BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	AS 2021-001
PETITION OF MIDWEST	)	
GENERATION, LLC FOR AN	)	
ADJUSTED STANDARD FROM	)	(Adjusted Standard)
845.740(a) AND FINDING OF	)	
INAPPLICABILITY OF PART 845	)	
(JOLIET 29 STATION)	)	

NOTICE OF FILING

To: See attached Service List

PLEASE TAKE NOTICE that I have today electronically filed with the Office of the Clerk of the Pollution Control Board Midwest Generation, LLC's Exhibits Introduced at Hearing, a copy of which is herewith served upon you.

Dated: July 1, 2022

MIDWEST GENERATION, LLC

By: /s/Kristen L. Gale

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CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that a true copy of the foregoing Notice of Filing, and Midwest Generation, LLC's Exhibits Introduced at Hearing was electronically filed on July 1, 2022 with the following:

Don Brown, Clerk of the Board
Illinois Pollution Control Board
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and that copies were sent via e-mail on July 1, 2022 to the parties on the service list.

Dated: July 1, 2022 /s/Kristen L. Gale _____

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	**)**	
	)	
Petition of Midwest Generation	**)**	
for an Adjusted Standard from 845.740(a)	**)**	
and Finding of Inapplicability of Part 845	**)**	**AS 2021-001**
(Joliet 29 Station)	**)**	
	)	
	)	

EXHIBITS INTRODUCED AT HEARING

Midwest Generation, L.L.C. ("Midwest Generation" or "MWG"), pursuant to 35 Ill. Adm. Code 101.627, submits the attached MWG exhibits 30 through 38, which were introduced and admitted at the hearing on June 28 and 29, 2022. MWG exhibits 1 through 28 were also admitted, and were electronically filed as attachments to MWG's Petition for an Adjusted Standard from 35 Ill. Adm. 845.740(a) and Finding of Inapplicability of Part 845 and its Response to the Illinois EPA's Recommendation. MWG exhibit 29, which is a piece of poz-o-pac, was admitted, but cannot be electronically filed.

Pursuant to Section 101.627(c), MWG certifies that each hearing exhibit filed is an accurate reproduction of the corresponding exhibit offered at the hearing.

MIDWEST GENERATION, LLC

By: ___/s/Kristen L. Gale _____

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EXHIBIT 30

Road salt retention and transport in soils and subsequent releases of toxic trace elements to porewaters

T. Baraza Piazuelo* & E.A. Hasenmueller

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Introduction

- Road salts are widely used to improve winter travel safety. Once on roadways, salts (mostly NaCl) are easily dissolved by precipitation.
- Road salts in soils can trigger ion exchange processes (Fig. 1), which can cause Na^+ and Cl^- retention and the mobilization of other ions that can then be released to groundwater over longer timescales.
- Mobilized ions include plant nutrients (e.g., Ca^{2+}, Mg^{2+}, K^+) and toxic trace elements (e.g., As, Pb, Cu).

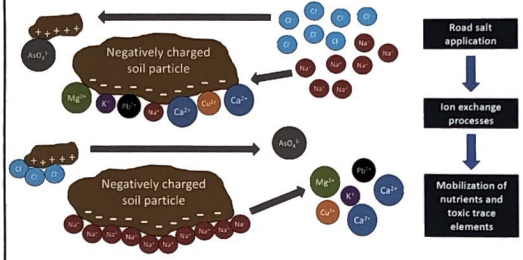


Fig. 1. Ion exchange processes, triggered by the introduction of Na^+ and Cl^- to soils, cause the release of nutrients and toxic trace elements.

Study site and methods

- Soil porewater sampling was conducted at the Rockwoods Reservation (Wildwood, MO, USA).
- Soil waters were collected with ten soil water samplers divided into nests. Each nest had samplers at different depths and distances from a road (Figs. 2-3). Chemical analyses of the samples were performed with ICP-OES, ICP-MS, and IC instrumentation.

Fig 2. (a) Close-up of two of the installed soil water samplers. (b) Samplers in nest B (see Fig. 3) that were installed 1.5 m away from the road. The white hue on the road is from a recent salt application.

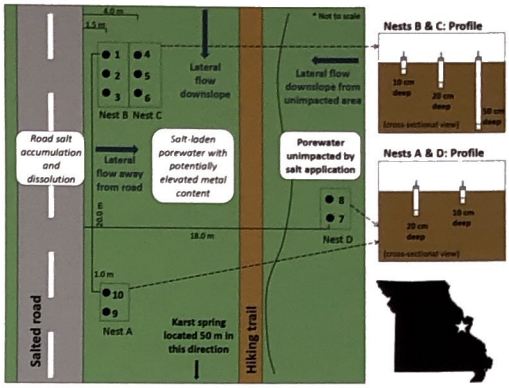


Fig. 3. Schematic plan view of the location of the ten soil porewater samplers in the study area. They are divided in four different nests (A-D).

Road salt retention in soils

- Large Na^+ and Cl^- peaks in porewater occurred in nest A at 10 cm deep on 18 January 2019, 7 days after a large salt application. Concentrations peaked in nest A's 20 cm deep sampler 5 days later (Fig. 4; red arrows).
- The timing of these peaks allowed us to estimate lateral and vertical salt movement through soil of about 14.3 and 2.0 cm/day, respectively.
- A significant increase in porewater Na^+ 2-4 months after the 2017-2018 road salting season (Fig. 4a; red box) illustrated Na^+ retention and subsequent release.

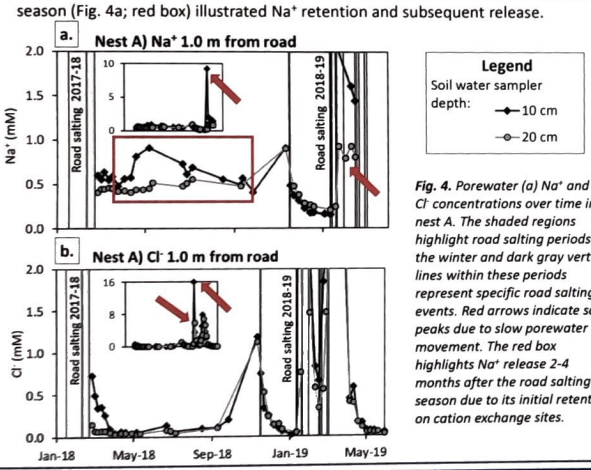


Fig. 4. Porewater (a) Na^+ and (b) Cl^- concentrations over time in nest A. The shaded regions highlight road salting periods in the winter and dark gray vertical lines within these periods represent specific road salting events. Red arrows indicate salt peaks due to slow porewater movement. The red box highlights Na^+ release 2-4 months after the road salting season due to its initial retention on cation exchange sites.

Major cation exchange and release

- The introduction of large amounts of Na^+ ions to the soil caused the release and mobilization of major cations (e.g., Ca^{2+}, Mg^{2+}, K^+). Indeed, base cations peaked at the same time as Na^+ and Cl^- in porewater (e.g., Ca^{2+}; Fig. 5; red arrows).
- Comparison of the molar ratios of various cations and Cl^- (Fig. 6) also supported the presence of cation exchange reactions in the soil. The porewater Na^+:Cl^- ratio suggests Na^+ retention. When the excess concentrations of exchangeable cations are consecutively added to the Na^+ values, the expected 1:1 cation to anion ratio in salt is nearly restored.

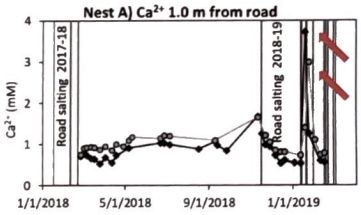


Fig. 5. Porewater Ca^{2+} concentrations over time in nest A.

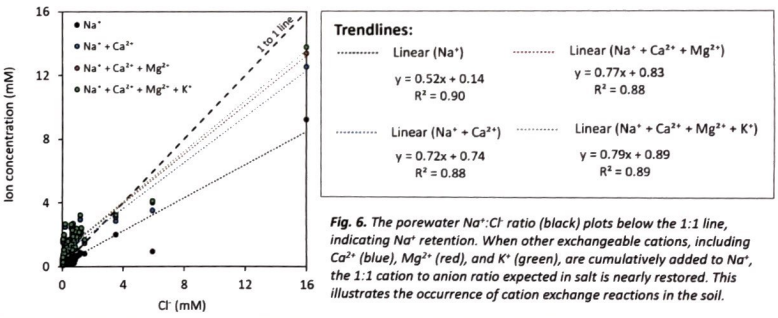


Fig. 6. The porewater Na^+:Cl^- ratio (black) plots below the 1:1 line, indicating Na^+ retention. When other exchangeable cations, including Ca^{2+} (blue), Mg^{2+} (red), and K^+ (green), are cumulatively added to Na^+, the 1:1 cation to anion ratio expected in salt is nearly restored. This illustrates the occurrence of cation exchange reactions in the soil.

Trace element releases to porewater

- The release of trace elements (e.g., total As (which is toxic), Fe, Rb; Fig. 7) triggered by the application of road salts was observed when these elements' concentrations peaked at the same time as Na^+ and Cl^- (compare with Fig. 4).

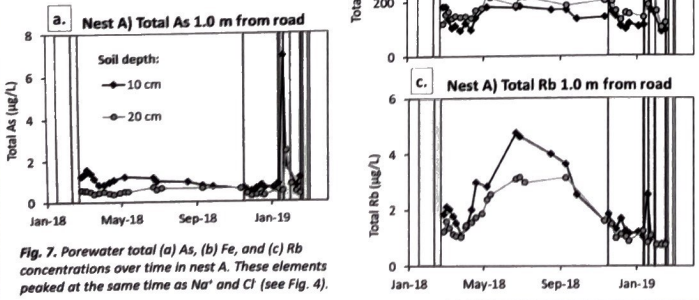
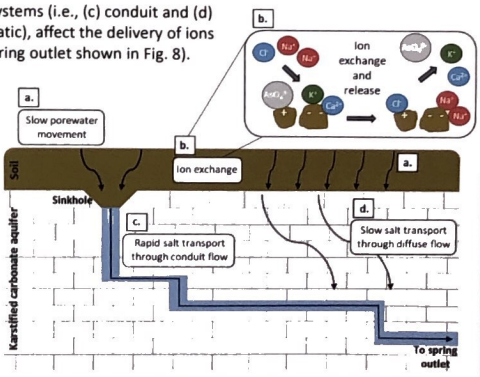


Fig. 7. Porewater total (a) As, (b) Fe, and (c) Rb concentrations over time in nest A. These elements peaked at the same time as Na^+ and Cl^- (see Fig. 4).

Implications for shallow groundwater

- We found that Na^+ and Cl^- were temporarily retained in soils due to (a) slow porewater movement and (b) ion exchange processes. The latter process caused the release of base cations and trace elements that can potentially be lost by leaching to the shallow groundwater (Fig. 8).
- Complex flow paths in karst systems (i.e., (c) conduit and (d) diffuse flow; see Fig. 8 schematic), affect the delivery of ions to surface waters (e.g., the spring outlet shown in Fig. 8).

Fig. 8. Temporary Na^+ and Cl^- retention in soils due to (a) slow porewater movement and (b) ion exchange reactions cause the mobilization of plant nutrients and trace elements. In the aquifer, ion transport occurs through (c) conduit and (d) diffuse flow, which affect ion delivery to surface waters.



Conclusions

- We found that Na^+ and Cl^- concentrations remained high in soil water for an extended period of time after road salt applications. The accumulation and delayed release of these ions to porewater and shallow groundwater could be driving the overall increase in salinity observed in surface waters and groundwaters.
- Ion exchange processes in soils, which are triggered by the application of excessive road deicing salts, can cause the release of trace elements, including toxic species like As. Once released from soil exchange sites, these elements become mobile and can pose a threat to soil and groundwater ecosystems. They can also impact drinking water supplies.

Acknowledgements

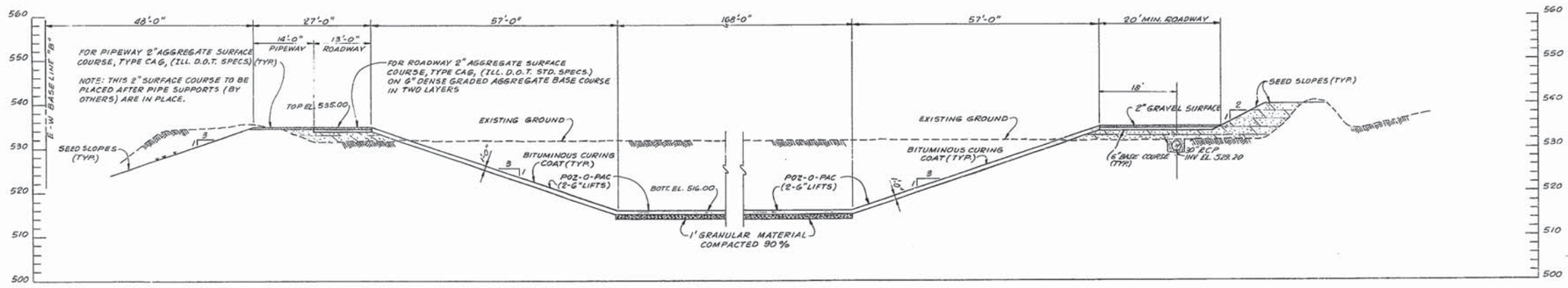
This project was funded by: (1) The 2018 William L. and Diane C. Wilson Scholarship in Karst Science awarded by The Karst Waters Institute to TBP, (2) The 2018 Graduate Research Grant awarded by the Geological Society of America to TBP, (3) The 2018 Graduate/Undergraduate Research Collaboration Fund awarded by Saint Louis University's College of Arts and Sciences to TBP, and (4) other Saint Louis University funds. The ICP-OES used to collect data for this project was funded by the National Science Foundation (CHE-1626501) and Saint Louis University. We would like to thank those who helped with field and lab work during the course of this project.

EXHIBIT 31

DWG. NO. 5079 C5019 REV. 2

5079C5019 SH2

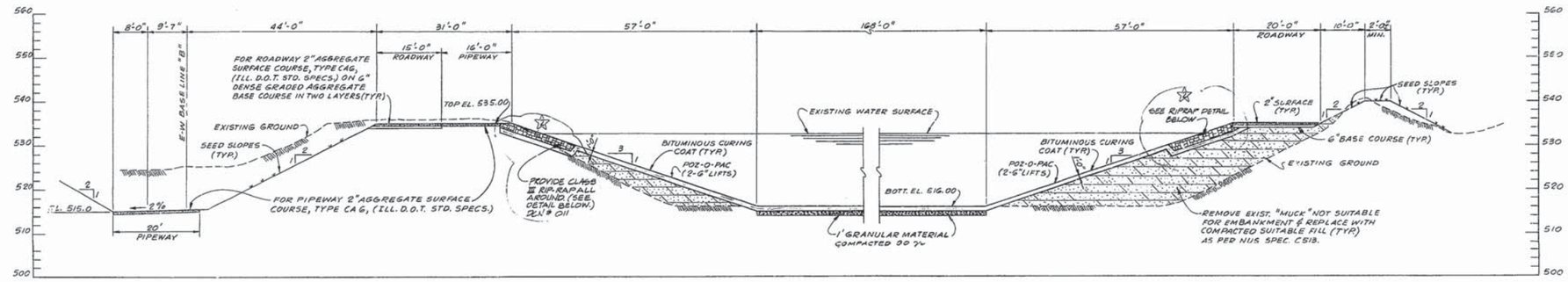
REVISIONS	
REV.	DESCRIPTION
1 5/7/79	APPROVED FOR CONSTRUCTION
2 7/27/79	REVISED POZ-O-PAC MIX IN NOTE 2 AS PER DCN # 002. ADDED RIPRAP DETAIL, ACCESS RAMP DETAIL & ADDED RIPRAP TO TYP SECTION THRU ASH POND #1 AS PER DCN # 011.



TYPICAL SECTION THROUGH ASH POND NO. 2

SCALE: HORIZ. 1" = 10'
VERT. 1" = 10'

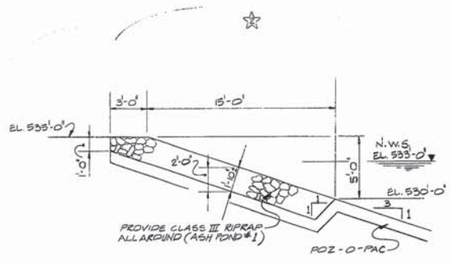
SECTION 5 (C5079)



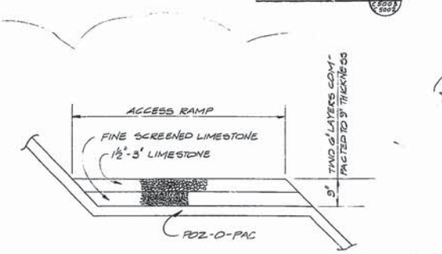
TYPICAL SECTION THROUGH ASH POND NO. 1

SCALE: HORIZ. 1" = 10'
VERT. 1" = 10'

SECTION 7 (C5079)



RIPRAP DETAIL (ASH POND #1 ONLY)



ACCESS RAMP DETAIL (ASH POND #1 ONLY)

POZ-O-PAC NOTES:

1. ALLOW A MINIMUM OF 7 DAYS CURING OF POZ-O-PAC PRIOR TO APPLICATION OF THE BITUMINOUS SEAL COAT.
2. THE POZ-O-PAC SHALL BE COMPOSED OF THE FOLLOWING MIX: 1) HYDRATED LIME 3 %, 2) FLY ASH 20 %, 3) BOILER SLAG AGGREGATE 77 %. POZ-O-PAC DENSITY 130.9 # PER CUBIC FT. (DCN 002)
3. THE 1 FOOT LAYER OF POZ-O-PAC SHALL BE COMPACTED WITH 2-6" LIFTS UNTIL THE DESIRED DENSITY IS OBTAINED.
4. PRIOR TO THE INSTALLATION OF THE POZ-O-PAC, THE SUBBASE SHALL BE PREPARED BY UNDERCUTTING TO A MINIMUM OF 1 FOOT BELOW THE BOTTOM OF THE POZ-O-PAC FILLING WITH 2-6" LIFTS TO A COMPACTION OF 90 % PROCTOR WITH CONSOLIDATION.

Sudhakar P Verma 6/17/78

DRAWING STATUS: APPROVED FOR CONSTRUCTION 6/17/78

DRAWN M. Faulkenberg	5/14/79	COMMONWEALTH EDISON COMPANY WASTE WATER TREATMENT FACILITIES JOLIET 7-8
CHECKED S.J.W. Pauken	5/15/79	
ASSOC. ENGINEER Ernest E. Hammer	5/16/79	PONDS & BASINS PROFILES SECTIONS & DETAILS
DESIGN SUB. APPVL. S.P. Verma	5/17/79	
APPROVAL-DESIGN Ernest Hammer	5/18/79	CECO CONTRACT 802647 / CECO DWG. NO. / REV.
APPROVAL		NUS CORPORATION ROCKVILLE, MD. / DRAWING NO. 5079C5019 / REV. 2
APPROVAL CLIENT	7/18/79	SCALE: AS NOTED / SHEET 2 OF 3

EXHIBIT 32

DATA SUMMARY POSTING

Station: Midwest Generation Joliet #29 Generating Station

Regulated Unit(s): Pond 2 (IEPA ID No. W1970450047-02)

In accordance with the new Ill. Adm. Code Title 35, Part 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (State CCR Rule) groundwater monitoring was completed during the 2nd quarter 2021 which includes the entire list of parameters specified under Section 845.600(a)(1) and (b). Table 1 is a summary table of all available CCR monitoring data to date including any data generated previously as part of the Federal CCR Rule monitoring. In addition, Table 2 provides a summary of turbidity data which was collected as part of State CCR Rule requirements which is a data parameter that was not required under the Federal CCR Rule.

No background statistics or proposed Groundwater Protection Standards are included on these tables as they will be calculated and proposed as part of the Operating Permit submittals due by October 31, 2021. Upon Illinois Environmental Protection Agency approval of the Operating Permit, the approved comparison values will be included for subsequent data comparisons/evaluations.

Table 1. Groundwater Analytical Results - Midwest Generation, LLC, Joliet Station #29, Joliet, IL.

