l	0.05	0.0079	< 0.025	< 0.025
AP-4	Selenium, total	mg/l	0.05	0.0079	< 0.025	< 0.025
AP-5	Selenium, total	mg/l	0.05	0.0079	< 0.025	< 0.025
RW-3	Selenium, total	mg/l	0.05	0.0079	< 0.025	< 0.025
AP-1	Thallium, total	mg/l	0.002	0.00556	< 0.005	< 0.005
AP-2	Thallium, total	mg/l	0.002	0.00556	< 0.005	< 0.005
AP-3	Thallium, total	mg/l	0.002	0.00556	< 0.005	< 0.005
AP-4	Thallium, total	mg/l	0.002	0.00556	< 0.005	< 0.005
AP-5	Thallium, total	mg/l	0.002	0.00556	< 0.005	< 0.005
RW-3	Thallium, total	mg/l	0.002	0.00556	< 0.005	< 0.005

Notes:

1. A yellow shaded value indicates and exceedance of the higher of the MCL or the Background. The comparison value that was used is highlighted grey.

2. The 40 CFR 257 list requires Radium-226 and Radium-228 combined. The established MCL is for the combined parameters. However, these parameters require two separate analysis and have been reported separately by the analytical laboratory. The sum of the values has been provided and compared to the MCL. Background values have been calculated for the individual parameters.

TABLE 2
City Water, Light and Power
Lakeside and Dalman Ash Impoundments
Assessment Investigation Results

Parameter	Units	MCL EPA 40 CFR 141	Background AP-4 & AP-5	GP-8 5/16/2019	GP-7 5/16/2019	GP-6 5/17/2019	GP-4 5/17/2019	GP-1 7/11/2019	GP-2 7/11/2019	GP-3 7/11/2019	GP-7 7/11/2019	GP-6 7/26/2019
Appendix III												
Boron, total	mg/l	na	0.787	0.359	0.949	0.321	1.17	0.34	0.531	0.0686	0.169	0.337
Calcium, total	mg/l	na	176.63	534	1560	275	174	129	63.8	72.6	111	66.1
Chloride, total	mg/l	na	24.2	18.7	30	25.6	24.2	15.2	74.8	2.91	16.2	46.7
Fluoride, total	mg/l	4	0.62	< 0.25	< 0.25	0.32	< 0.25	< 0.2	0.657	< 0.2	< 0.2	0.59
pH (field)	units	na	6.76-7.63	6.49	7.01	6.76	6.84	7.12	7.68	7.43	6.92	6.95
Sulfate, total	mg/l	na	84.5	223	585	57.7	298	12.4	< 1	59	4.56	7.88
Total Dissolved Solids	mg/l	na	597.94	1760	1760	564	910	498	516	223	464	458
Appendix IV												
Antimony, total	mg/l	0.006	0.016	< ***0.4***	< ***0.4***	< ***0.025***	< ***0.025***	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Arsenic, total	mg/l	0.01	0.0724	< ***0.4***	1.82	0.13	< 0.025	< 0.0025	0.0365	< 0.0025	< 0.0025	< 0.0025
Barium, total	mg/l	2	5.24	1.72	5.75	1.6	0.217	0.25	0.211	0.0605	0.221	0.18
Beryllium, total	mg/l	0.004	0.0164	< ***0.04***	0.0644	0.0146	< 0.0025	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cadmium, total	mg/l	0.005	0.0128	< ***0.04***	< ***0.04***	0.0053	< 0.0025	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chromium, total	mg/l	0.1	0.811	< 0.4	2.42	0.412	< 0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cobalt, total	mg/l	na	0.297	< ***0.4***	1.41	0.178	< 0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Lead, total	mg/l	na	0.638	< 0.4	1.71	0.2	< 0.025	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Lithium	mg/l	na	0.05	0.155	1.44	0.271	< 0.05	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Mercury, total	mg/l	0.002	0.0008	0.00062	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Molybdenum	mg/l	na	0.025	< ***0.4***	< ***0.4***	< 0.025	< 0.025	< 0.0025	< 0.0025	< 0.0025	< 0.0025	< 0.0025
Selenium, total	mg/l	0.05	0.0079	< ***0.4***	< ***0.4***	0.0541	< 0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thallium, total	mg/l	0.002	0.00556	< ***0.4***	< ***0.4***	< ***0.025***	< ***0.025***	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
				dilution of 50	dilution of 50	dilution of 5	dilution of 5					

Notes:

1. A yellow shaded value indicates and exceedance of the higher of the MCL or the Background (Groundwater Protection Standard). The comparison value that was used is highlighted grey.

2. A bold and italicized value indicates that the reporting limits was higher than the comparison value.

3. For the Appendix IV parameters, the higher of the MCL or Background Concentration is the Groundwater Protection Standard.

4. 1" dia. Temporary wells (May 2019) and 2" dia. Temporary wells (July 2019) were installed at GP-6 and GP-7 locations.