Well	Date	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Molybdenum	Radium 226 + 228	Selenium	Thallium
MW-10 up-gradient	10/28/2015	0.47	100	200	0.41	7.04	84	790	< 0.003	< 0.001	0.041	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.41	< 0.0005	0.013	< 0.0002	0.0060	0.2981	< 0.0025	< 0.002
	2/10/2016	0.41	100	210	0.44	7.17	120	820	< 0.003	0.001	0.043	< 0.001	< 0.0005	< 0.005	< 0.001	0.44	< 0.0005	0.011	< 0.0002	0.0067	< 0.438	< 0.0025	< 0.002
	5/12/2016	0.29	100	300	0.42	7.02	110	920	< 0.003	< 0.001	0.046	< 0.001	< 0.0005	< 0.005	< 0.001	0.42	< 0.0005	0.012	< 0.0002	0.0051	< 0.414	< 0.0025	< 0.002
	8/31/2016	0.36	89	170	0.46	6.95	100	760	< 0.003	< 0.001	0.039	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.46	< 0.0005	0.010	< 0.0002	0.0077	< 0.394	< 0.0025	< 0.002
	11/2/2016	0.48	100	130	0.45	6.99	95	720	< 0.003	0.0018	0.035	< 0.001	< 0.0005	< 0.005	< 0.001	0.45	0.0014	0.011	< 0.0002	0.0061	0.626	< 0.0025	< 0.002
	2/6/2017	0.44	120	190	0.36	6.99	88	820	< 0.003	0.0011	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	0.36	0.00086	0.014	< 0.0002	0.0056	< 0.389	< 0.0025	< 0.002
	4/26/2017	0.35	120	200	0.35	7.27	87	760	< 0.003	0.0015	0.046	< 0.001	< 0.0005	< 0.005	< 0.001	0.35	0.0012	< 0.01	< 0.0002	0.006	< 0.34	< 0.0025	< 0.002
	6/14/2017	0.29	91	160	0.43	7.47	75	690	< 0.003	< 0.001	0.034	< 0.001	< 0.0005	< 0.005	< 0.001	0.43	< 0.0005	0.012	< 0.0002	0.0072	< 0.356	< 0.0025	< 0.002
	8/2/2017	0.45	97	170	0.38	7.23	110	750	< 0.003	0.0011	0.036	< 0.001	< 0.0005	< 0.005	< 0.001	0.38	< 0.0005	0.011	< 0.0002	0.0079	0.429	< 0.0025	< 0.002
	10/18/2017	0.61	120	140	0.41	7.11	130	820	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/24/2018	0.4	110	260	0.39	7.28	120	910	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	0.63	120	180	0.42	7.30	110	810	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/24/2018 R	0.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/7/2019	0.56	130	410	0.39	7.17	95	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/3/2019 R	NA	NA	230	NA	NA	NA	830	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/7/2019	0.35	90	130	0.36	7.40	59	650	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/20/2020	0.85	120	250	0.41	6.90	100	960	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/11/2020 R	0.26	NA	NA	NA	NA	NA	770	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2020	0.34	110	230	0.41	7.11	93	850	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/18/2021	0.33	140	350	0.39	7.16	210	1,200	< 0.003	0.0014	0.06	< 0.001	< 0.0005	< 0.005	< 0.001	0.39	< 0.0005	0.015	< 0.0002	0.0055	< 0.4800	< 0.0025	< 0.002
	6/29/2021 R	NA	160	420	NA	NA	190	1,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-03 down-gradient	10/28/2015	0.34	110	230	0.41	7.11	110	960	0.003	0.0015	0.100	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.41	< 0.0005	0.013	< 0.0002	< 0.0050	0.41	< 0.0025	< 0.002
	2/10/2016	0.49	100	220	0.44	7.31	130	790	0.003	0.0017	0.100	< 0.001	< 0.0005	< 0.005	< 0.001	0.44	< 0.0005	0.011	< 0.0002	0.0060	< 1.68	0.0045	< 0.002
	5/10/2016	0.48	95	240	0.44	7.07	130	800	0.003	0.0011	0.095	< 0.001	< 0.0005	< 0.005	< 0.001	0.44	< 0.0005	0.012	< 0.0002	0.0062	< 0.326	0.0030	< 0.002
	8/31/2016	0.49	100	250	0.45	7.18	120	920	0.003	0.0013	0.095	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.45	< 0.0005	0.012	< 0.0002	0.0086	< 0.373	0.0051	< 0.002
	11/2/2016	0.34	87	190	0.44	7.45	94	780	0.003	0.0019	0.082	< 0.001	< 0.0005	0.0051	< 0.001	0.44	< 0.0005	< 0.010	< 0.0002	0.0059	0.965	0.0032	< 0.002
	2/6/2017	0.40	97	140	0.39	7.35	77	720	0.003	0.0019	0.093	< 0.001	< 0.0005	< 0.005	< 0.001	0.39	< 0.0005	0.012	< 0.0002	0.0066	< 0.356	0.0028	< 0.002
	4/26/2017	0.54	100	210	0.36	7.03	120	820	0.003	0.0017	0.11	< 0.001	< 0.0005	< 0.005	< 0.001	0.36	< 0.0005	0.010	< 0.0002	0.0088	< 0.411	0.0052	< 0.002
	6/14/2017	0.45	88	190	0.44	7.48	75	760	0.003	0.0014	0.09	< 0.001	< 0.0005	< 0.005	< 0.001	0.44	< 0.0005	0.012	< 0.0002	0.0072	< 0.358	0.0037	< 0.002
	8/2/2017	0.41	99	200	0.40	7.34	110	850	0.003	0.0022	0.10	< 0.001	< 0.0005	< 0.005	< 0.001	0.40	< 0.0005	0.011	< 0.0002	0.0065	0.414	0.005	< 0.002
	10/18/2017	0.35	93	160	0.42	7.11	100	850	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/24/2018	0.52	100	220	0.42	7.2	150	930	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/31/2018 R	NA	NA	NA	NA	NA	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	0.25	100	250	0.4	7.04	110	870	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/7/2019	0.43	120	280	0.4	7.27	140	880	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/3/2019 R	NA	NA	NA	NA	NA	65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/7/2019	0.34	100	150	0.4	7.32	65	660	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/20/2020	0.38	100	230	0.42	7.56	78	960	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/11/2020 R	NA	NA	NA	NA	NA	NA	930	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2020	0.32	110	180	0.43	7.23	90	770	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/18/2021	0.28	130	290	0.4	7.13	190	1,200	< 0.003	0.0016	0.14	< 0.001	< 0.0005	< 0.005	0.0011	0.4	< 0.0005	0.014	< 0.0002	< 0.0050	1.1000	< 0.0025	< 0.002
	6/29/2021 R	NA	NA	NA	NA	NA	210	1,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-04 down-gradient	10/28/2015	0.34	94	F1 200	0.45	7.07	83	740	< 0.003	0.0013	0.082	^ < 0.001	< 0.0005	< 0.005	0.0063	0.45	< 0.0005	0.013	< 0.0002	0.0065	0.741	< 0.0025	< 0.002
	2/10/2016	0.32	97	210	0.47	7.22	140	810	< 0.003	0.0018	0.088	< 0.001	< 0.0005	< 0.005	0.0074	0.47	0.00062	0.011	< 0.0002	0.0063	< 1.52	< 0.0025	< 0.002
	5/10/2016	0.47	100	260	0.46	6.71	150	900	< 0.003	0.0014	0.088	< 0.001	< 0.0005	< 0.005	0.0086	0.46	< 0.0005	0.012	< 0.0002	0.0088	< 0.365	< 0.0025	< 0.002
	8/31/2016	0.42	100	210	0.45	7.07	120	890	< 0.003	0.0014	0.086	^ < 0.001	< 0.0005	< 0.005	0.0035	0.45	< 0.0005	0.011	< 0.0002	0.0083	0.432	< 0.0025	< 0.002
	11/2/2016	0.32	98	160	0.43	7.25	83	750	< 0.003	0.0025	0.079	< 0.001	< 0.0005	< 0.005	0.0100	0.43	0.0012	0.012	< 0.0002	0.007	< 0.463	< 0.0025	< 0.002
	2/6/2017	0.40	110	200	0.37	7.19	98	790	< 0.003	0.0015	0.100	< 0.001	< 0.0005	< 0.005	0.0160	0.37	< 0.0005	0.013	< 0.0002	0.0071	< 0.356	< 0.0025	< 0.002
	4/26/2017	0.33	100	220	0.37	7.46	89	770	< 0.003	0.0021	0.095	< 0.001	< 0.0005	< 0.005	0.0078	0.37	0.00055	0.012	< 0.0002	0.0069	< 0.35	< 0.0025	< 0.002
	6/14/2017	0.37	92	190	0.47	7.43	80	770	< 0.003	0.0013	0.078	< 0.001	< 0.0005	< 0.005	0.0120	0.47	< 0.0005	0.013	< 0.0002	0.0085	< 0.309	< 0.0025	< 0.002
	8/2/2017	0.35	93	180	0.43	7.41	100	770	< 0.003	0.0013	0.077	< 0.001	< 0.0005	0.04	0.0031	0.43	< 0.0005	0.012	< 0.0002	0.0091	< 0.282	0.0029	< 0.002
	10/18/2017	0.54	97	140	0.45	7.2	120	790	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/24/2018	0.4	110	240	0.43	7.21	160	940	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/31/2018 R	NA	NA	NA	NA	NA	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	0.29	100	230	0.45	7.2	130	840	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/7/2019	0.76	120	340	0.42	7.27	120	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/3/2019 R	0.23	NA	250	NA	NA	NA	870	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2019	0.3	77	140	0.41	7.33	53	670	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/20/2020	0.79	110	250	0.45	7.3	110	1,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/11/2020 R	0.28	NA	NA	NA	NA	NA	850	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2020	0.33	100	190	0.48	7.15	83	770	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/18/2021	0.22	120	280	0.42	7.3	190	1,100	< 0.003	0.0019	0.12	< 0.001	< 0.0005	< 0.005	0.0037	0.42	< 0.0005	0.014	< 0.0002	< 0.005	< 0.4450	< 0.0025	< 0.002
	6/29/2021 R	NA	NA	NA	NA	NA	190	1,200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-05 down-gradient	10/28/2015	0.64	100	160	0.39	7.12	120	790	< 0.003	0.0011	0.057	^ < 0.001	< 0.0005	< 0.005	0.0013	0.39	< 0.0005	0.018	< 0.0002	0.0088	0.6231	0.0031	< 0.002
	2/10/2016	0.46	110	220	0.39	7.25	120	790	< 0.003	0.0028	0.071	< 0.001	< 0.0005	0.0062	0.0013	0.39	0.0022	< 0.02	< 0.0002	F1 0.0053	1.09	< 0.0025	< 0.002
	5/10/2016	0.8	150	220	0.46	6.88	290	950	< 0.003	0.0023	0.075	< 0.001	< 0.0005	< 0.005	< 0.001	0.46	0.0022	0.014	< 0.0002	0.008	< 0.40	0.019	< 0.002
	8/31/2016	1.0	140	99	0.56	6.81	260	820	< 0.003	< 0.001	0.07	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.56	< 0.0005	< 0.01	< 0.0002	0.012	< 0.42	0.02	< 0.002
	11/2/2016	0.41	98	130	0.37	7.26	100	700	< 0.003	0.0022	0.056	< 0.001	< 0.0005	0.0051	< 0.001	0.37	0.0017	0.015	< 0.0002	0.0061	0.438	< 0.0025	< 0.002
	2/6/2017	0.48	150	180	0.30	7.22	120	790	< 0.003	0.0016	0.082	< 0.001	< 0.0005	< 0.005	< 0.001	0.30	0.0016	0.021	< 0.0002	< 0.005	0.564	0.0029	< 0.002
	4/26/2017	0.67	110	F1 190	0.37	7.28	170	770	< 0.003	0.0014	0.063	< 0.001	< 0.0005	< 0.005	< 0.001	0.37	0.0008	< 0.01	< 0.0002	0.0066	< 0.411	0.013	< 0.002
	6/14/2017	0.44	75	150	0.46	7.45	110	670	< 0.003	0.0012	0.044	< 0.001	< 0.0005	< 0.005	< 0.001	0.46	< 0.0005	0.013	< 0.0002	0.0076	< 0.316	0.0029	< 0.002
	8/2/2017	0.28	83	170	0.35	7.30	99	770	< 0.003	< 0.001	0.054	< 0.001	< 0.0005	< 0.005	< 0.001	0.35	< 0.0005	0.014	< 0.0002	0.0053	0.659	< 0.0025	< 0.002
	10/18/2017	0.42	110	110	0.38	7.16	95	720	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/24/2018	0.31	110	300	0.34	7.33	130	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/31/2018 R	NA	NA	NA	NA	NA	NA	940	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	0.31	110	210	0.36	7.29	93	810	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/6/2019	0.38	130	500	0.31	7.11	84	1,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/3/2019 R	NA	NA	150	NA	NA	NA	890	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/7/2019	0.31	180	130	0.3	7.44	64	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/4/2019 R	NA	89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/20/2020	0.32	100	270	0.37	7.03	67	890	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2020	0.52	92	180	0.38	7.16	85	720	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/18/2021	0.37	130	410	0.3	7.00	160	1,300	< 0.003	0.0015	0.1	< 0.001	< 0.0005	< 0.0050	< 0.0010	0.3	< 0.0005	0.023	< 0.0002	< 0.005	< 0.5970	< 0.0025	< 0.002
	6/29/2021 R	NA	NA	430	NA	NA	150	1,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All units are in mg/l except pH is in stan

F1 - MS and/or MSD Recovery outside of limits.

NA - Not analyzed. No confirmation resample required.

Table 2. Groundwater Turbidity - Midwest Generation, LLC, Joliet Station #29, Joliet, IL.

Well ID	Date	Turbidity (NTU)
MW-03	3/2/2021	0.45
	4/10/2021	22.9
	4/25/2021	2.40
	5/18/2021	2.53
	6/11/2021	2.34
	6/29/2021	2.86
MW-04	3/2/2021	81.89
	4/10/2021	5.96
	4/25/2021	3.02
	5/18/2021	2.52
	6/11/2021	2.8
	6/29/201	3.34
MW-05	2/25/2021	1.57
	4/10/2021	8.36
	4/25/2021	2.42
	5/17/2021	5.2
	6/11/2021	14.22
	6/29/2021	5.33
MW-10	3/2/2021	26.07
	4/10/2021	7.31
	4/25/2021	5.21
	5/18/2021	3.73
	6/11/2021	6.65
	6/29/2021	9.49

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Tel: (708)534-5200

Laboratory Job ID: 500-199296-1
Client Project/Site: Joliet #29 CCR

For:
Midwest Generation EME LLC
1800 Channahon Road
Joliet, Illinois 60436

Attn: DeAndre Cooley

Diana Mockler

Authorized for release by:
6/15/2021 1:36:14 PM

Diana Mockler, Project Manager I
(219)252-7570
Diana.Mockler@Eurofinset.com

Table of Contents

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Job ID: 500-199296-1

Laboratory: Eurofins TestAmerica, Chicago

Narrative

Job Narrative
500-199296-1

Comments
No additional comments.

Receipt
The samples were received on 5/18/2021 1:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 5.5º C, 5.9º C and 6.0º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL CHI
6020A	Metals (ICP/MS)	SW846	TAL CHI
7470A	Mercury (CVAA)	SW846	TAL CHI
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CHI
SM 4500 Cl- E	Chloride, Total	SM	TAL CHI
SM 4500 F C	Fluoride	SM	TAL CHI
SM 4500 SO4 E	Sulfate, Total	SM	TAL CHI
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL CHI
7470A	Preparation, Mercury	SW846	TAL CHI

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CHI = Eurofins TestAmerica, Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Sample Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
500-199296-1	MW-05	Water	05/17/21 12:06	05/18/21 13:00	
500-199296-2	MW-03	Water	05/18/21 11:55	05/19/21 11:33	
500-199296-3	MW-04	Water	05/18/21 12:53	05/19/21 11:33	
500-199296-4	MW-10	Water	05/18/21 00:00	05/19/21 11:33	
500-199296-5	Duplicate	Water	05/18/21 00:00	05/19/21 11:33	

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Client Sample ID: MW-05

Date Collected: 05/17/21 12:06
Date Received: 05/18/21 13:00

Lab Sample ID: 500-199296-1

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**0.023**		0.010		mg/L		05/19/21 08:28	05/19/21 17:38	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		05/19/21 08:28	05/19/21 18:18	1
Arsenic	**0.0015**		0.0010		mg/L		05/19/21 08:28	05/19/21 18:18	1
Barium	**0.10**		0.0025		mg/L		05/19/21 08:28	05/19/21 18:18	1
Beryllium	<0.0010		0.0010		mg/L		05/19/21 08:28	05/19/21 18:18	1
Boron	**0.37**		0.050		mg/L		05/19/21 08:28	05/19/21 18:18	1
Cadmium	<0.00050		0.00050		mg/L		05/19/21 08:28	05/19/21 18:18	1
Calcium	**130**		0.20		mg/L		05/19/21 08:28	05/19/21 18:18	1
Chromium	<0.0050		0.0050		mg/L		05/19/21 08:28	05/19/21 18:18	1
Cobalt	<0.0010		0.0010		mg/L		05/19/21 08:28	05/19/21 18:18	1
Lead	<0.00050		0.00050		mg/L		05/19/21 08:28	05/19/21 18:18	1
Molybdenum	<0.0050		0.0050		mg/L		05/19/21 08:28	05/19/21 18:18	1
Selenium	<0.0025		0.0025		mg/L		05/19/21 08:28	05/19/21 18:18	1
Thallium	<0.0020		0.0020		mg/L		05/19/21 08:28	05/19/21 18:18	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/01/21 09:35	06/02/21 07:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1300**		10		mg/L			05/22/21 19:35	1
Chloride	**410**		40		mg/L			06/07/21 10:48	20
Fluoride	**0.30**		0.10		mg/L			06/03/21 10:53	1
Sulfate	**160**		25		mg/L			06/07/21 17:06	5

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Client Sample ID: MW-03

Date Collected: 05/18/21 11:55
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-2

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**0.014**		0.010		mg/L		05/20/21 18:19	05/22/21 00:09	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		05/20/21 18:19	05/26/21 00:31	1
Arsenic	**0.0016**		0.0010		mg/L		05/20/21 18:19	05/26/21 00:31	1
Barium	**0.14**		0.0025		mg/L		05/20/21 18:19	05/26/21 00:31	1
Beryllium	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 14:45	1
Boron	**0.28**		0.050		mg/L		05/20/21 18:19	05/26/21 00:31	1
Cadmium	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:31	1
Calcium	**130**		0.20		mg/L		05/20/21 18:19	05/26/21 00:31	1
Chromium	<0.0050		0.0050		mg/L		05/20/21 18:19	05/26/21 00:31	1
Cobalt	**0.0011**		0.0010		mg/L		05/20/21 18:19	05/26/21 00:31	1
Lead	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:31	1
Molybdenum	<0.0050		0.0050		mg/L		05/20/21 18:19	05/26/21 00:31	1
Selenium	<0.0025		0.0025		mg/L		05/20/21 18:19	05/26/21 00:31	1
Thallium	<0.0020		0.0020		mg/L		05/20/21 18:19	05/26/21 00:31	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/01/21 09:35	06/02/21 07:12	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1200**		10		mg/L			05/22/21 19:38	1
Chloride	**290**		40		mg/L			06/07/21 10:59	20
Fluoride	**0.40**		0.10		mg/L			06/03/21 10:56	1
Sulfate	**190**		25		mg/L			06/07/21 17:10	5

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Client Sample ID: MW-04

Date Collected: 05/18/21 12:53
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-3

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**0.014**		0.010		mg/L		05/20/21 18:19	05/22/21 00:12	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		05/20/21 18:19	05/26/21 00:35	1
Arsenic	**0.0019**		0.0010		mg/L		05/20/21 18:19	05/26/21 00:35	1
Barium	**0.12**		0.0025		mg/L		05/20/21 18:19	05/26/21 00:35	1
Beryllium	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 14:49	1
Boron	**0.22**		0.050		mg/L		05/20/21 18:19	05/26/21 00:35	1
Cadmium	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:35	1
Calcium	**120**		0.20		mg/L		05/20/21 18:19	05/26/21 00:35	1
Chromium	<0.0050		0.0050		mg/L		05/20/21 18:19	05/26/21 00:35	1
Cobalt	**0.0037**		0.0010		mg/L		05/20/21 18:19	05/26/21 00:35	1
Lead	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:35	1
Molybdenum	<0.0050		0.0050		mg/L		05/20/21 18:19	05/26/21 00:35	1
Selenium	<0.0025		0.0025		mg/L		05/20/21 18:19	05/26/21 00:35	1
Thallium	<0.0020		0.0020		mg/L		05/20/21 18:19	05/26/21 00:35	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/01/21 09:35	06/02/21 07:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1100**		10		mg/L			05/22/21 19:40	1
Chloride	**280**		40		mg/L			06/07/21 11:00	20
Fluoride	**0.42**		0.10		mg/L			06/03/21 10:59	1
Sulfate	**190**		25		mg/L			06/07/21 17:10	5

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Client Sample ID: MW-10

Date Collected: 05/18/21 00:00
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-4

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**0.015**		0.010		mg/L		05/20/21 18:19	05/22/21 00:16	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		05/20/21 18:19	05/26/21 00:38	1
Arsenic	**0.0014**		0.0010		mg/L		05/20/21 18:19	05/26/21 00:38	1
Barium	**0.060**		0.0025		mg/L		05/20/21 18:19	05/26/21 00:38	1
Beryllium	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 14:52	1
Boron	**0.33**		0.050		mg/L		05/20/21 18:19	05/26/21 00:38	1
Cadmium	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:38	1
Calcium	**140**		0.20		mg/L		05/20/21 18:19	05/26/21 00:38	1
Chromium	<0.0050		0.0050		mg/L		05/20/21 18:19	05/26/21 00:38	1
Cobalt	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 00:38	1
Lead	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:38	1
Molybdenum	**0.0055**		0.0050		mg/L		05/20/21 18:19	05/26/21 00:38	1
Selenium	<0.0025		0.0025		mg/L		05/20/21 18:19	05/26/21 00:38	1
Thallium	<0.0020		0.0020		mg/L		05/20/21 18:19	05/26/21 00:38	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/01/21 09:35	06/02/21 07:16	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1200**		10		mg/L			05/22/21 19:43	1
Chloride	**350**		40		mg/L			06/07/21 11:00	20
Fluoride	**0.39**		0.10		mg/L			06/03/21 11:02	1
Sulfate	**210**		25		mg/L			06/07/21 17:11	5

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Client Sample ID: Duplicate

Date Collected: 05/18/21 00:00
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-5

Matrix: Water

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**0.015**		0.010		mg/L		05/20/21 18:19	05/22/21 00:20	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		05/20/21 18:19	05/26/21 00:42	1
Arsenic	**0.0015**		0.0010		mg/L		05/20/21 18:19	05/26/21 00:42	1
Barium	**0.061**		0.0025		mg/L		05/20/21 18:19	05/26/21 00:42	1
Beryllium	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 14:56	1
Boron	**0.34**		0.050		mg/L		05/20/21 18:19	05/26/21 00:42	1
Cadmium	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:42	1
Calcium	**140**		0.20		mg/L		05/20/21 18:19	05/26/21 00:42	1
Chromium	<0.0050		0.0050		mg/L		05/20/21 18:19	05/26/21 00:42	1
Cobalt	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 00:42	1
Lead	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:42	1
Molybdenum	**0.0059**		0.0050		mg/L		05/20/21 18:19	05/26/21 00:42	1
Selenium	<0.0025		0.0025		mg/L		05/20/21 18:19	05/26/21 00:42	1
Thallium	<0.0020		0.0020		mg/L		05/20/21 18:19	05/26/21 00:42	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/01/21 09:35	06/02/21 07:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1300**		10		mg/L			05/22/21 19:45	1
Chloride	**350**		40		mg/L			06/07/21 11:01	20
Fluoride	**0.39**		0.10		mg/L			06/03/21 11:05	1
Sulfate	**210**		25		mg/L			06/07/21 17:11	5

Definitions/Glossary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Association Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Metals

Prep Batch: 599713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total Recoverable	Water	3005A	
MB 500-599713/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 500-599713/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 599943

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total Recoverable	Water	6010C	599713
MB 500-599713/1-A	Method Blank	Total Recoverable	Water	6010C	599713
LCS 500-599713/2-A	Lab Control Sample	Total Recoverable	Water	6010C	599713

Analysis Batch: 599958

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total Recoverable	Water	6020A	599713
MB 500-599713/1-A	Method Blank	Total Recoverable	Water	6020A	599713
LCS 500-599713/2-A	Lab Control Sample	Total Recoverable	Water	6020A	599713

Prep Batch: 600086

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-2	MW-03	Total Recoverable	Water	3005A	
500-199296-3	MW-04	Total Recoverable	Water	3005A	
500-199296-4	MW-10	Total Recoverable	Water	3005A	
500-199296-5	Duplicate	Total Recoverable	Water	3005A	
MB 500-600086/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 500-600086/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 600441

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-2	MW-03	Total Recoverable	Water	6010C	600086
500-199296-3	MW-04	Total Recoverable	Water	6010C	600086
500-199296-4	MW-10	Total Recoverable	Water	6010C	600086
500-199296-5	Duplicate	Total Recoverable	Water	6010C	600086
MB 500-600086/1-A	Method Blank	Total Recoverable	Water	6010C	600086
LCS 500-600086/2-A	Lab Control Sample	Total Recoverable	Water	6010C	600086

Analysis Batch: 600933

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-2	MW-03	Total Recoverable	Water	6020A	600086
500-199296-3	MW-04	Total Recoverable	Water	6020A	600086
500-199296-4	MW-10	Total Recoverable	Water	6020A	600086
500-199296-5	Duplicate	Total Recoverable	Water	6020A	600086
MB 500-600086/1-A	Method Blank	Total Recoverable	Water	6020A	600086
LCS 500-600086/2-A	Lab Control Sample	Total Recoverable	Water	6020A	600086

Analysis Batch: 601019

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-2	MW-03	Total Recoverable	Water	6020A	600086
500-199296-3	MW-04	Total Recoverable	Water	6020A	600086
500-199296-4	MW-10	Total Recoverable	Water	6020A	600086
500-199296-5	Duplicate	Total Recoverable	Water	6020A	600086
MB 500-600086/1-A	Method Blank	Total Recoverable	Water	6020A	600086
LCS 500-600086/2-A	Lab Control Sample	Total Recoverable	Water	6020A	600086

QC Association Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Metals

Prep Batch: 601691

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total/NA	Water	7470A	
500-199296-2	MW-03	Total/NA	Water	7470A	
500-199296-3	MW-04	Total/NA	Water	7470A	
500-199296-4	MW-10	Total/NA	Water	7470A	
500-199296-5	Duplicate	Total/NA	Water	7470A	
MB 500-601691/12-A	Method Blank	Total/NA	Water	7470A	
LCS 500-601691/13-A	Lab Control Sample	Total/NA	Water	7470A	
LCSD 500-601691/14-A	Lab Control Sample Dup	Total/NA	Water	7470A	
500-199296-4 MS	MW-10	Total/NA	Water	7470A	
500-199296-4 MSD	MW-10	Total/NA	Water	7470A	
500-199296-4 DU	MW-10	Total/NA	Water	7470A	

Analysis Batch: 601923

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total/NA	Water	7470A	601691
500-199296-2	MW-03	Total/NA	Water	7470A	601691
500-199296-3	MW-04	Total/NA	Water	7470A	601691
500-199296-4	MW-10	Total/NA	Water	7470A	601691
500-199296-5	Duplicate	Total/NA	Water	7470A	601691
MB 500-601691/12-A	Method Blank	Total/NA	Water	7470A	601691
LCS 500-601691/13-A	Lab Control Sample	Total/NA	Water	7470A	601691
LCSD 500-601691/14-A	Lab Control Sample Dup	Total/NA	Water	7470A	601691
500-199296-4 MS	MW-10	Total/NA	Water	7470A	601691
500-199296-4 MSD	MW-10	Total/NA	Water	7470A	601691
500-199296-4 DU	MW-10	Total/NA	Water	7470A	601691

General Chemistry

Analysis Batch: 600116

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total/NA	Water	SM 2540C	
500-199296-2	MW-03	Total/NA	Water	SM 2540C	
500-199296-3	MW-04	Total/NA	Water	SM 2540C	
500-199296-4	MW-10	Total/NA	Water	SM 2540C	
500-199296-5	Duplicate	Total/NA	Water	SM 2540C	
MB 500-600116/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 500-600116/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 602163

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total/NA	Water	SM 4500 F C	
500-199296-2	MW-03	Total/NA	Water	SM 4500 F C	
500-199296-3	MW-04	Total/NA	Water	SM 4500 F C	
500-199296-4	MW-10	Total/NA	Water	SM 4500 F C	
500-199296-5	Duplicate	Total/NA	Water	SM 4500 F C	
MB 500-602163/31	Method Blank	Total/NA	Water	SM 4500 F C	
LCS 500-602163/32	Lab Control Sample	Total/NA	Water	SM 4500 F C	

Analysis Batch: 602679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total/NA	Water	SM 4500 Cl- E	

QC Association Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

General Chemistry (Continued)

Analysis Batch: 602679 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-2	MW-03	Total/NA	Water	SM 4500 Cl- E	
500-199296-3	MW-04	Total/NA	Water	SM 4500 Cl- E	
500-199296-4	MW-10	Total/NA	Water	SM 4500 Cl- E	
500-199296-5	Duplicate	Total/NA	Water	SM 4500 Cl- E	
MB 500-602679/31	Method Blank	Total/NA	Water	SM 4500 Cl- E	
LCS 500-602679/36	Lab Control Sample	Total/NA	Water	SM 4500 Cl- E	
500-199296-1 MS	MW-05	Total/NA	Water	SM 4500 Cl- E	
500-199296-1 MSD	MW-05	Total/NA	Water	SM 4500 Cl- E	

Analysis Batch: 602680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 500-602680/15	Method Blank	Total/NA	Water	SM 4500 SO4 E	

Analysis Batch: 602742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total/NA	Water	SM 4500 SO4 E	
500-199296-2	MW-03	Total/NA	Water	SM 4500 SO4 E	
500-199296-3	MW-04	Total/NA	Water	SM 4500 SO4 E	
500-199296-4	MW-10	Total/NA	Water	SM 4500 SO4 E	
500-199296-5	Duplicate	Total/NA	Water	SM 4500 SO4 E	
500-199296-1 MS	MW-05	Total/NA	Water	SM 4500 SO4 E	
500-199296-1 MSD	MW-05	Total/NA	Water	SM 4500 SO4 E	

QC Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 500-599713/1-A
Matrix: Water
Analysis Batch: 599943

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 599713

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	<0.010		0.010		mg/L		05/19/21 08:28	05/19/21 16:54	1

Lab Sample ID: LCS 500-599713/2-A
Matrix: Water
Analysis Batch: 599943

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 599713

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.500	0.548		mg/L		110	80 - 120

Lab Sample ID: MB 500-600086/1-A
Matrix: Water
Analysis Batch: 600441

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 600086

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	<0.010		0.010		mg/L		05/20/21 18:19	05/21/21 23:35	1

Lab Sample ID: LCS 500-600086/2-A
Matrix: Water
Analysis Batch: 600441

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 600086

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.500	0.536		mg/L		107	80 - 120

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 500-599713/1-A
Matrix: Water
Analysis Batch: 599958

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 599713

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		05/19/21 08:28	05/19/21 17:15	1
Arsenic	<0.0010		0.0010		mg/L		05/19/21 08:28	05/19/21 17:15	1
Barium	<0.0025		0.0025		mg/L		05/19/21 08:28	05/19/21 17:15	1
Beryllium	<0.0010		0.0010		mg/L		05/19/21 08:28	05/19/21 17:15	1
Boron	<0.050		0.050		mg/L		05/19/21 08:28	05/19/21 17:15	1
Cadmium	<0.00050		0.00050		mg/L		05/19/21 08:28	05/19/21 17:15	1
Calcium	<0.20		0.20		mg/L		05/19/21 08:28	05/19/21 17:15	1
Chromium	<0.0050		0.0050		mg/L		05/19/21 08:28	05/19/21 17:15	1
Cobalt	<0.0010		0.0010		mg/L		05/19/21 08:28	05/19/21 17:15	1
Lead	<0.00050		0.00050		mg/L		05/19/21 08:28	05/19/21 17:15	1
Molybdenum	<0.0050		0.0050		mg/L		05/19/21 08:28	05/19/21 17:15	1
Selenium	<0.0025		0.0025		mg/L		05/19/21 08:28	05/19/21 17:15	1
Thallium	<0.0020		0.0020		mg/L		05/19/21 08:28	05/19/21 17:15	1

Lab Sample ID: LCS 500-599713/2-A
Matrix: Water
Analysis Batch: 599958

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 599713

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.500	0.508		mg/L		102	80 - 120

QC Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 500-599713/2-A
Matrix: Water
Analysis Batch: 599958

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 599713

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.0991		mg/L		99	80 - 120
Barium	2.00	2.06		mg/L		103	80 - 120
Beryllium	0.0500	0.0483		mg/L		97	80 - 120
Boron	1.00	1.03		mg/L		103	80 - 120
Cadmium	0.0500	0.0495		mg/L		99	80 - 120
Calcium	10.0	8.88		mg/L		89	80 - 120
Chromium	0.200	0.199		mg/L		99	80 - 120
Cobalt	0.500	0.491		mg/L		98	80 - 120
Lead	0.100	0.104		mg/L		104	80 - 120
Molybdenum	1.00	0.944		mg/L		94	80 - 120
Selenium	0.100	0.100		mg/L		100	80 - 120
Thallium	0.100	0.106		mg/L		106	80 - 120

Lab Sample ID: MB 500-600086/1-A
Matrix: Water
Analysis Batch: 600933

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 600086

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		05/20/21 18:19	05/26/21 00:16	1
Arsenic	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 00:16	1
Barium	<0.0025		0.0025		mg/L		05/20/21 18:19	05/26/21 00:16	1
Boron	<0.050		0.050		mg/L		05/20/21 18:19	05/26/21 00:16	1
Cadmium	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:16	1
Calcium	<0.20		0.20		mg/L		05/20/21 18:19	05/26/21 00:16	1
Chromium	<0.0050		0.0050		mg/L		05/20/21 18:19	05/26/21 00:16	1
Cobalt	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 00:16	1
Lead	<0.00050		0.00050		mg/L		05/20/21 18:19	05/26/21 00:16	1
Molybdenum	<0.0050		0.0050		mg/L		05/20/21 18:19	05/26/21 00:16	1
Selenium	<0.0025		0.0025		mg/L		05/20/21 18:19	05/26/21 00:16	1
Thallium	<0.0020		0.0020		mg/L		05/20/21 18:19	05/26/21 00:16	1

Lab Sample ID: MB 500-600086/1-A
Matrix: Water
Analysis Batch: 601019

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 600086

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	<0.0010		0.0010		mg/L		05/20/21 18:19	05/26/21 14:37	1

Lab Sample ID: LCS 500-600086/2-A
Matrix: Water
Analysis Batch: 600933

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 600086

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.500	0.487		mg/L		97	80 - 120
Arsenic	0.100	0.0948		mg/L		95	80 - 120
Barium	2.00	2.03		mg/L		102	80 - 120
Boron	1.00	0.998		mg/L		100	80 - 120
Cadmium	0.0500	0.0493		mg/L		99	80 - 120
Calcium	10.0	8.90		mg/L		89	80 - 120

QC Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 500-600086/2-A
Matrix: Water
Analysis Batch: 600933

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 600086

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	0.200	0.193		mg/L		96	80 - 120
Cobalt	0.500	0.494		mg/L		99	80 - 120
Lead	0.100	0.107		mg/L		107	80 - 120
Molybdenum	1.00	0.974		mg/L		97	80 - 120
Selenium	0.100	0.0967		mg/L		97	80 - 120
Thallium	0.100	0.108		mg/L		108	80 - 120

Lab Sample ID: LCS 500-600086/2-A
Matrix: Water
Analysis Batch: 601019

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 600086

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.0500	0.0521		mg/L		104	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 500-601691/12-A
Matrix: Water
Analysis Batch: 601923

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 601691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/01/21 09:35	06/02/21 07:02	1

Lab Sample ID: LCS 500-601691/13-A
Matrix: Water
Analysis Batch: 601923

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 601691

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00200	0.00187		mg/L		93	80 - 120

Lab Sample ID: LCSD 500-601691/14-A
Matrix: Water
Analysis Batch: 601923

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 601691

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.00200	0.00201		mg/L		101	80 - 120	7	20

Lab Sample ID: 500-199296-4 MS
Matrix: Water
Analysis Batch: 601923

Client Sample ID: MW-10
Prep Type: Total/NA
Prep Batch: 601691

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00100	0.000898		mg/L		90	75 - 125

Lab Sample ID: 500-199296-4 MSD
Matrix: Water
Analysis Batch: 601923

Client Sample ID: MW-10
Prep Type: Total/NA
Prep Batch: 601691

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00100	0.000893		mg/L		89	75 - 125	1	20

QC Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 500-199296-4 DU
Matrix: Water
Analysis Batch: 601923

Client Sample ID: MW-10
Prep Type: Total/NA
Prep Batch: 601691

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Mercury	<0.00020			<0.00020		mg/L				NC	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 500-600116/1
Matrix: Water
Analysis Batch: 600116

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<10		10		mg/L			05/22/21 18:49	1

Lab Sample ID: LCS 500-600116/2
Matrix: Water
Analysis Batch: 600116

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids			250	242		mg/L		97	80 - 120		

Method: SM 4500 Cl- E - Chloride, Total

Lab Sample ID: MB 500-602679/31
Matrix: Water
Analysis Batch: 602679

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<2.0		2.0		mg/L			06/07/21 10:42	1

Lab Sample ID: LCS 500-602679/36
Matrix: Water
Analysis Batch: 602679

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			20.0	17.5		mg/L		87	85 - 115		

Lab Sample ID: 500-199296-1 MS
Matrix: Water
Analysis Batch: 602679

Client Sample ID: MW-05
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	410		20.0	417	4	mg/L		15	75 - 125		

Lab Sample ID: 500-199296-1 MSD
Matrix: Water
Analysis Batch: 602679

Client Sample ID: MW-05
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	410		20.0	415	4	mg/L		4	75 - 125	1	20

QC Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Method: SM 4500 F C - Fluoride

Lab Sample ID: MB 500-602163/31
Matrix: Water
Analysis Batch: 602163

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.10		0.10		mg/L			06/03/21 10:26	1

Lab Sample ID: LCS 500-602163/32
Matrix: Water
Analysis Batch: 602163

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Fluoride			10.0	11.3		mg/L		113	80 - 120		

Method: SM 4500 SO4 E - Sulfate, Total

Lab Sample ID: MB 500-602680/15
Matrix: Water
Analysis Batch: 602680

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<5.0		5.0		mg/L			06/07/21 12:34	1

Lab Sample ID: 500-199296-1 MS
Matrix: Water
Analysis Batch: 602742

Client Sample ID: MW-05
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate	160		20.0	176	4	mg/L		80	75 - 125		

Lab Sample ID: 500-199296-1 MSD
Matrix: Water
Analysis Batch: 602742

Client Sample ID: MW-05
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	160		20.0	175	4	mg/L		77	75 - 125	0	20

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Phone (708) 534-5200 Phone (708) 534-5211

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Erin Bulson	Lab PM: Mockler, Diana J	Carrier Tracking No(s):	COC No: 500-91207-40679 1
Client Contact: Erin Bulson	Phone: 262 278 1621	E-Mail: Diana Mockler@Eurofinset.com	State of Origin:	Page: Page 1 of 1
Company: KPRG and Associates, Inc.	PWSID:	Analysis Requested		Job #: 500-199296

Address: 14665 West Lisbon Road, Suite 1A	Due Date Requested:		Preservation Codes: A - HCL; B - NaOH; C Zn Acetate; D Nitric Acid; E NaHSO4; F MeOH; G Amchlor; H Ascorbic Acid; I Ice; J - DI Water; K EDTA; L EDA; M Hexane; N None; O AsNaO2; P Na2O4S; Q Na2SO3; R - Na2S2O3; S H2SO4; T TSP Dodecahydrate; U Acetone; V MCAA; W pH 4-5; Z other (specify); Other:
City: Brookfield	TAT Requested (days):		
State, Zip: WI, 53005	Compliance Project: Δ Yes Δ No		
Phone:	PO #: 4502042860		
Email: erinb@kprginc.com	WO #:		
Project Name: Joliet #29 CCR/ Event Desc. Quarterly MWG Joliet #29 CCR	Project #: 50011568		
Site: Illinois	SSOW#:		

500-199296 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 6020A, 7470A	2540C, 4500_F_C, SM4500_Cl_E, SM4500_SO4_E	903.0, 904.0	Total Number of containers	Special Instructions/Note.
			Preservation Code:				D	N	D		
MW-03				Water							
MW-04				Water							
MW-05	5-17	1206		Water			X	X	X		
MW-10				Water							
Duplicate				Water							

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I II III, IV Other (specify)

Special Instructions/QC Requirements.

Empty Kit Relinquished by	Date	Time	Method of Shipment:

	Date/Time	Company	Received by	Date/Time	Company
Relinquished by: Erin Bulson	5-17 4:20PM	KPRG		5/18/21 1200	
Relinquished by:	5/18/20 1300		Received by:	5/18/21 1300	BTA-CHI
Relinquished by:	Date/Time	Company	Received by:	Date/Time	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks: 5.6

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Phone (708) 534-5200 Phone (708) 534-5211

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler	Lab PM: Mockler Diana J	Carrier Tracking No(s)	COC No: 500-91207-40679 1
Client Contact: Erin Bulson	Phone	E-Mail: Diana Mockler@Eurofinset.com	State of Origin	Page: Page 1 of 1
Company: KPRG and Associates, Inc.	PWSID:			Job #: 500.199296

Address: 14665 West Lisbon Road Suite 1A
City: Brookfield
State Zip: WI 53005
Phone:
Email: erinb@kprginc.com

500-199296 COC

Due Date Requested:
TAT Requested (days):
Compliance Project: Δ Yes Δ No
PO #: 4502042860
WO #:
Project #: 50011568
SSOW#:

Project Name: Joliet #29 CCR/ Event Desc. Quarterly MWG Joliet #29 CCR
Site: Illinois

Analysis Requested

Preservation Codes:
A HCL, B NaOH, C - Zn Acetate, D - Nitric Acid, E NaHSO4, F MeOH, G - Amchlor, H Ascorbic Acid, I Ice, J DI Water, K EDTA, L EDA, M Hexane, N None, O AsNaO2, P Na2O4S, Q Na2SO3, R Na2S2O3, S H2SO4, T TSP Dodecahydrate, U Acetone, V - MCAA, W pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 6020A, 7470A	2540C, 4500_F_C, SM4500_Cl_E, SM4500_SO4_E	903.0, 904.0	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N	D		
2 MW-03	5-18	1155		Water			X	X	X		
3 MW-04	5-18	1253		Water							
MW-05	—	—		Water							
4 MW-10	5-18			Water							
5 Duplicate	5-18	—		Water							

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I II, III, IV Other (specify)

Special Instructions/QC Requirements.

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
	5-18 4pm	KPRG		5/19/21 1040	ECA
	5/19/21 1133	ECA		5/19/21 1133	ECA

Custody Seals Intact: Δ Yes Δ No
Custody Seal No:
Cooler Temperature(s) °C and Other Remarks: 6.0 36 gt. 5.9 48 gt.

Login Sample Receipt Checklist

Client: Midwest Generation EME LLC

Job Number: 500-199296-1

Login Number: 199296
List Number: 1
Creator: Scott, Sherri L

List Source: Eurofins TestAmerica, Chicago

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	5.5,6.0,5.9
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Lab Chronicle

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Client Sample ID: MW-05
Date Collected: 05/17/21 12:06
Date Received: 05/18/21 13:00

Lab Sample ID: 500-199296-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			599713	05/19/21 08:28	BDE	TAL CHI
Total Recoverable	Analysis	6010C		1	599943	05/19/21 17:38	JJB	TAL CHI
Total Recoverable	Prep	3005A			599713	05/19/21 08:28	BDE	TAL CHI
Total Recoverable	Analysis	6020A		1	599958	05/19/21 18:18	FXG	TAL CHI
Total/NA	Prep	7470A			601691	06/01/21 09:35	MJG	TAL CHI
Total/NA	Analysis	7470A		1	601923	06/02/21 07:10	MJG	TAL CHI
Total/NA	Analysis	SM 2540C		1	600116	05/22/21 19:35	CLB	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		20	602679	06/07/21 10:48	MS	TAL CHI
Total/NA	Analysis	SM 4500 F C		1	602163	06/03/21 10:53	MS	TAL CHI
Total/NA	Analysis	SM 4500 SO4 E		5	602742	06/07/21 17:06	RES	TAL CHI

Client Sample ID: MW-03
Date Collected: 05/18/21 11:55
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6010C		1	600441	05/22/21 00:09	EEN	TAL CHI
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6020A		1	600933	05/26/21 00:31	FXG	TAL CHI
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6020A		1	601019	05/26/21 14:45	FXG	TAL CHI
Total/NA	Prep	7470A			601691	06/01/21 09:35	MJG	TAL CHI
Total/NA	Analysis	7470A		1	601923	06/02/21 07:12	MJG	TAL CHI
Total/NA	Analysis	SM 2540C		1	600116	05/22/21 19:38	CLB	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		20	602679	06/07/21 10:59	MS	TAL CHI
Total/NA	Analysis	SM 4500 F C		1	602163	06/03/21 10:56	MS	TAL CHI
Total/NA	Analysis	SM 4500 SO4 E		5	602742	06/07/21 17:10	RES	TAL CHI

Client Sample ID: MW-04
Date Collected: 05/18/21 12:53
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6010C		1	600441	05/22/21 00:12	EEN	TAL CHI
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6020A		1	600933	05/26/21 00:35	FXG	TAL CHI
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6020A		1	601019	05/26/21 14:49	FXG	TAL CHI
Total/NA	Prep	7470A			601691	06/01/21 09:35	MJG	TAL CHI
Total/NA	Analysis	7470A		1	601923	06/02/21 07:14	MJG	TAL CHI
Total/NA	Analysis	SM 2540C		1	600116	05/22/21 19:40	CLB	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		20	602679	06/07/21 11:00	MS	TAL CHI

Lab Chronicle

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-1

Client Sample ID: MW-04
Date Collected: 05/18/21 12:53
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 4500 F C		1	602163	06/03/21 10:59	MS	TAL CHI
Total/NA	Analysis	SM 4500 SO4 E		5	602742	06/07/21 17:10	RES	TAL CHI

Client Sample ID: MW-10
Date Collected: 05/18/21 00:00
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6010C		1	600441	05/22/21 00:16	EEN	TAL CHI
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6020A		1	600933	05/26/21 00:38	FXG	TAL CHI
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6020A		1	601019	05/26/21 14:52	FXG	TAL CHI
Total/NA	Prep	7470A			601691	06/01/21 09:35	MJG	TAL CHI
Total/NA	Analysis	7470A		1	601923	06/02/21 07:16	MJG	TAL CHI
Total/NA	Analysis	SM 2540C		1	600116	05/22/21 19:43	CLB	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		20	602679	06/07/21 11:00	MS	TAL CHI
Total/NA	Analysis	SM 4500 F C		1	602163	06/03/21 11:02	MS	TAL CHI
Total/NA	Analysis	SM 4500 SO4 E		5	602742	06/07/21 17:11	RES	TAL CHI

Client Sample ID: Duplicate
Date Collected: 05/18/21 00:00
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6010C		1	600441	05/22/21 00:20	EEN	TAL CHI
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6020A		1	600933	05/26/21 00:42	FXG	TAL CHI
Total Recoverable	Prep	3005A			600086	05/20/21 18:19	LMN	TAL CHI
Total Recoverable	Analysis	6020A		1	601019	05/26/21 14:56	FXG	TAL CHI
Total/NA	Prep	7470A			601691	06/01/21 09:35	MJG	TAL CHI
Total/NA	Analysis	7470A		1	601923	06/02/21 07:53	MJG	TAL CHI
Total/NA	Analysis	SM 2540C		1	600116	05/22/21 19:45	CLB	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		20	602679	06/07/21 11:01	MS	TAL CHI
Total/NA	Analysis	SM 4500 F C		1	602163	06/03/21 11:05	MS	TAL CHI
Total/NA	Analysis	SM 4500 SO4 E		5	602742	06/07/21 17:11	RES	TAL CHI

Laboratory References:
TAL CHI = Eurofins TestAmerica, Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Tel: (708)534-5200

Laboratory Job ID: 500-199296-2
Client Project/Site: Joliet #29 CCR

For:
Midwest Generation EME LLC
1800 Channahon Road
Joliet, Illinois 60436

Attn: DeAndre Cooley

Diana Mockler

Authorized for release by:
7/19/2021 1:41:33 PM

Diana Mockler, Project Manager I
(219)252-7570
Diana.Mockler@Eurofinset.com

Table of Contents

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Job ID: 500-199296-2

Laboratory: Eurofins TestAmerica, Chicago

Narrative

Job Narrative
500-199296-2

Comments
No additional comments.

Receipt
The samples were received on 5/18/2021 1:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 5.5º C, 5.9º C and 6.0º C.

RAD
Method 903.0: Radium-226 Batch 511584

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-05 (500-199296-1), MW-03 (500-199296-2), MW-04 (500-199296-3), (LCS 160-511584/1-A), (MB 160-511584/24-A) and (500-199296-E-1-A DU)

Methods 903.0, 9315: Radium-226 prep batch 160-515419:

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-10 (500-199296-4), Duplicate (500-199296-5), (LCS 160-515419/1-A), (MB 160-515419/23-A) and (500-199296-D-4-A DU)

Method 904.0: Radium-228 Batch 511594

The following sample(s) did not meet the requested limit (RL) due to the reduced sample volume attributed to the presence of matrix interferences. The method blank (MB) and laboratory control sample (LCS) were also run at the reduced aliquot following NELAC guidance to match the nominal volume of client samples in the prep batch. The data have been reported with this narrative.
(MB 160-511594/24-A)

Method 904.0: Radium-228 Batch 511594

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-05 (500-199296-1), MW-03 (500-199296-2), MW-04 (500-199296-3), (LCS 160-511594/1-A), (MB 160-511594/24-A) and (500-199296-E-1-B DU)

Methods 904.0, 9320: Radium228 prep batch 160-511755
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.
MW-10 (500-199296-4), Duplicate (500-199296-5), (LCS 160-511755/1-A), (MB 160-511755/23-A) and (500-199296-E-5-C DU)

Methods 904.0, 9320: Radium228 prep batch 160-511755
The carrier recovery is outside acceptance limit for the laboratory control sample (LCS). The LCS spike recoveries are within control limits, which demonstrates acceptable sample preparation and instrument performance. As such, this was an apparent anomaly in the sample preparation, isolated to the LCS, which is not indicative of the entire batch.
(LCS 160-511755/1-A)

Method PrecSep_0: Radium 228 Prep Batch 160-511594:

Case Narrative

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Job ID: 500-199296-2 (Continued)

Laboratory: Eurofins TestAmerica, Chicago (Continued)

During the in-growth process, the following samples needed to be filtered due to sediment present in the sample: MW-05 (500-199296-1), MW-03 (500-199296-2) and (500-199296-E-1 DU). This is an indicator of matrix interference.

Method PrecSep_0: Ra-228 Batch 160-511755:

During the in-growth process, the following samples needed to be filtered due to sediment present in the sample: (500-199296-E-5 DU). This is an indicator of matrix interference.

Method PrecSep-21: Radium 226 Prep Batch 160-511584:

During the in-growth process, the following samples needed to be filtered due to sediment present in the sample: MW-05 (500-199296-1), MW-03 (500-199296-2) and (500-199296-E-1 DU). This is an indicator of matrix interference.

Method PrecSep-21: Ra-226 Batch 160-511750:

During the in-growth process, the following samples needed to be filtered due to sediment present in the sample: (500-199296-E-5 DU). This is an indicator of matrix interference.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL SL

Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
500-199296-1	MW-05	Water	05/17/21 12:06	05/18/21 13:00	
500-199296-2	MW-03	Water	05/18/21 11:55	05/19/21 11:33	
500-199296-3	MW-04	Water	05/18/21 12:53	05/19/21 11:33	
500-199296-4	MW-10	Water	05/18/21 00:00	05/19/21 11:33	
500-199296-5	Duplicate	Water	05/18/21 00:00	05/19/21 11:33	

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Client Sample ID: MW-05

Date Collected: 05/17/21 12:06
Date Received: 05/18/21 13:00

Lab Sample ID: 500-199296-1

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0437	U	0.156	0.156	1.00	0.294	pCi/L	05/25/21 11:28	06/17/21 22:27	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*69.8*		*40 - 110*	*05/25/21 11:28*	*06/17/21 22:27*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.248	U	0.357	0.357	1.00	0.597	pCi/L	05/25/21 13:45	06/16/21 14:05	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*69.8*		*40 - 110*	*05/25/21 13:45*	*06/16/21 14:05*	*1*
Y Carrier	*87.1*		*40 - 110*	*05/25/21 13:45*	*06/16/21 14:05*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.292	U	0.390	0.390	5.00	0.597	pCi/L		07/18/21 21:42	1

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Client Sample ID: MW-03
Date Collected: 05/18/21 11:55
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-2
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.259	U	0.191	0.193	1.00	0.278	pCi/L	05/25/21 11:28	06/17/21 22:27	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*74.5*		*40 - 110*	*05/25/21 11:28*	*06/17/21 22:27*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**0.840**		0.358	0.366	1.00	0.508	pCi/L	05/25/21 13:45	06/16/21 13:59	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*74.5*		*40 - 110*	*05/25/21 13:45*	*06/16/21 13:59*	*1*
Y Carrier	*87.1*		*40 - 110*	*05/25/21 13:45*	*06/16/21 13:59*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**1.10**		0.406	0.414	5.00	0.508	pCi/L		07/18/21 21:42	1

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Client Sample ID: MW-04
Date Collected: 05/18/21 12:53
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-3
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0777	U	0.138	0.138	1.00	0.242	pCi/L	05/25/21 11:28	06/17/21 22:29	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*85.0*		*40 - 110*	*05/25/21 11:28*	*06/17/21 22:29*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.299	U	0.276	0.277	1.00	0.445	pCi/L	05/25/21 13:45	06/16/21 13:59	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*85.0*		*40 - 110*	*05/25/21 13:45*	*06/16/21 13:59*	*1*
Y Carrier	*88.6*		*40 - 110*	*05/25/21 13:45*	*06/16/21 13:59*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.377	U	0.309	0.309	5.00	0.445	pCi/L		07/18/21 21:42	1

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Client Sample ID: MW-10
Date Collected: 05/18/21 00:00
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-4
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.217**		0.0956	0.0975	1.00	0.113	pCi/L	06/22/21 10:46	07/15/21 13:27	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*83.7*		*40 - 110*	*06/22/21 10:46*	*07/15/21 13:27*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.117	U	0.255	0.256	1.00	0.480	pCi/L	05/26/21 13:25	06/17/21 09:21	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*78.2*		*40 - 110*	*05/26/21 13:25*	*06/17/21 09:21*	*1*
Y Carrier	*83.7*		*40 - 110*	*05/26/21 13:25*	*06/17/21 09:21*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.100	U	0.272	0.274	5.00	0.480	pCi/L		07/18/21 21:42	1

Client Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Client Sample ID: Duplicate

Date Collected: 05/18/21 00:00
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-5

Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.138		0.0852	0.0861	1.00	0.118	pCi/L	06/22/21 10:46	07/15/21 13:21	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*86.4*		*40 - 110*	*06/22/21 10:46*	*07/15/21 13:21*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0841	U	0.286	0.286	1.00	0.496	pCi/L	05/26/21 13:25	06/17/21 09:22	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.0*		*40 - 110*	*05/26/21 13:25*	*06/17/21 09:22*	*1*
Y Carrier	*86.0*		*40 - 110*	*05/26/21 13:25*	*06/17/21 09:22*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.222	U	0.298	0.299	5.00	0.496	pCi/L		07/18/21 21:42	1

Definitions/Glossary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Qualifiers

Rad

Qualifier	Qualifier Description
G	The Sample MDC is greater than the requested RL.
U	Result is less than the sample detection limit.
X	Carrier is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Association Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Rad

Prep Batch: 511584

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total/NA	Water	PrecSep-21	
500-199296-2	MW-03	Total/NA	Water	PrecSep-21	
500-199296-3	MW-04	Total/NA	Water	PrecSep-21	
MB 160-511584/24-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-511584/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
500-199296-1 DU	MW-05	Total/NA	Water	PrecSep-21	

Prep Batch: 511594

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-1	MW-05	Total/NA	Water	PrecSep_0	
500-199296-2	MW-03	Total/NA	Water	PrecSep_0	
500-199296-3	MW-04	Total/NA	Water	PrecSep_0	
MB 160-511594/24-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-511594/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
500-199296-1 DU	MW-05	Total/NA	Water	PrecSep_0	

Prep Batch: 511755

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-4	MW-10	Total/NA	Water	PrecSep_0	
500-199296-5	Duplicate	Total/NA	Water	PrecSep_0	
MB 160-511755/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-511755/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
500-199296-5 DU	Duplicate	Total/NA	Water	PrecSep_0	

Prep Batch: 515419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-199296-4	MW-10	Total/NA	Water	PrecSep-21	
500-199296-5	Duplicate	Total/NA	Water	PrecSep-21	
MB 160-515419/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-515419/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
500-199296-4 DU	MW-10	Total/NA	Water	PrecSep-21	

QC Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-511584/24-A
Matrix: Water
Analysis Batch: 514735

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 511584

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.1440	U	0.265	0.266	1.00	0.473	pCi/L	05/25/21 11:28	06/17/21 22:30	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*47.7*		*40 - 110*	*05/25/21 11:28*	*06/17/21 22:30*	*1*

Lab Sample ID: LCS 160-511584/1-A
Matrix: Water
Analysis Batch: 514698

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 511584

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			15.1	12.97		1.57	1.00	0.306	pCi/L	86	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*85.7*		*40 - 110*

Lab Sample ID: 500-199296-1 DU
Matrix: Water
Analysis Batch: 514718

Client Sample ID: MW-05
Prep Type: Total/NA
Prep Batch: 511584

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	0.0437	U		0.1412	U	0.169	1.00	0.276	pCi/L			0.30	1

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Ba Carrier	*75.4*		*40 - 110*

Lab Sample ID: MB 160-515419/23-A
Matrix: Water
Analysis Batch: 518711

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 515419

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03898	U	0.0627	0.0628	1.00	0.109	pCi/L	06/22/21 10:46	07/15/21 16:54	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*78.3*		*40 - 110*	*06/22/21 10:46*	*07/15/21 16:54*	*1*

Lab Sample ID: LCS 160-515419/1-A
Matrix: Water
Analysis Batch: 518711

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 515419

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			11.3	11.25		1.17	1.00	0.130	pCi/L	99	75 - 125		

QC Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: LCS 160-515419/1-A
Matrix: Water
Analysis Batch: 518711

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 515419

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	74.7		40 - 110

Lab Sample ID: 500-199296-4 DU
Matrix: Water
Analysis Batch: 518711

Client Sample ID: MW-10
Prep Type: Total/NA
Prep Batch: 515419

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	0.217			0.1231		0.0860	1.00	0.123	pCi/L			0.51	1

Carrier	DU %Yield	DU Qualifier	Limits
Ba Carrier	84.0		40 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-511594/24-A
Matrix: Water
Analysis Batch: 514499

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 511594

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.1671	U G	0.667	0.667	1.00	1.16	pCi/L	05/25/21 13:45	06/16/21 14:00	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	47.7		40 - 110	05/25/21 13:45	06/16/21 14:00	1
Y Carrier	88.6		40 - 110	05/25/21 13:45	06/16/21 14:00	1

Lab Sample ID: LCS 160-511594/1-A
Matrix: Water
Analysis Batch: 514499

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 511594

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			12.8	13.56		1.62	1.00	0.609	pCi/L	106	75 - 125		

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	85.7		40 - 110
Y Carrier	80.7		40 - 110

Lab Sample ID: 500-199296-1 DU
Matrix: Water
Analysis Batch: 514553

Client Sample ID: MW-05
Prep Type: Total/NA
Prep Batch: 511594

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-228	0.248	U		0.6353		0.335	1.00	0.484	pCi/L			0.56	1

QC Sample Results

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: 500-199296-1 DU
Matrix: Water
Analysis Batch: 514553

Client Sample ID: MW-05
Prep Type: Total/NA
Prep Batch: 511594

Carrier	DU %Yield	DU Qualifier	Limits
Ba Carrier	75.4		40 - 110
Y Carrier	86.7		40 - 110

Lab Sample ID: MB 160-511755/23-A
Matrix: Water
Analysis Batch: 514718

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 511755

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.2218	U	0.323	0.323	1.00	0.541	pCi/L	05/26/21 13:25	06/17/21 09:18	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	66.4		40 - 110	05/26/21 13:25	06/17/21 09:18	1
Y Carrier	87.5		40 - 110	05/26/21 13:25	06/17/21 09:18	1

Lab Sample ID: LCS 160-511755/1-A
Matrix: Water
Analysis Batch: 514698

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 511755

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			9.62	8.907		2.68	1.00	3.24	pCi/L	93	75 - 125		

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	11.5	X	40 - 110
Y Carrier	83.4		40 - 110

Lab Sample ID: 500-199296-5 DU
Matrix: Water
Analysis Batch: 514698

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 511755

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-228	0.0841	U		0.5136		0.305	1.00	0.454	pCi/L			0.73	1

Carrier	DU %Yield	DU Qualifier	Limits
Ba Carrier	77.6		40 - 110
Y Carrier	84.5		40 - 110

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Phone (708) 534-5200 Phone (708) 534-5211

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Erin Bulson	Lab PM: Mockler, Diana J	Carrier Tracking No(s):	COC No: 500-91207-40679 1
Client Contact: Erin Bulson	Phone: 262 278 1621	E-Mail: Diana Mockler@Eurofinset.com	State of Origin:	Page: Page 1 of 1
Company: KPRG and Associates, Inc.	PWSID:	Analysis Requested		Job #: 500-199296

Address: 14665 West Lisbon Road, Suite 1A	Due Date Requested:		Preservation Codes: A - HCL; B - NaOH; C Zn Acetate; D Nitric Acid; E NaHSO4; F MeOH; G Amchlor; H Ascorbic Acid; I Ice; J - DI Water; K EDTA; L EDA; M Hexane; N None; O AsNaO2; P Na2O4S; Q Na2SO3; R - Na2S2O3; S H2SO4; T TSP Dodecahydrate; U Acetone; V MCAA; W pH 4-5; Z other (specify); Other:
City: Brookfield	TAT Requested (days):		
State, Zip: WI, 53005	Compliance Project: Δ Yes Δ No		
Phone:	PO #: 4502042860		
Email: erinb@kprginc.com	WO #:		
Project Name: Joliet #29 CCR/ Event Desc. Quarterly MWG Joliet #29 CCR	Project #: 50011568		
Site: Illinois	SSOW#:		

500-199296 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 6020A, 7470A	2540C, 4500_F_C, SM4500_Cl_E, SM4500_SO4_E	903.0, 904.0	Total Number of containers	Special Instructions/Note.
			Preservation Code:				D	N	D		
MW-03				Water							
MW-04				Water							
MW-05	5-17	1206		Water			X	X	X		
MW-10				Water							
Duplicate				Water							

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I II III, IV Other (specify)

Special Instructions/QC Requirements.

Empty Kit Relinquished by	Date	Time	Method of Shipment:

	Date/Time	Company	Received by	Date/Time	Company
Relinquished by:	5-17 4:20PM	KPRG		5/18/21 1200	
Relinquished by:	5/18/20 1300			5/18/21 1300	
Relinquished by:					

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks: 5.6

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Phone (708) 534-5200 Phone (708) 534-5211

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler	Lab PM: Mockler Diana J	Carrier Tracking No(s)	COC No: 500-91207-40679 1
Client Contact: Erin Bulson	Phone	E-Mail: Diana Mockler@Eurofinset.com	State of Origin	Page: Page 1 of 1
Company: KPRG and Associates, Inc.	PWSID:			Job #: 500.199296

Address: 14665 West Lisbon Road Suite 1A	Due Date Requested	Analysis Requested	Preservation Codes
City: Brookfield	TAT Requested (days)		A HCL M Hexane B NaOH N None C - Zn Acetate O AsNaO2 D - Nitric Acid P Na2O4S E NaHSO4 Q Na2SO3 F MeOH R Na2S2O3 G - Amchlor S H2SO4 H Ascorbic Acid T TSP Dodecahydrate I Ice U Acetone J DI Water V - MCAA K EDTA W pH 4-5 L EDA Z - other (specify)
State, Zip: WI 53005	Compliance Project: Δ Yes Δ No		
Phone	PO #: 4502042860		Other:
Email: erinb@kprginc.com	WO #:		
Project Name: Joliet #29 CCR/ Event Desc. Quarterly MWG Joliet #29 CCR	Project #: 50011568		
Site: Illinois	SSOW#:		

500-199296 COC

	Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 6020A, 7470A	2540C, 4500_F_C, SM4500_Cl_E, SM4500_SO4_E	903.0, 904.0	Total Number of containers	Special Instructions/Note:
	Preservation Code:							D	N	D		
2	MW-03	5-18	1155		Water			X	X	X		
3	MW-04	5-18	1253		Water							
	MW-05	—	—		Water							
4	MW-10	5-18			Water							
5	Duplicate	5-18	—		Water							

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I II, III, IV Other (specify)

Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		5-18 4pm	KPRG		5/19/21 1040	ECA
2		5/19/21 1133	ECA		5/19/21 1133	ECA
3						

Custody Seals Intact. Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks.
		6.0 3bt. 5.9 4bt.

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Phone: 708-534-5200 Fax: 708-534-5211

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Mockler, Diana J	Carrier Tracking No(s):	COC No: 500-148770.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Diana.Mockler@Eurofinset.com	State of Origin: Illinois	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Illinois		Job #: 500-199296-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 6/8/2021			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Joliet #29 CCR	Project #: 50011568			
Site: NRG Midwest Generation LSQ Joliet#29 CCR	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_21 Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-05 (500-199296-1)	5/17/21	12:06 Central		Water			X	X	X	3	Batch QC must be performed (dup, spikes, etc) - no NCMs concerning limited volume;

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by:	Date/Time: 5/18/21 1500	Company ETA	Received by: FED EX	Date/Time:	Company		
Relinquished by: FED EX	Date/Time:	Company	Received by:	Date/Time: 5/19/21 1015	Company ETA STL		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Phone: 708-534-5200 Fax: 708-534-5211

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Mockler, Diana J	Carrier Tracking No(s):	COC No: 500-148798.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Diana.Mockler@Eurofinset.com	State of Origin: Illinois	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Illinois		Job #: 500-199296-1
Address: 13715 Rider Trail North, ,	Due Date Requested: 6/9/2021			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Joliet #29 CCR	Project #: 50011568			
Site: NRG Midwest Generation LSQ Joliet#29 CCR	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_21 Standard Target List	904.0/PrecSep_0 Standard Target List	Ra226Ra228_GFPC	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-03 (500-199296-2)	5/18/21	11:55 Central		Water			X	X	X	3	Batch QC must be performed (dup, spikes, etc) - no NCMs concerning limited volume;
MW-04 (500-199296-3)	5/18/21	12:53 Central		Water			X	X	X	3	Batch QC must be performed (dup, spikes, etc) - no NCMs concerning limited volume;
MW-10 (500-199296-4)	5/18/21	Central		Water			X	X	X	3	Batch QC must be performed (dup, spikes, etc) - no NCMs concerning limited volume;
Duplicate (500-199296-5)	5/18/21	Central		Water			X	X	X	3	Batch QC must be performed (dup, spikes, etc) - no NCMs concerning limited volume;

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	5/19/21 1500	ETA	FedEx		
2	Relinquished by: FedEx	Date/Time:	Company	Received by: [signature]	Date/Time: 5/20/21 10:10	Company ETASR
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

7/19/2021

Login Sample Receipt Checklist

Client: Midwest Generation EME LLC

Job Number: 500-199296-2

Login Number: 199296
List Number: 1
Creator: Scott, Sherri L

List Source: Eurofins TestAmerica, Chicago

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	5.5,6.0,5.9
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Midwest Generation EME LLC

Job Number: 500-199296-2

Login Number: 199296
List Number: 2
Creator: Worthington, Sierra M

List Source: Eurofins TestAmerica, St. Louis
List Creation: 05/19/21 12:41 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Midwest Generation EME LLC

Job Number: 500-199296-2

Login Number: 199296
List Number: 3
Creator: Mazariegos, Leonel A

List Source: Eurofins TestAmerica, St. Louis
List Creation: 05/20/21 12:10 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Lab Chronicle

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Client Sample ID: MW-05
Date Collected: 05/17/21 12:06
Date Received: 05/18/21 13:00

Lab Sample ID: 500-199296-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			511584	05/25/21 11:28	MJ	TAL SL
Total/NA	Analysis	903.0		1	514718	06/17/21 22:27	ANW	TAL SL
Total/NA	Prep	PrecSep_0			511594	05/25/21 13:45	RBR	TAL SL
Total/NA	Analysis	904.0		1	514553	06/16/21 14:05	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	519144	07/18/21 21:42	GRW	TAL SL

Client Sample ID: MW-03
Date Collected: 05/18/21 11:55
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			511584	05/25/21 11:28	MJ	TAL SL
Total/NA	Analysis	903.0		1	514718	06/17/21 22:27	ANW	TAL SL
Total/NA	Prep	PrecSep_0			511594	05/25/21 13:45	RBR	TAL SL
Total/NA	Analysis	904.0		1	514499	06/16/21 13:59	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	519144	07/18/21 21:42	GRW	TAL SL

Client Sample ID: MW-04
Date Collected: 05/18/21 12:53
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			511584	05/25/21 11:28	MJ	TAL SL
Total/NA	Analysis	903.0		1	514735	06/17/21 22:29	ANW	TAL SL
Total/NA	Prep	PrecSep_0			511594	05/25/21 13:45	RBR	TAL SL
Total/NA	Analysis	904.0		1	514499	06/16/21 13:59	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	519144	07/18/21 21:42	GRW	TAL SL

Client Sample ID: MW-10
Date Collected: 05/18/21 00:00
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			515419	06/22/21 10:46	MJ	TAL SL
Total/NA	Analysis	903.0		1	518711	07/15/21 13:27	JCB	TAL SL
Total/NA	Prep	PrecSep_0			511755	05/26/21 13:25	MJ	TAL SL
Total/NA	Analysis	904.0		1	514698	06/17/21 09:21	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	519144	07/18/21 21:42	GRW	TAL SL

Lab Chronicle

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Client Sample ID: Duplicate

Date Collected: 05/18/21 00:00
Date Received: 05/19/21 11:33

Lab Sample ID: 500-199296-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			515419	06/22/21 10:46	MJ	TAL SL
Total/NA	Analysis	903.0		1	518711	07/15/21 13:21	JCB	TAL SL
Total/NA	Prep	PrecSep_0			511755	05/26/21 13:25	MJ	TAL SL
Total/NA	Analysis	904.0		1	514698	06/17/21 09:22	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	519144	07/18/21 21:42	GRW	TAL SL

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Tracer/Carrier Summary

Client: Midwest Generation EME LLC
Project/Site: Joliet #29 CCR

Job ID: 500-199296-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water — **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba (40-110)
500-199296-1	MW-05	69.8
500-199296-1 DU	MW-05	75.4
500-199296-2	MW-03	74.5
500-199296-3	MW-04	85.0
500-199296-4	MW-10	83.7
500-199296-4 DU	MW-10	84.0
500-199296-5	Duplicate	86.4
LCS 160-511584/1-A	Lab Control Sample	85.7
LCS 160-515419/1-A	Lab Control Sample	74.7
MB 160-511584/24-A	Method Blank	47.7
MB 160-515419/23-A	Method Blank	78.3

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water — **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
500-199296-1	MW-05	69.8	87.1
500-199296-1 DU	MW-05	75.4	86.7
500-199296-2	MW-03	74.5	87.1
500-199296-3	MW-04	85.0	88.6
500-199296-4	MW-10	78.2	83.7
500-199296-5	Duplicate	81.0	86.0
500-199296-5 DU	Duplicate	77.6	84.5
LCS 160-511594/1-A	Lab Control Sample	85.7	80.7
LCS 160-511755/1-A	Lab Control Sample	11.5 X	83.4
MB 160-511594/24-A	Method Blank	47.7	88.6
MB 160-511755/23-A	Method Blank	66.4	87.5

Tracer/Carrier Legend

Ba = Ba Carrier
Y = Y Carrier

EXHIBIT 33

CCA QUARTERLY GROUNDWATER MONITORING REPORT
JOLIET #29 GENERATING STATION

October 15, 2021

Ms. Andrea Rhodes
Illinois Environmental Protection Agency
Division of Public Water Supplies
MC#19
1021 North Grand Avenue East
Springfield, IL 62794-9276

VIA FEDERAL EXPRESS

Re: Quarterly Groundwater Monitoring Results – Third Quarter 2021
Joliet #29 Generating Station – Ash Impoundments
Compliance Commitment Agreement VN W-2012-00059; ID# 6284

Dear Ms. Rhodes:

The third quarterly groundwater sampling for 2021 has been completed for the ash pond monitoring wells located at the Midwest Generation, LLC (Midwest Generation) Joliet #29 Generating Station in accordance with the signed Compliance Commitment Agreement (CCA) with Illinois Environmental Protection Agency (IEPA) dated October 24, 2012. This quarterly monitoring report is being submitted summarizing the results of the monitoring event.

Well Inspection and Sampling Procedures

The groundwater monitoring network around the ash ponds at the Joliet facility consists of eleven wells (MW-01 through MW-11) as shown on Figure 1. As part of sampling procedures, the integrity of all monitoring wells was inspected and water levels obtained using an electronic water level meter. Overall the wells were in good condition with locked protector casings and the concrete surface seals were intact.

Groundwater samples at well locations MW-01 through MW-11 were collected using the low-flow sampling technique. Based on historical water levels at monitoring well locations MW-01 and MW-02, it was determined that there was not enough water column within these wells (generally less than two feet of water column within each well) to allow for the placement of dedicated pumping systems. Instead, at these two well locations, sample collection is completed using a peristaltic pump when sufficient water is available for sampling. During this sampling event, there was not enough water volume within both of these wells to allow for sample collection.

One duplicate sample was collected from well MW-11. In addition, a deionized water trip blank accompanied the groundwater samples bottles from and back to the laboratory. The groundwater monitoring samples and the duplicate sample were analyzed for the compounds listed in Illinois Administrative Code (IAC) 620.410(a), 620.410(d) and 620.410(e), excluding radium 226/228. The trip blank was analyzed for the volatile organic compounds listed in IAC 620.410(d).

Groundwater Flow Evaluation

Water level data from the most recent round of sampling along with historical water levels obtained from each well are summarized in Table 1. The water levels were used to generate a groundwater flow map which is provided on Figure 2. Groundwater flow is generally in a southerly direction.

Analytical Data

A copy of the analytical data package is provided in Attachment 1. The field parameter and analytical data from the most recent sampling, along with the previous nine quarters of data, are summarized in Table 2. All duplicate values were within an acceptable range (below +/- 30%), with the exception of iron. Iron was not detected in the MW-11 sample but was detected in the corresponding duplicate sample at a concentration of 0.18 mg/L which is just above the detection limit. All wells for which the sampling data reports a value above one or more groundwater standards are located within the area of the approved Groundwater Management Zone.

If there are any questions, please contact either Sharene Shealey of Midwest Generation at 724-255-3220 or Richard Gnat of KPRG at 262-781-0475.

Sincerely,

William Naglosky
Station Manager

cc: Mike Summers/Lynn Dunaway, IEPA
Sharene Shealey, Midwest Generation, LLC
DeAndre Cooley, Midwest Generation, LLC
Richard Gnat, KPRG and Associates, Inc.

FIGURES

NOTE:
BACKGROUND MAP RETRIEVED FROM GOOGLE MAPS 2013

0 250'
APPROXIMATE SCALE

N

ENVIRONMENTAL CONSULTATION & REMEDIATION

K P R G

KPRG and Associates, inc.

14665 West Lisbon Road, Suite 1A Brookfield, Wisconsin 53005 Telephone 262-781-0475 Facsimile 262-781-0478

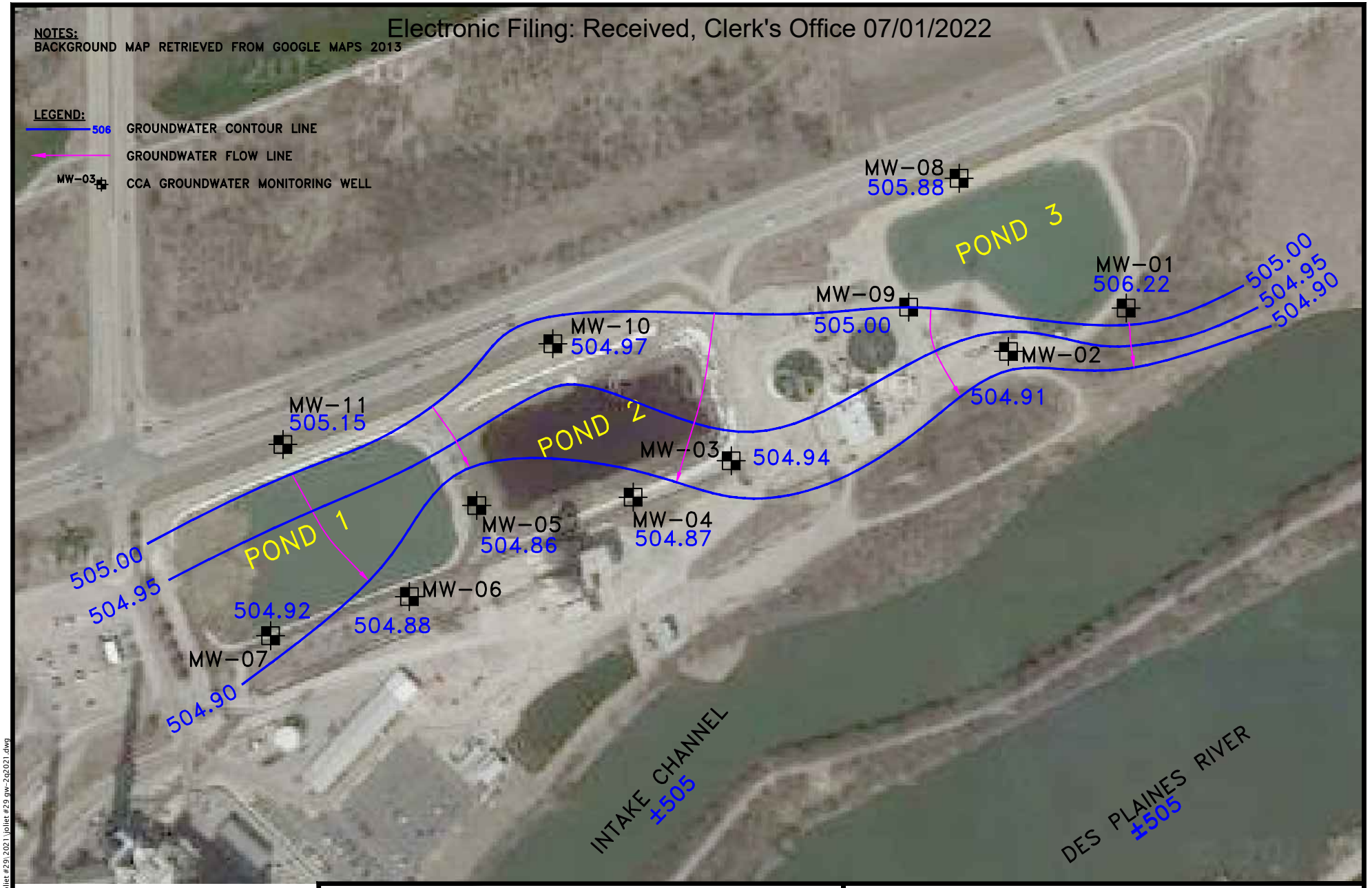
414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593

SITE MAP

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 250' | Date: January 23, 2019

KPRG Project No. 12313.0 | FIGURE 1



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0 250'
APPROXIMATE SCALE

N

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GROUNDWATER CONTOUR MAP 8/2021

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 250' | Date: October 11, 2021

KPRG Project No. 12313.0 | FIGURE 2

TABLES

Table 1. Groundwater Elevations - Midwest Generation, LLC, Joliet Station #29, Joliet, IL

Well ID	Date	Top of Casing (TOC) Elevation (ft above MSL)	Ground Elevation (ft above MSL)	Groundwater Elevation (ft above MSL)	Sampling Groundwater Elevation (ft above MSL)	Bottom of Well Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Sampling Depth to Groundwater (ft below TOC)	Depth to Bottom of Well (ft below TOC)
MW-01	02/10/15	534.76	531.46	NM	NM	504.88	NM	NM	29.88
	05/27/15	534.76	531.46	NM	NM	504.88	NM	NM	29.88
	08/04/15	534.76	531.46	NM	NM	504.88	NM	NM	29.88
	10/27/15	534.76	531.46	NM	NM	504.88	NM	NM	29.88
	02/09/16	534.03	531.56	NM	NM	505.50	NM	NM	28.53
	05/10/16	534.03	531.56	505.90	506.18	505.50	28.13	27.85	28.53
	08/30/16	534.03	531.56	506.85	506.91	505.50	27.18	27.12	28.53
	11/01/16	534.03	531.56	505.89	505.53	505.50	28.14	28.50	28.53
	02/06/17	534.03	531.56	NM	NM	505.50	NM	NM	28.53
	04/25/17	534.03	531.56	NM	NM	505.50	NM	NM	28.53
	08/01/17	534.03	531.56	506.59	506.53	505.50	27.44	27.50	28.53
	10/17/17	534.03	531.56	508.87	508.85	505.50	25.16	25.18	28.53
	02/21/18	534.03	531.56	506.37	509.54	505.50	27.66	24.49	28.53
	04/25/18	534.03	531.56	505.89	505.58	505.50	28.14	28.45	28.53
	07/31/18	534.03	531.56	505.75	505.50	505.50	28.28	28.53	28.53
	10/16/18	534.03	531.56	506.22	505.93	505.50	27.81	28.10	28.53
	02/04/19	534.03	531.56	505.73	NM	505.50	28.30	NM	28.53
	05/06/19	534.03	531.56	509.00	509.00	505.50	25.03	25.03	28.53
	08/06/19	534.03	531.56	505.88	NM	505.50	28.15	NM	28.53
	11/06/19	534.03	531.56	507.38	NM	505.50	26.65	NM	28.53
	02/12/20	534.03	531.56	505.69	NM	505.50	28.34	NM	28.53
	05/21/20	534.03	531.56	511.60	NM	505.50	22.43	NM	28.53
	07/30/20	534.03	531.56	505.74	NM	505.50	28.29	NM	28.53
	10/21/20	534.03	531.56	505.73	NM	505.50	28.30	NM	28.53
	02/11/21	534.03	531.56	505.73	NM	505.50	28.30	NM	28.53
	05/17/21	534.03	531.56	505.76	NM	505.50	28.27	NM	28.53
	08/27/21	534.03	531.56	506.22	NM	505.50	27.81	NM	28.53
MW-02	02/10/15	534.28	531.19	505.17	510.69	504.05	29.11	23.59	30.23
	05/27/15	534.28	531.19	505.34	505.32	504.05	28.94	28.96	30.23
	08/04/15	534.28	531.19	505.14	505.13	504.05	29.14	29.15	30.23
	10/27/15	534.28	531.19	504.89	505.09	504.05	29.39	29.19	30.23
	02/09/16	534.30	531.17	505.59	505.57	504.07	28.71	28.73	30.23
	05/10/16	534.30	531.17	505.89	506.09	504.07	28.41	28.21	30.23
	08/30/16	534.30	531.17	506.83	506.97	504.07	27.47	27.33	30.23
	11/01/16	534.30	531.17	505.90	505.89	504.07	28.40	28.41	30.23
	02/06/17	534.30	531.17	505.46	505.74	504.07	28.84	28.56	30.23
	04/25/17	534.30	531.17	505.69	505.70	504.07	28.61	28.60	30.23
	08/01/17	534.30	531.17	506.59	506.52	504.07	27.71	27.78	30.23
	10/17/17	534.30	531.17	508.82	508.82	504.07	25.48	25.48	30.23
	02/21/18	534.30	531.17	506.35	509.65	504.07	27.95	24.65	30.23
	04/25/18	534.30	531.17	505.87	505.81	504.07	28.43	28.49	30.23
	08/01/18	534.30	531.17	505.22	505.14	504.07	29.08	29.16	30.23
	10/16/18	534.30	531.17	506.17	506.11	504.07	28.13	28.19	30.23
	02/04/19	534.30	531.17	505.68	505.65	504.07	28.62	28.65	30.23
	05/06/19	534.30	531.17	508.95	508.29	504.07	25.35	26.01	30.23
	08/06/19	534.30	531.17	505.16	NM	504.07	29.14	NM	30.23
	11/06/19	534.30	531.17	507.27	NM	504.07	27.03	NM	30.23
	02/12/20	534.30	531.17	505.49	NM	504.07	28.81	NM	30.23
	05/21/20	534.30	531.17	510.37	NM	504.07	23.93	23.94	30.23
	07/30/20	534.30	531.17	504.98	NM	504.07	29.32	NM	30.23
	10/21/20	534.30	531.17	505.25	NM	504.07	29.05	NM	30.23
	02/11/21	534.30	531.17	505.15	NM	504.07	29.15	NM	30.23
	05/17/21	534.30	531.17	505.68	NM	504.07	28.62	NM	30.23
	08/27/21	534.30	531.17	504.91	NM	504.07	29.39	NM	30.23
MW-03	02/10/15	538.78	535.54	505.19	505.20	494.68	33.59	33.58	44.10
	05/27/15	538.78	535.54	505.36	505.35	494.68	33.42	33.43	44.10
	08/04/15	538.78	535.54	505.22	505.22	494.68	33.56	33.56	44.10
	10/27/15	538.78	535.54	504.91	505.04	494.68	33.87	33.74	44.10
	02/09/16	538.79	535.53	505.62	505.51	494.68	33.17	33.28	44.10
	05/10/16	538.79	535.53	505.97	505.99	494.68	32.82	32.80	44.10
	08/30/16	538.79	535.53	506.91	507.22	494.68	31.88	31.57	44.10
	11/01/16	538.79	535.53	505.91	505.94	494.68	32.88	32.85	44.10
	02/06/17	538.79	535.53	505.54	505.54	494.68	33.25	33.25	44.10
	04/26/17	538.79	535.53	505.73	505.78	494.68	33.06	33.01	44.10
	08/01/17	538.79	535.53	506.43	506.44	494.68	32.36	32.35	44.10
	10/18/17	538.79	535.53	508.76	508.54	494.68	30.03	30.25	44.10
	02/20/18	538.79	535.53	506.38	506.56	494.68	32.41	32.23	44.10
	04/24/18	538.79	535.53	505.96	505.96	494.68	32.83	32.83	44.10
	07/31/18	538.79	535.53	505.23	505.25	494.68	33.56	33.54	44.10
	10/17/18	538.79	535.53	506.21	506.09	494.68	32.58	32.70	44.10
	02/04/19	538.79	535.53	505.74	505.81	494.68	33.05	32.98	44.10
	05/06/19	538.79	535.53	508.84	508.61	494.68	29.95	30.18	44.10
	08/06/19	538.79	535.53	505.26	505.29	494.68	33.53	33.50	44.10
	11/06/19	538.79	535.53	505.41	505.29	494.68	33.38	33.50	44.10
	02/12/20	538.79	535.53	505.61	505.29	494.68	33.18	33.50	44.10
	05/20/20	538.79	535.53	511.66	511.66	494.68	27.13	27.13	44.10
	07/30/20	538.79	535.53	505.06	505.04	494.68	33.73	33.75	44.10
	10/21/20	538.79	535.53	505.27	505.46	494.68	33.52	33.33	44.10
	02/11/21	538.79	535.53	504.23	505.46	494.68	34.56	33.33	44.10
	05/17/21	538.79	535.53	505.74	505.73	494.68	33.05	33.06	44.10
	08/27/21	538.79	535.53	504.94	505.73	494.68	33.85	33.06	44.10

Table 1. Groundwater Elevations - Midwest Generation, LLC, Joliet Station #29, Joliet, IL

Well ID	Date	Top of Casing (TOC) Elevation (ft above MSL)	Ground Elevation (ft above MSL)	Groundwater Elevation (ft above MSL)	Sampling Groundwater Elevation (ft above MSL)	Bottom of Well Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Sampling Depth to Groundwater (ft below TOC)	Depth to Bottom of Well (ft below TOC)
MW-04	02/10/15	539.03	535.80	505.19	505.18	496.13	33.84	33.85	42.90
	05/27/15	539.03	535.80	505.39	505.37	496.13	33.64	33.66	42.90
	08/04/15	539.03	535.80	505.19	505.19	496.13	33.84	33.84	42.90
	10/27/15	539.03	535.80	504.98	505.00	496.13	34.05	34.03	42.90
	02/09/16	539.01	535.83	505.59	505.44	496.11	33.42	33.57	42.90
	05/10/16	539.01	535.83	505.94	505.95	496.11	33.07	33.06	42.90
	08/30/16	539.01	535.83	506.93	507.19	496.11	32.08	31.82	42.90
	11/01/16	539.01	535.83	505.85	505.87	496.11	33.16	33.14	42.90
	02/06/17	539.01	535.83	505.50	505.52	496.11	33.51	33.49	42.90
	04/26/17	539.01	535.83	505.72	505.74	496.11	33.29	33.27	42.90
	08/01/17	539.01	535.83	506.92	506.39	496.11	32.09	32.62	42.90
	10/18/17	539.01	535.83	508.73	508.50	496.11	30.28	30.51	42.90
	02/20/18	539.01	535.83	505.37	506.69	496.11	33.64	32.32	42.90
	04/24/18	539.01	535.83	505.91	505.92	496.11	33.10	33.09	42.90
	07/31/18	539.01	535.83	505.20	505.22	496.11	33.81	33.79	42.90
	10/17/18	539.01	535.83	506.16	506.03	496.11	32.85	32.98	42.90
	02/04/19	539.01	535.83	505.72	505.72	496.11	33.29	33.29	42.90
	05/06/19	539.01	535.83	509.18	508.57	496.11	29.83	30.44	42.90
	08/06/19	539.01	535.83	505.22	505.21	496.11	33.79	33.80	42.90
	11/06/19	539.01	535.83	507.36	505.21	496.11	31.65	33.80	42.90
	02/12/20	539.01	535.83	505.56	505.26	496.11	33.45	33.75	42.90
	05/20/20	539.01	535.83	511.61	511.61	496.11	27.40	27.40	42.90
	07/30/20	539.01	535.83	505.01	505.04	496.11	34.00	33.97	42.90
	10/21/20	539.01	535.83	505.53	505.46	496.11	33.48	33.55	42.90
	02/11/21	539.01	535.83	505.16	505.46	496.11	33.85	33.55	42.90
	05/17/21	539.01	535.83	505.69	505.69	496.11	33.32	33.32	42.90
	08/27/21	539.01	535.83	504.87	505.69	496.11	34.14	33.32	42.90
MW-05	02/11/15	539.69	536.43	505.12	505.12	494.64	34.57	34.57	45.05
	05/27/15	539.69	536.43	505.26	505.25	494.64	34.43	34.44	45.05
	08/04/15	539.69	536.43	505.14	505.14	494.64	34.55	34.55	45.05
	10/27/15	539.69	536.43	504.78	504.95	494.64	34.91	34.74	45.05
	02/09/16	539.64	536.36	505.46	505.33	494.59	34.18	34.31	45.05
	05/10/16	539.64	536.36	505.83	505.86	494.59	33.81	33.78	45.05
	08/30/16	539.64	536.36	506.82	507.09	494.59	32.82	32.55	45.05
	11/01/16	539.64	536.36	505.74	505.74	494.59	33.90	33.90	45.05
	02/06/17	539.64	536.36	505.41	505.40	494.59	34.23	34.24	45.05
	04/26/17	539.64	536.36	505.60	505.66	494.59	34.04	33.98	45.05
	08/01/17	539.64	536.36	506.52	506.24	494.59	33.12	33.40	45.05
	10/18/17	539.64	536.36	508.61	508.59	494.59	31.03	31.05	45.05
	02/20/18	539.64	536.36	506.35	506.74	494.59	33.29	32.90	45.05
	04/24/18	539.64	536.36	505.85	505.82	494.59	33.79	33.82	45.05
	07/31/18	539.64	536.36	505.10	505.11	494.59	34.54	34.53	45.05
	10/17/18	539.64	536.36	506.03	505.91	494.59	33.61	33.73	45.05
	02/04/19	539.64	536.36	505.97	505.96	494.59	33.67	33.68	45.05
	05/06/19	539.64	536.36	509.09	508.98	494.59	30.55	30.66	45.05
	08/06/19	539.64	536.36	505.09	505.09	494.59	34.55	34.55	45.05
	11/06/19	539.64	536.36	507.24	505.09	494.59	32.40	34.55	45.05
	02/12/20	539.64	536.36	505.48	504.59	494.59	34.16	35.05	45.05
	05/20/20	539.64	536.36	511.48	511.48	494.59	28.16	28.16	45.05
	07/30/20	539.64	536.36	504.87	504.88	494.59	34.77	34.76	45.05
	10/21/20	539.64	536.36	505.12	506.09	494.59	34.52	33.55	45.05
	02/11/21	539.64	536.36	505.04	506.09	494.59	34.60	33.55	45.05
	05/17/21	539.64	536.36	505.59	505.54	494.59	34.05	34.10	45.05
	08/27/21	539.64	536.36	504.86	505.54	494.59	34.78	34.10	45.05
MW-06	02/10/15	539.06	535.86	505.23	505.23	496.86	33.83	33.83	42.20
	05/28/15	539.06	535.86	505.46	505.45	496.86	33.60	33.61	42.20
	08/05/15	539.06	535.86	505.11	505.12	496.86	33.95	33.94	42.20
	10/27/15	539.06	535.86	504.88	504.93	496.86	34.18	34.13	42.20
	02/09/16	539.05	535.89	505.61	505.46	496.85	33.44	33.59	42.20
	05/10/16	539.05	535.89	506.00	506.94	496.85	33.05	32.11	42.20
	08/30/16	539.05	535.89	506.96	507.36	496.85	32.09	31.69	42.20
	11/01/16	539.05	535.89	505.88	505.91	496.85	33.17	33.14	42.20
	02/06/17	539.05	535.89	505.56	505.57	496.85	33.49	33.48	42.20
	04/27/17	539.05	535.89	505.74	505.77	496.85	33.31	33.28	42.20
	08/01/17	539.05	535.89	506.65	506.28	496.85	32.40	32.77	42.20
	10/19/17	539.05	535.89	508.74	508.14	496.85	30.31	30.91	42.20
	02/21/18	539.05	535.89	506.57	509.45	496.85	32.48	29.60	42.20
	04/25/18	539.05	535.89	505.94	505.86	496.85	33.11	33.19	42.20
	07/31/18	539.05	535.89	505.27	505.25	496.85	33.78	33.80	42.20
	10/18/18	539.05	535.89	506.16	506.00	496.85	32.89	33.05	42.20
	02/04/19	539.05	535.89	506.12	506.12	496.85	32.93	32.93	42.20
	05/06/19	539.05	535.89	509.19	508.22	496.85	29.86	30.83	42.20
	08/06/19	539.05	535.89	505.26	505.33	496.85	33.79	33.72	42.20
	11/06/19	539.05	535.89	507.36	505.33	496.85	31.69	33.72	42.20
	02/12/20	539.05	535.89	505.63	505.60	496.85	33.42	33.45	42.20
	05/21/20	539.05	535.89	511.51	511.45	496.85	27.54	27.60	42.20
	07/30/20	539.05	535.89	505.08	505.08	496.85	33.97	33.97	42.20
	10/21/20	539.05	535.89	505.30	505.37	496.85	33.75	33.68	42.20
	02/11/21	539.05	535.89	505.22	505.37	496.85	33.83	33.68	42.20
	05/17/21	539.05	535.89	505.73	505.73	496.85	33.32	33.32	42.20
	08/27/21	539.05	535.89	504.88	505.73	496.85	34.17	33.32	42.20
MW-07	02/10/15	539.35	535.86	505.24	505.24	496.12	34.11	34.11	43.23
	05/28/15	539.35	535.86	505.50	505.50	496.12	33.85	33.85	43.23
	08/05/15	539.35	535.86	505.18	505.17	496.12	34.17	34.18	43.23
	10/27/15	539.35	535.86	504.93	505.00	496.12	34.42	34.35	43.23
	02/09/16	539.35	535.87	505.66	505.51	496.12	33.69	33.84	43.23
	05/10/16	539.35	535.87	506.34	507.02	496.12	33.01	32.33	43.23
	08/30/16	539.35	535.87	507.04	507.41	496.12	32.31	31.94	43.23
	11/01/16	539.35	535.87	505.91	505.93	496.12	33.44	33.42	43.23
	02/06/17	539.35	535.87	505.59	505.62	496.12	33.76	33.73	43.23
	04/27/17	539.35	535.87	505.77	505.82	496.12	33.58	33.53	43.23
	08/01/17	539.35	535.87	506.68	506.30	496.12	32.67	33.05	43.23
	10/19/17	539.35	535.87	508.76	508.07	496.12	30.59	31.28	43.23
	02/21/18	539.35	535.87	506.67	509.64	496.12	32.68	29.71	43.23
	04/25/18	539.35	535.87	505.98	505.89	496.12	33.37	33.46	43.23
	08/01/18	539.35	535.87	505.30	505.31	496.12	34.05	34.04	43.23
	10/18/18	539.35	535.87	506.17	506.03	496.12	33.18	33.32	43.23
	02/04/19	539.35	535.87	506.19	506.19	496.12	33.16	33.16	43.23
	05/06/19	539.35	535.87	509.22	508.51	496.12	30.13	30.84	43.23
	08/06/19	539.35	535.87	505.33	505.33	496.12	34.02	34.02	43.23
	11/06/19	539.35	535.87	507.40	505.33	496.12	31.95	34.02	43.23
	02/12/20	539.35	535.87	505.65	505.65	496.12	33.70	33.70	43.23
	05/21/20	539.35	535.87	511.53	511.53	496.12	27.82	27.82	43.23
	07/30/20	539.35	535.87	505.14	505.14	496.12	34.21	34.21	43.23
	10/21/20	539.35	535.87	505.32	505.65	496.12	34.03	33.70	43.23
	02/11/21	539.35	535.87	505.25	505.65	496.12	34.10	33.70	43.23
	05/17/21	539.35	535.87	505.63	505.60	496.12	33.72	33.75	43.23
	08/27/21	539.35	535.87	504.92	505.60	496.12	34.43	33.75	43.23

Table 1. Groundwater Elevations - Midwest Generation, LLC, Joliet Station #29, Joliet, IL

Well ID	Date	Top of Casing (TOC) Elevation (ft above MSL)	Ground Elevation (ft above MSL)	Groundwater Elevation (ft above MSL)	Sampling Groundwater Elevation (ft above MSL)	Bottom of Well Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Sampling Depth to Groundwater (ft below TOC)	Depth to Bottom of Well (ft below TOC)
MW-08	02/10/15	536.87	533.72	505.18	505.19	498.81	31.69	31.68	38.06
	05/27/15	536.87	533.72	505.36	505.38	498.81	31.51	31.49	38.06
	08/04/15	536.87	533.72	505.19	505.20	498.81	31.68	31.67	38.06
	10/27/15	536.87	533.72	504.93	504.98	498.81	31.94	31.89	38.06
	02/09/16	536.96	533.77	505.72	505.72	498.90	31.24	31.24	38.06
	05/10/16	536.96	533.77	498.00	498.24	498.90	38.96	38.72	38.06
	08/30/16	536.96	533.77	507.05	507.09	498.90	29.91	29.87	38.06
	11/01/16	536.96	533.77	506.01	506.03	498.90	30.95	30.93	38.06
	02/06/17	536.96	533.77	505.58	505.62	498.90	31.38	31.34	38.06
	04/25/17	536.96	533.77	505.74	505.79	498.90	31.22	31.17	38.06
	08/01/17	536.96	533.77	506.78	506.76	498.90	30.18	30.20	38.06
	10/17/17	536.96	533.77	509.02	508.99	498.90	27.94	27.97	38.06
	02/20/18	536.96	533.77	506.00	506.55	498.90	30.96	30.41	38.06
	08/01/18	536.96	533.77	505.23	505.26	498.90	31.73	31.70	38.06
	10/16/18	536.96	533.77	506.36	506.35	498.90	30.60	30.61	38.06
	02/04/19	536.96	533.77	506.04	506.04	498.90	30.92	30.92	38.06
	05/06/19	536.96	533.77	509.22	509.13	498.90	27.74	27.83	38.06
	08/06/19	536.96	533.77	505.27	505.27	498.90	31.69	31.69	38.06
	11/06/19	536.96	533.77	507.54	507.16	498.90	29.42	29.80	38.06
	02/12/20	536.96	533.77	505.56	505.56	498.90	31.40	31.40	38.06
	05/20/20	536.96	533.77	511.82	511.63	498.90	25.14	25.33	38.06
	07/30/20	536.96	533.77	505.13	505.12	498.90	31.83	31.84	38.06
	10/28/20	536.96	533.77	505.29	505.41	498.90	31.67	31.55	38.06
	02/11/21	536.96	533.77	505.26	505.41	498.90	31.70	31.55	38.06
	05/17/21	536.96	533.77	505.81	505.76	498.90	31.15	31.20	38.06
	08/27/21	536.96	533.77	505.08	505.76	498.90	31.88	31.20	38.06
MW-09	02/10/15	534.44	531.13	505.22	504.70	496.29	29.22	29.74	38.15
	05/27/15	534.44	531.13	505.37	504.98	496.29	29.07	29.46	38.15
	08/04/15	534.44	531.13	505.22	504.91	496.29	29.22	29.53	38.15
	10/27/15	534.44	531.13	504.96	504.83	496.29	29.48	29.61	38.15
	02/09/16	534.41	531.08	505.64	505.49	496.26	28.77	28.92	38.15
	05/10/16	534.41	531.08	505.90	506.39	496.26	28.51	28.02	38.15
	08/30/16	534.41	531.08	506.98	506.94	496.26	27.43	27.47	38.15
	11/01/16	534.41	531.08	505.89	505.32	496.26	28.52	29.09	38.15
	02/06/17	534.41	531.08	505.51	505.66	496.26	28.90	28.75	38.15
	04/25/17	534.41	531.08	505.66	505.54	496.26	28.75	28.87	38.15
	08/01/17	534.41	531.08	506.64	506.27	496.26	27.77	28.14	38.15
	10/17/17	534.41	531.08	508.89	508.73	496.26	25.52	25.68	38.15
	02/20/18	534.41	531.08	506.39	506.99	496.26	28.02	27.42	38.15
	04/26/18	534.41	531.08	505.89	505.58	496.26	28.52	28.83	38.15
	08/01/18	534.41	531.08	505.18	505.05	496.26	29.23	29.36	38.15
	10/16/18	534.41	531.08	506.23	506.12	496.26	28.18	28.29	38.15
	02/04/19	534.41	531.08	506.02	505.99	496.26	28.39	28.42	38.15
	05/06/19	534.41	531.08	509.08	508.09	496.26	25.33	26.32	38.15
	08/06/19	534.41	531.08	505.23	504.61	496.26	29.18	29.80	38.15
	11/06/19	534.41	531.08	507.42	504.61	496.26	26.99	29.80	38.15
	02/12/20	534.41	531.08	505.53	504.89	496.26	28.88	29.52	38.15
	05/20/20	534.41	531.08	511.06	510.76	496.26	23.35	23.65	38.15
	07/30/20	534.41	531.08	505.02	505.05	496.26	29.39	29.36	38.15
	10/21/20	534.41	531.08	505.28	505.05	496.26	29.13	29.36	38.15
	02/11/21	534.41	531.08	505.21	505.05	496.26	29.20	29.36	38.15
	05/17/21	534.41	531.08	505.73	505.36	496.26	28.68	29.05	38.15
	08/27/21	534.41	531.08	505.00	505.36	496.26	29.41	29.05	38.15
MW-10	02/11/15	540.03	536.95	505.27	505.27	496.10	34.76	34.76	43.93
	05/28/15	540.03	536.95	505.48	505.48	496.10	34.55	34.55	43.93
	08/04/15	540.03	536.95	505.29	505.30	496.10	34.74	34.73	43.93
	10/27/15	540.03	536.95	504.93	505.07	496.10	35.10	34.96	43.93
	02/09/16	540.02	536.98	505.70	505.61	496.09	34.32	34.41	43.93
	05/10/16	540.02	536.98	506.00	506.66	496.09	34.02	33.36	43.93
	08/30/16	540.02	536.98	507.05	507.38	496.09	32.97	32.64	43.93
	11/01/16	540.02	536.98	505.98	505.97	496.09	34.04	34.05	43.93
	02/06/17	540.02	536.98	505.60	505.62	496.09	34.42	34.40	43.93
	04/26/17	540.02	536.98	505.80	505.84	496.09	34.22	34.18	43.93
	08/01/17	540.02	536.98	506.84	506.50	496.09	33.18	33.52	43.93
	10/18/17	540.02	536.98	508.89	508.61	496.09	31.13	31.41	43.93
	02/21/18	540.02	536.98	506.19	509.42	496.09	33.83	30.60	43.93
	04/24/18	540.02	536.98	506.05	506.02	496.09	33.97	34.00	43.93
	08/01/18	540.02	536.98	505.27	505.27	496.09	34.75	34.75	43.93
	10/17/18	540.02	536.98	506.29	506.14	496.09	33.73	33.88	43.93
	02/04/19	540.02	536.98	506.11	506.10	496.09	33.91	33.92	43.93
	05/06/19	540.02	536.98	509.44	508.82	496.09	30.58	31.20	43.93
	08/06/19	540.02	536.98	505.32	505.32	496.09	34.70	34.70	43.93
	11/06/19	540.02	536.98	507.60	505.32	496.09	32.42	34.70	43.93
	02/12/20	540.02	536.98	505.67	505.67	496.09	34.35	34.35	43.93
	05/20/20	540.02	536.98	511.83	511.86	496.09	28.19	28.16	43.93
	07/30/20	540.02	536.98	505.14	505.12	496.09	34.88	34.90	43.93
	10/21/20	540.02	536.98	505.30	505.30	496.09	34.72	34.72	43.93
	02/11/21	540.02	536.98	505.25	505.30	496.09	34.77	34.72	43.93
	05/17/21	540.02	536.98	505.79	505.78	496.09	34.23	34.24	43.93
	08/27/21	540.02	536.98	504.97	505.78	496.09	35.05	34.24	43.93
MW-11	02/11/15	539.47	536.52	505.49	505.49	497.14	33.98	33.98	42.33
	05/28/15	539.47	536.52	505.96	505.97	497.14	33.51	33.50	42.33
	08/04/15	539.47	536.52	505.65	505.64	497.14	33.82	33.83	42.33
	10/27/15	539.47	536.52	505.16	505.32	497.14	34.31	34.15	42.33
	02/09/16	539.41	536.62	506.10	505.88	497.08	33.31	33.53	42.33
	05/10/16	539.41	536.62	507.33	506.60	497.08	32.08	32.81	42.33
	08/30/16	539.41	536.62	508.27	508.85	497.08	31.14	30.56	42.33
	11/01/16	539.41	536.62	506.32	506.28	497.08	33.09	33.13	42.33
	02/06/17	539.41	536.62	505.90	505.92	497.08	33.51	33.49	42.33
	04/26/17	539.41	536.62	506.17	506.17	497.08	33.24	33.24	42.33
	08/01/17	539.41	536.62	507.47	507.38	497.08	31.94	32.03	42.33
	10/19/17	539.41	536.62	509.61	509.16	497.08	29.8	30.25	42.33
	02/21/18	539.41	536.62	506.45	509.85	497.08	32.96	29.56	42.33
	04/25/18	539.41	536.62	505.48	506.40	497.08	33.93	33.01	42.33
	08/01/18	539.41	536.62	505.53	505.54	497.08	33.88	33.87	42.33
	10/17/18	539.41	536.62	506.63	506.51	497.08	32.78	32.90	42.33
	02/04/19	539.41	536.62	506.19	506.19	497.08	33.22	33.22	42.33
	05/06/19	539.41	536.62	510.58	509.98	497.08	28.83	29.43	42.33
	08/06/19	539.41	536.62	505.66	505.66	497.08	33.75	33.75	42.33
	11/06/19	539.41	536.62	508.26	505.66	497.08	31.15	33.75	42.33
	02/12/20	539.41	536.62	505.88	505.81	497.08	33.53	33.60	42.33
	05/20/20	539.41	536.62	512.83	512.81	497.08	26.58	26.60	42.33
	07/30/20	539.41	536.62	505.53	505.48	497.08	33.88	33.93	42.33
	10/21/20	539.41	536.62	505.39	505.39	497.08	34.02	34.02	42.33
	02/11/21	539.41	536.62	505.46	505.39	497.08	33.95	34.02	42.33
	05/17/21	539.41	536.62	506.09	506.05	497.08	33.32	33.36	42.33
	08/27/21	539.41	536.62	505.15	506.05	497.08	34.26	33.36	42.33

Note: Values for Depth to Bottom of Well are from prior to the installation of the dedicated pumps.
NM - Not Measured

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-01	Date	8/6/2019		11/7/2019		2/13/2020		5/21/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021		8/30/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	NS	0.003	ND	NS	NS	0.003	0.0066	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Arsenic	0.01	0.001	NS	0.001	ND	NS	NS	0.001	0.0012	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Barium	2	0.0025	NS	0.0025	0.051	NS	NS	0.0025	0.076	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Beryllium	0.004	0.001	NS	0.001	ND	NS	NS	0.001	ND ^	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Boron	2	0.05	NS	0.05	0.22	NS	NS	0.05	0.35	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	0.005	0.0005	NS	0.0005	ND	NS	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chloride	200	10	NS	10	60	NS	NS	10	140	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	0.1	0.005	NS	0.005	ND	NS	NS	0.005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cobalt	1	0.001	NS	0.001	ND	NS	NS	0.001	0.0011	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Copper	0.65	0.002	NS	0.002	ND	NS	NS	0.002	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cyanide	0.2	0.01	NS	0.01	ND	NS	NS	0.01	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluoride	4	0.1	NS	0.1	0.34	NS	NS	0.1	0.4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Iron	5	0.1	NS	0.1	ND	NS	NS	0.1	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lead	0.0075	0.0005	NS	0.0005	ND	NS	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Manganese	0.15	0.0025	NS	0.0025	ND	NS	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Mercury	0.002	0.0002	NS	0.0002	ND	NS	NS	0.0002	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	0.1	0.002	NS	0.002	ND	NS	NS	0.002	0.0023	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate	10	0.1	NS	0.1	1.6	NS	NS	0.1	2.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate, Nitrite	NA	0.1	NS	0.1	1.6	NS	NS	0.1	2.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrite	NA	0.02	NS	0.02	ND	NS	NS	0.02	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Perchlorate	0.0049	0.004	NS	0.004	ND	NS	NS	0.004	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	0.05	0.0025	NS	0.0025	ND	NS	NS	0.0025	0.0075	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Silver	0.05	0.0005	NS	0.0005	ND	NS	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Sulfate	400	20	NS	20	42	NS	NS	20	120	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Thallium	0.002	0.002	NS	0.002	ND	NS	NS	0.002	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Total Dissolved Solids	1,200	10	NS	10	510	NS	NS	10	730	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	0.049	0.005	NS	0.005	ND	NS	NS	0.005	0.005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	5	0.02	NS	0.02	ND	NS	NS	0.02	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzene	0.005	0.0005	NS	0.0005	ND	NS	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BETX	11.705	0.0025	NS	0.0025	ND	NS	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
pH	6.5 - 9.0	NA	NS	NA	7.9	NS	NS	NA	7.01	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Temperature	NA	NA	NS	NA	11.25	NS	NS	NA	12.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conductivity	NA	NA	NS	NA	90.6	NS	NS	NA	1.226	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dissolved Oxygen	NA	NA	NS	NA	12.51	NS	NS	NA	8.61	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ORP	NA	NA	NS	NA	-29.4	NS	NS	NA	87.6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, All values are in mg/L

°C degrees Celsius
ms/cm^{2} millisiemens/centimeters
mg/L milligrams/liter
mV millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-02	Date	8/6/2019		11/7/2019		2/13/2020		5/21/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021		8/30/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	NS	0.003	ND	0.003	NS	0.003	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Arsenic	0.01	0.001	NS	0.001	ND	0.001	NS	0.001	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Barium	2	0.0025	NS	0.0025	0.065	0.0025	NS	0.0025	0.089	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Beryllium	0.004	0.001	NS	0.001	ND	0.001	NS	0.001	ND ^	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Boron	2	0.05	NS	0.05	0.18	0.05	NS	0.05	0.24	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	0.005	0.0005	NS	0.0005	ND	0.0005	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chloride	200	10	NS	10	100	10	NS	10	260	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	0.1	0.005	NS	0.005	ND	0.005	NS	0.005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cobalt	1	0.001	NS	0.001	ND	0.001	NS	0.001	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Copper	0.65	0.002	NS	0.002	ND	0.002	NS	0.002	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cyanide	0.2	0.01	NS	0.01	ND	0.01	NS	0.01	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluoride	4	0.1	NS	0.1	0.38	0.1	NS	0.1	0.41	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Iron	5	0.1	NS	0.1	ND	0.1	NS	0.1	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lead	0.0075	0.0005	NS	0.0005	ND	0.0005	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Manganese	0.15	0.0025	NS	0.0025	ND	0.0025	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Mercury	0.002	0.0002	NS	0.0002	ND	0.0002	NS	0.0002	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	0.1	0.002	NS	0.002	0.0021	0.002	NS	0.002	0.0046	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate	10	0.1	NS	0.1	1.2	0.1	NS	0.1	2.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate, Nitrite	NA	0.1	NS	0.1	1.2	0.1	NS	0.1	2.9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrite	NA	0.02	NS	0.02	ND	0.02	NS	0.02	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Perchlorate	0.0049	0.004	NS	0.004	ND	0.004	NS	0.004	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	0.05	0.0025	NS	0.0025	ND	0.0025	NS	0.0025	0.0045	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Silver	0.05	0.0005	NS	0.0005	ND	0.0005	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Sulfate	400	20	NS	20	34	20	NS	20	160	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Thallium	0.002	0.002	NS	0.002	ND	0.002	NS	0.002	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Total Dissolved Solids	1,200	10	NS	10	580	10	NS	10	910	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	0.049	0.005	NS	0.005	ND	0.005	NS	0.005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	5	0.02	NS	0.02	ND	0.02	NS	0.02	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzene	0.005	0.0005	NS	0.0005	ND	0.0005	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BETX	11.705	0.0025	NS	0.0025	ND	0.0025	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
pH	6.5 - 9.0	NA	NS	NA	7.16	NA	NS	NA	6.99	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Temperature	NA	NA	NS	NA	12.61	NA	NS	NA	14.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conductivity	NA	NA	NS	NA	9.67	NA	NS	NA	1.577	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dissolved Oxygen	NA	NA	NS	NA	9.1	NA	NS	NA	7.77	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ORP	NA	NA	NS	NA	-10.5	NA	NS	NA	82.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section
All values are in mg/L

ºC	degrees Celsius
ms/cm	millisiemens/centimeters
mg/L	milligrams/liter
mV	millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-03	Date	8/7/2019		11/7/2019		2/17/2020		5/20/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021		5/18/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	ND	0.001	0.0012	0.001	0.0015	0.001	0.0015	0.001	0.001	0.001	ND	0.001	0.001	0.001	ND	0.001	ND
Barium	2	0.0025	0.088	0.0025	0.081	0.0025	0.09	0.0025	0.11	0.0025	0.093	0.0025	0.1	0.0025	0.11	0.0025	0.14	0.0025	0.12
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2	0.05	0.36	0.05	0.32	0.05	0.33	0.05	0.36	0.05	0.28	0.05	0.29	0.05	0.35	0.05	0.25	0.05	0.21
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	220	10	150	10	130	10	230	10	170	10	180	10	200	40	290	40	280
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.001	0.001	0.0013
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0062	0.01	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	4	0.1	0.39	0.1	0.41	0.1	0.46	0.1	0.42	0.1	0.45	0.1	0.44	0.1	0.44	0.1	0.4	0.1	0.36
Iron	5	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	0.0035	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	0.0028	0.002	ND	0.002	ND	0.002	ND	0.002	0.0031	0.002	0.0048	0.002	0.0072	0.002	0.0093
Nitrogen/Nitrate	10	0.1	2.7	0.1	1.8	0.1	1.7	0.1	2.1	0.1	3	0.1	2.8	0.1	2.8	0.1	1.9	0.1	0.95
Nitrogen/Nitrate, Nitrite	NA	0.1	2.7	0.1	1.8	0.1	1.7	0.1	2.1	0.5	3	0.5	2.8	0.5	2.8	0.5	1.9	0.1	0.95
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	0.0037	0.0025	0.0025	0.0025	0.0025	0.0025	0.0039	0.0025	0.0028	0.0025	ND	0.0025	0.0047	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	25	71	25	73	25	65	25	100	25	77	15	91	25	140	25	190	25	150
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	760	10	740	10	610	10	910	30	680	30	760	10	900	10	1100	10	950
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.34	NA	7.32	NA	7.31	NA	7.56	NA	7.1	NA	7.23	NA	7.27	NA	7.13	NA	7.33
Temperature	NA	NA	13.00	NA	11.86	NA	12.00	NA	11.50	NA	12.50	NA	12.60	NA	12.40	NA	12.80	NA	13.40
Conductivity	NA	NA	1.37	NA	11.87	NA	9.37	NA	9.92	NA	1.36	NA	1.35	NA	1.561	NA	1.802	NA	1.472
Dissolved Oxygen	NA	NA	6.09	NA	8.23	NA	5.7	NA	3.98	NA	7.65	NA	4.22	NA	4.96	NA	5.34	NA	7.07
ORP	NA	NA	157.7	NA	-9.8	NA	154.4	NA	160.7	NA	157.4	NA	180.0	NA	20.0	NA	88.3	NA	88.3

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, All values are in mg/L

°C degrees Celsius
ms/cm millisiemens/centimeters
mg/L milligrams/liter
mV millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-04	Date	8/6/2019		11/6/2019		2/17/2020		5/20/2020		7/31/2020		10/22/2020		3/2/2021		5/18/2021		8/30/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	ND	0.001	0.001	0.001	0.0014	0.001	0.0014	0.001	ND	0.001	ND	0.001	0.0012	0.001	ND	0.001	ND
Barium	2	0.0025	0.08	0.0025	0.082	0.0025	0.085	0.0025	0.085	0.0025	0.082	0.0025	0.09	0.0025	0.099	0.0025	0.12	0.0025	0.12
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2	0.05	0.26	0.05	0.28	0.05	0.25	0.05	0.25	0.05	0.23	0.05	0.29	0.05	0.33	0.05	0.2	0.05	0.31
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	220	10	140	10	160	10	160	10	170	10	190	10	230	40	290	40	320
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	0.0057	0.001	0.0016	0.001	0.0071	0.001	0.0071	0.001	0.0031	0.001	0.0041	0.001	0.0059	0.001	0.0025	0.001	0.0055
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0057	0.01	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	4	0.1	0.39	0.1	0.42	0.1	0.46	0.1	0.46	0.1	0.47	0.1	0.49	0.1	0.46	0.1	0.42	0.1	0.41
Iron	5	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.14	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0033	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.003	0.002	0.0062
Nitrogen/Nitrate	10	0.1	2.5	0.1	1.8	0.1	1.6	0.1	1.6	0.1	2.7	0.1	3.4	0.1	1.5	0.1	2.4	0.1	1.6
Nitrogen/Nitrate, Nitrite	NA	0.1	2.5	0.1	1.8	0.1	1.6	0.1	1.6	0.5	2.7	0.5	3.4	0.1	1.5	0.5	ND F1	0.1	1.6
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	0.02	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.003	0.0025	ND	0.0025	0.0028
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	25	74	25	53	25	94	25	94	25	75	15	82	25	150	25	190	25	170
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	770	10	690	10	710	10	710	30	700	30	760	10	920	10	950	10	710
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.31	NA	7.33	NA	7.26	NA	7.26	NA	7.23	NA	7.15	NA	7.36	NA	7.30	NA	7.46
Temperature	NA	NA	12.70	NA	11.72	NA	11.20	NA	11.20	NA	14.20	NA	14.40	NA	11.30	NA	17.50	NA	14.80
Conductivity	NA	NA	1.440	NA	1.080	NA	1.016	NA	1.016	NA	1.428	NA	0.292	NA	1.605	NA	1.739	NA	1.876
Dissolved Oxygen	NA	NA	52.40	NA	6.65	NA	6.23	NA	6.23	NA	7.32	NA	5.33	NA	6.65	NA	7.47	NA	5.83
ORP	NA	NA	182.3	NA	192.0	NA	167.2	NA	167.2	NA	128.4	NA	178.4	NA	-5.8	NA	121.7	NA	-8.9

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, All values are in mg/L

°C degrees Celsius
ms/cm^2 millisiemens/centimeters
mg/L milligrams/liter
mV millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-05	Date	8/6/2019		11/7/2019		2/13/2020		5/20/2020		7/31/2020		10/22/2020		2/25/2021		5/17/2021		5/17/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	ND	0.001	0.0033	0.001	ND	0.001	0.0011	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2	0.0025	0.062	0.0025	0.062	0.0025	0.072	0.0025	0.074	0.0025	0.054	0.0025	0.07	0.0025	0.091	0.0025	0.098	0.0025	0.07
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND
Boron	2	0.05	0.5	0.05	0.32	0.05	0.43	0.05	0.29	0.05	0.47	0.05	0.47	0.05	0.29	0.05	0.32	0.05	0.34
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	120	10	130	10	170	10	280	10	180	10	180	10	220	40	410	40	290
Chromium	0.1	0.005	ND	0.005	0.0053	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	ND	0.001	0.0015	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	0.0063	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.01	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	4	0.1	0.31	0.1	0.31	0.1	0.36	0.1	0.37	0.1	0.38	0.1	0.38	0.1	0.34	0.1	0.31	0.1	0.3
Iron	5	0.1	ND	0.1	4.1	0.1	ND	0.1	0.11	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	0.0033	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	0.14	0.0025	ND	0.0025	0.0025	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	0.0024	0.002	0.0072	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0023
Nitrogen/Nitrate	10	0.1	1.3	0.1	1.2	0.1	1.2	0.1	1.4	0.1	1.3	0.1	0.99	0.1	0.99	0.1	1.7	0.1	1.2
Nitrogen/Nitrate, Nitrite	NA	0.1	1.3	0.1	1.2	0.1	1.2	0.1	1.4	0.1	1.3	0.1	0.99	0.1	0.99	0.1	1.7	0.1	1.2
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	0.011	0.0025	ND	0.0025	0.0025	0.0025	0.0048	0.0025	0.0029	0.0025	0.0032	0.0025	ND	0.0025	ND	0.0025	0.0025
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	25	180	25	68	25	ND	25	190	25	79	15	84	25	140	25	160	25	130
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	770	10	630	10	700	10	920	30	680	30	690	10	880	10	1200	10	910
Vanadium	0.049	0.005	ND	0.005	0.012	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	ND	0.02	0.027	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.03	NA	7.44	NA	7.02	NA	7.03	NA	7.28	NA	7.16	NA	7.31	NA	7	NA	6.94
Temperature	NA	NA	14.2	NA	10.34	NA	13.2	NA	12.8	NA	13.7	NA	14.5	NA	12.1	NA	13.2	NA	13.8
Conductivity	NA	NA	1.28	NA	10.56	NA	1.058	NA	1.534	NA	1.381	NA	0.278	NA	1.505	NA	2.084	NA	1.84
Dissolved Oxygen	NA	NA	3.53	NA	7.84	NA	6.2	NA	6.85	NA	5.7	NA	4.34	NA	4.63	NA	3.93	NA	5.68
ORP	NA	NA	170.6	NA	-11.9	NA	136.4	NA	142.8	NA	119.9	NA	161.3	NA	11.4	NA	161.6	NA	5.6

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, All values are in mg/L

ºC degrees Celsius
ms/cm millisiemens/centimeters
mg/L milligrams/liter
mV millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-06	Date	8/7/2019		11/7/2019		2/13/2020		5/21/2020		7/31/2020		10/22/2020		2/25/2021		5/17/2021		8/30/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	ND	0.001	0.0011	0.001	0.0014	0.001	0.0017	0.001	0.001	0.001	ND	0.001	0.001	0.001	ND	0.001	ND
Barium	2	0.0025	0.11	0.0025	0.13	0.0025	0.14	0.0025	0.14	0.0025	0.13	0.0025	0.13	0.0025	0.16	0.0025	0.2	0.0025	0.15
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND
Boron	2	0.05	0.21	0.05	0.24	0.05	0.2	0.05	0.49	0.05	0.18	0.05	0.23	0.05	0.26	0.05	0.17	0.05	0.21
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	130	10	99	10	150	10	180	10	160	10	160	10	240	40	410	10	220
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0051	0.01	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	4	0.1	0.26	0.1	0.3	0.1	0.37	0.1	0.37	0.1	0.32	0.1	0.31	0.1	0.36	0.1	0.3	0.1	0.25
Iron	5	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	10	0.1	0.47	0.1	0.61	0.1	0.75	0.1	1.9	0.1	0.66	0.1	0.56	0.1	1.5	0.1	1.7	0.1	0.54
Nitrogen/Nitrate, Nitrite	NA	0.1	0.47	0.1	0.61	0.1	0.75	0.1	1.9	0.1	0.66	0.1	0.56	0.1	1.5	0.1	1.7	0.1	0.54
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.053	0.0025	ND	0.0025	ND	0.0025	0.0025	0.0025	0.0036	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND F1	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	20	7.8	20	78	20	130	20	160	25	110	15	83	25	160	25	130	25	91
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	620	10	620	10	710	10	830	30	650	30	640	10	930	10	1200	10	700
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	0.0056	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.39	NA	7.27	NA	7.42	NA	7.06	NA	7.44	NA	6.95	NA	7.52	NA	7.35	NA	7.55
Temperature	NA	NA	12.8	NA	13.84	NA	13.2	NA	12.5	NA	13.2	NA	17.1	NA	12.7	NA	12.2	NA	13.7
Conductivity	NA	NA	1.06	NA	9.34	NA	0.983	NA	1.141	NA	1.306	NA	1.2	NA	1.539	NA	2.003	NA	1.953
Dissolved Oxygen	NA	NA	51.00	NA	9.01	NA	7.71	NA	7.98	NA	7.06	NA	3.67	NA	6.47	NA	6.93	NA	7.13
ORP	NA	NA	187.4	NA	-11.6	NA	157.2	NA	224.6	NA	152.0	NA	157.4	NA	3.0	NA	161.0	NA	-5.9

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, All values are in mg/L

°C degrees Celsius
ms/cm^2 millisiemens/centimeters
mg/L milligrams/liter
mV millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-07	Date	8/6/2019		11/7/2019		2/13/2020		5/21/2020		7/31/2020		10/22/2020		2/25/2021		5/17/2021		8/30/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	ND	0.001	ND	0.001	0.0011	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2	0.0025	0.11	0.0025	0.11	0.0025	0.14	0.0025	0.095	0.0025	0.11	0.0025	0.13	0.0025	0.17	0.0025	0.17	0.0025	0.11
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND
Boron	2	0.05	0.23	0.05	0.19	0.05	0.23	0.05	0.38	0.05	0.19	0.05	0.34	0.05	0.22	0.05	0.16	0.05	0.18
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	130	10	87	10	190	10	190	10	210	10	150	40	310	40	440	10	190
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.01	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	4	0.1	0.24	0.1	0.26	0.1	0.3	0.1	0.33	0.1	0.29	0.1	0.28	0.1	0.25	0.1	0.26	0.1	0.26
Iron	5	0.1	0.16	0.1	ND	0.1	0.13	0.1	ND	0.1	ND	0.1	ND	0.1	0.15	0.1	ND	0.1	0.3
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	0.0063	0.0025	ND	0.0025	0.004	0.0025	ND	0.0025	0.0041	0.0025	ND	0.0025	0.0061	0.0025	ND	0.0025	0.0079
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	10	0.1	0.23	0.1	0.68	0.1	0.88	0.1	1.4	0.1	0.54	0.1	0.93	0.1	1.1	0.1	1.6	0.1	0.36
Nitrogen/Nitrate, Nitrite	NA	0.1	0.23	0.1	0.68	0.1	0.88	0.1	1.4	0.1	0.54	0.1	0.93	0.1	1.1	0.1	1.6	0.1	0.36
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0038	0.0025	ND	0.0025	0.0025	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	20	48	20	83	20	96	20	140	25	85	15	97	25	130	25	120	25	74
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	590	10	540	10	710	10	750	30	630	30	680	10	1000	10	1300	10	670
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.31	NA	7.55	NA	7.27	NA	7.09	NA	7.23	NA	7.06	NA	7.25	NA	7.18	NA	7.75
Temperature	NA	NA	12.40	NA	13.75	NA	12.80	NA	12.00	NA	13.10	NA	14.50	NA	12.00	NA	12.30	NA	14.58
Conductivity	NA	NA	1.020	NA	8.950	NA	1.052	NA	1.100	NA	1.327	NA	1.230	NA	1.692	NA	2.101	NA	1.735
Dissolved Oxygen	NA	NA	27.40	NA	5.54	NA	7.22	NA	6.48	NA	4.62	NA	3.98	NA	3.76	NA	4.93	NA	3.93
ORP	NA	NA	189.6	NA	-22.6	NA	158.8	NA	282.5	NA	187.6	NA	150.9	NA	8.2	NA	163.9	NA	-20.5

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, All values are in mg/L

ºC degrees Celsius
ms/cm millisiemens/centimeters
mg/L milligrams/liter
mV millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-08	Date	8/6/2019		11/7/2019		2/12/2020		5/20/2020		7/30/2020		10/22/2020		2/11/2021		5/17/2021		8/27/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2	0.0025	0.027	0.0025	0.034	0.0025	0.054	0.0025	0.041	0.0025	0.047	0.0025	0.062	0.0025	0.081	0.0025	0.086	0.0025	0.05
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2	0.05	0.12	0.05	0.14	0.05	0.11	0.05	0.14	0.05	0.11	0.05	0.18	0.05	0.16	0.05	0.091	0.05	0.17
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	270	10	70	10	230	10	370	10	160	10	180	10	230	40	450	10	160
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0062	0.01	ND	0.005	ND	0.005	0.0072	0.005	0.0068
Fluoride	4	0.1	0.28	0.1	0.26	0.1	0.33	0.1	0.34	0.1	0.3	0.1	0.27	0.1	0.26	0.1	0.27	0.1	0.26
Iron	5	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.006	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	0.0055	0.002	0.0024	0.002	ND	0.002	0.002	0.002	0.0023	0.002	ND	0.002	ND
Nitrogen/Nitrate	10	0.1	0.76	0.1	0.94	0.1	1	0.1	3.6	0.1	1.4	0.1	1.4	0.1	1.5	0.1	1.3	0.1	0.9
Nitrogen/Nitrate, Nitrite	NA	0.1	0.76	0.1	0.94	0.1	1	0.1	3.6	0.1	1.4	0.1	1.4	0.1	1.5	0.1	1.3	0.1	0.9
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	0.004
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0043	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	20	16	20	29	20	63	20	89	25	83	15	140	100	260	25	190	25	95
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	420	10	470	10	750	10	1100	30	650	30	800	10	990	10	1300	10	600
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.41	NA	7.01	NA	7.25	NA	7.10	NA	6.97	NA	7.14	NA	7.10	NA	7.14	NA	7.88
Temperature	NA	NA	12.40	NA	11.31	NA	13.30	NA	12.80	NA	13.20	NA	12.90	NA	11.70	NA	12.90	NA	13.80
Conductivity	NA	NA	0.850	NA	8.020	NA	1.112	NA	1.860	NA	1.297	NA	1.880	NA	1.570	NA	2.151	NA	2.046
Dissolved Oxygen	NA	NA	48.30	NA	6.97	NA	7.14	NA	9.68	NA	6.97	NA	3.88	NA	5.92	NA	7.60	NA	6.28
ORP	NA	NA	190.0	NA	-24.4	NA	177.6	NA	139.8	NA	185.2	NA	189.0	NA	70.4	NA	186.3	NA	24.0

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, All values are in mg/L

ºC degrees Celsius
ms/cm^2 millisiemens/centimeters
mg/L milligrams/liter
mV millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-09	Date	8/7/2019		11/7/2019		2/12/2020		5/20/2020		8/5/2020		10/22/2020		3/2/2021		5/17/2021		8/27/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	0.0016	0.001	0.0047	0.001	0.0038	0.001	0.0062	0.001	0.001	0.001	0.034	0.001	0.0043	0.001	0.0025	0.001	0.0028
Barium	2	0.0025	0.0084	0.0025	0.012	0.0025	0.01	0.0025	0.013	0.0025	0.01	0.0025	0.086	0.0025	0.015	0.0025	0.012	0.0025	0.0098
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND
Boron	2	0.05	0.33	0.05	0.73	0.05	0.33	0.05	0.3	0.05	0.29	0.05	0.37	0.05	0.47	0.05	0.29	0.05	0.31
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.0021	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	180	10	23	10	75	10	6.1 F1	10	140	10	190	2	7	10	180	10	220
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	0.028	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	0.031	0.001	0.065	0.001	0.032	0.001	0.04	0.001	0.016	0.001	0.046	0.001	0.044	0.001	0.024	0.001	0.042
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.041	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0053	0.01	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	4	0.1	0.41	0.1	0.63	0.1	0.52	0.1	0.71	0.1	0.66	0.1	0.66	0.1	0.62	0.1	0.46	0.1	0.69
Iron	5	1	630	1	1800	1	960	1	1900	10	400	0.5	970	10	2000 ^	10	620	10	660
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.036	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	1.4	0.0025	4.4	0.0025	2.2	0.0025	3	0.0025	0.96	0.0025	2.3	0.0025	3.5	0.0025	1.4	0.0025	1.3
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	0.051	0.002	0.22	0.002	0.084	0.002	0.13	0.002	0.036	0.002	0.1	0.002	0.15	0.002	0.051	0.002	0.075
Nitrogen/Nitrate	10	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrate, Nitrite	NA	0.1	ND	0.1	ND	0.1	ND F1	0.1	ND	5	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.02	ND	0.04	ND	0.02	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0027	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	500	2800	500	7100	500	ND	500	6800	250	2000	250	1500	1000	7400	1000	3300	500	3300
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	5000	10	11000	10	6600	10	11000	150	2900	150	3000	50	12000	25	5600 H	13	4900
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	0.026	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	0.6	0.02	2.6	0.02	1	0.02	2.4	0.02	0.42	0.02	1.2	0.02	1.8	0.02	0.47	0.02	0.66
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	6.07	NA	5.53	NA	5.74	NA	5.41	NA	6.26	NA	5.73	NA	5.92	NA	6.03	NA	5.62
Temperature	NA	NA	13.10	NA	12.17	NA	12.60	NA	12.10	NA	13.90	NA	17.70	NA	12.50	NA	12.80	NA	14.00
Conductivity	NA	NA	4.050	NA	7.426	NA	4.789	NA	7.209	NA	3.080	NA	4.030	NA	8.104	NA	4.881	NA	7.385
Dissolved Oxygen	NA	NA	0.36	NA	1.18	NA	5.13	NA	1.17	NA	NS	NA	0.47	NA	0.12	NA	0.09	NA	0.21
ORP	NA	NA	-25.1	NA	35.2	NA	24.8	NA	25.9	NA	-44.5	NA	-91.4	NA	-28.2	NA	-34.6	NA	-78.6

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section
All values are in mg/L

°C degrees Celsius
ms/cm millisiemens/centimeters
mg/L milligrams/liter
mV millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.
H- Samples was prepped or analyzed beyond the specified holding time

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-10	Date	8/6/2019		11/7/2019		2/12/2020		5/20/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021		8/30/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2	0.0025	0.037	0.0025	0.033	0.0025	0.044	0.0025	0.045	0.0025	0.036	0.0025	0.04	0.0025	0.053	0.0025	0.064	0.0025	0.05
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2	0.05	0.35	0.05	0.29	0.05	0.29	0.05	0.7	0.05	0.24	0.05	0.29	0.05	0.36	0.05	0.36	0.05	0.23
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	200	10	130	10	180	10	250	2	170	10	230	40	290	40	350	40	330
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	0.0029	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.01	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	4	0.1	0.35	0.1	0.37	0.1	0.44	0.1	0.42	0.1	0.42	0.1	0.41	0.1	0.41	0.1	0.39	0.1	0.36
Iron	5	0.1	ND	0.1	0.25	0.1	ND	0.1	1.8	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	0.0029	0.0025	ND	0.0025	0.0034	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	0.0023	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0027	0.002	0.0026
Nitrogen/Nitrate	10	0.1	ND	0.1	1.8	0.1	1.7	0.1	1.4	0.1	2.8	0.1	3.8	0.1	2.2	0.1	2.7	0.1	1.9
Nitrogen/Nitrate, Nitrite	NA	0.1	2.3	0.1	1.8	0.1	1.7	0.1	1.4	0.5	2.8	0.5	3.8	0.5	2.2	0.5	2.7	0.1	1.9
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0035	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	25	95	25	ND	25	110	25	170	25	88	15	94	25	150	25	210	25	160
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	810	10	660	10	810	10	1000	30	720	30	850	10	1100	10	1100	10	990
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.4	NA	7.4	NA	7.28	NA	6.9	NA	6.95	NA	7.11	NA	7.19	NA	7.16	NA	7.56
Temperature	NA	NA	12.3	NA	11.89	NA	12.9	NA	12.5	NA	12.3	NA	12.7	NA	12.2	NA	14	NA	12.9
Conductivity	NA	NA	1.45	NA	1.085	NA	1.133	NA	1.61	NA	1.405	NA	1.51	NA	1.747	NA	1.95	NA	1.89
Dissolved Oxygen	NA	NA	5.45	NA	9.30	NA	7.73	NA	8.65	NA	7.68	NA	4.79	NA	4.70	NA	6.87	NA	7.61
ORP	NA	NA	167.5	NA	-12.2	NA	166.3	NA	133.9	NA	138.6	NA	172.5	NA	41.8	NA	147.7	NA	2.2

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D. Section
All values are in mg/L

ºC	degrees Celsius
ms/cm^{c}	millisiemens/centimeters
mg/L	milligrams/liter
mV	millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

Table 2. Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet, IL

Sample: MW-11	Date	8/6/2019		11/7/2019		2/13/2020		5/20/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021		8/30/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.01	0.001	0.0011	0.001	ND	0.001	0.0014	0.001	0.0023	0.001	0.0011	0.001	ND	0.001	0.0013	0.001	ND	0.001	ND
Barium	2	0.0025	0.051	0.0025	0.033	0.0025	0.065	0.0025	0.085	0.0025	0.051	0.0025	0.055	0.0025	0.089	0.0025	0.078	0.0025	0.049
Beryllium	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2	0.05	1.1	0.05	0.29	0.05	1.4	0.05	0.51	0.05	0.86	0.05	0.44	0.05	1.2	0.05	0.67	0.05	0.54
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200	10	130	10	130	10	200	10	520	10	170	10	170	40	320	40	420	10	190
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	0.0029	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.01	ND	0.005	ND	0.005	0.0051	0.005	ND
Fluoride	4	0.1	0.24	0.1	0.37	0.1	0.3	0.1	0.34	0.1	0.3	0.1	0.28	0.1	0.28	0.1	0.28	0.1	0.25
Iron	5	0.1	ND	0.1	0.25	0.1	ND	0.1	0.23	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	0.0029	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	10	0.1	0.34	0.1	1.8	0.1	0.79	0.1	2	0.1	0.85	0.1	0.59	0.1	1.1	0.1	1.4	0.1	0.46
Nitrogen/Nitrate, Nitrite	NA	0.1	0.34	0.1	1.8	0.1	0.79	0.1	2	0.1	0.85	0.1	0.59	0.1	1.1	0.1	1.4	0.1	0.46
Nitrogen/Nitrite	NA	0.02	ND F1	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	0.003	0.0025	ND	0.0025	0.0029	0.0025	0.0039	0.0025	ND	0.0025	ND	0.0025	0.0035	0.0025	0.0025	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400	50	78	50	ND	50	110	50	82	25	100	15	89	25	160	25	140	25	94
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	590	10	660	10	710	10	1400	30	670	30	710	10	1000	10	1200	10	510
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.42	NA	7.4	NA	7.3	NA	7.12	NA	7.13	NA	7.11	NA	7.33	NA	7.22	NA	7.33
Temperature	NA	NA	12.3	NA	11.89	NA	13.7	NA	12.2	NA	12.1	NA	12.7	NA	12.5	NA	13.2	NA	13.4
Conductivity	NA	NA	1.05	NA	1.085	NA	1.138	NA	2.323	NA	1.332	NA	1.51	NA	1.702	NA	2.022	NA	1.954
Dissolved Oxygen	NA	NA	7.00	NA	9.30	NA	8.76	NA	11.05	NA	9.19	NA	4.79	NA	9.97	NA	10.34	NA	9.43
ORP	NA	NA	163.4	NA	-12.2	NA	156.1	NA	139.8	NA	140.8	NA	172.5	NA	27.7	NA	152.2	NA	-51.2

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D. Section
All values are in mg/L

ºC	degrees Celsius
ms/cm^c	millisiemens/centimeters
mg/L	milligrams/liter
mV	millivolts

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NS - Not Sampled

^ - Instrument related QC outside limit.
F1- MS and/or MSD recovery exceeds control limits.
J- Estimated concentration. Less than RL but at or above MDL.

ATTACHMENT 1
Analytical Data Package(s)

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Tel: (708)534-5200

Laboratory Job ID: 500-204478-1
Client Project/Site: Joliet #29 Station Ash Ponds (CCA)

For:
KPRG and Associates, Inc.
14665 West Lisbon Road,
Suite 1A
Brookfield, Wisconsin 53005

Attn: Richard Gnat

Authorized for release by:
9/20/2021 5:28:14 PM

Diana Mockler, Project Manager I
(219)252-7570
Diana.Mockler@Eurofinset.com

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Case Narrative

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Job ID: 500-204478-1

Laboratory: Eurofins TestAmerica, Chicago

Narrative

Job Narrative
500-204478-1

Comments
No additional comments.

Receipt
The samples were received on 8/27/2021 6:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 5 coolers at receipt time were 1.3º C, 2.5º C, 2.6º C, 3.2º C and 5.4º C.

Receipt Exceptions
One or more containers for the following sample(s) was received empty: Sample #6 "MW-11" one of three HCL voa vials received empty.

Samples #8,10,11,and 12 container for perchlorate analysis does not have 1/3 headspace, container completely filled.

The following sample(s) was listed on the Chain of Custody (COC); however, no sample(s) was received: COC received on 8/31/21 has sample "Duplicate" with date and time of 8/30/21 1430.

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Field Service / Mobile Lab
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method 314.0: Due to the nature of the matrix and, or, the high conductivity measurement for the following sample in 320-522907 was analyzed at a dilution. The sample was orange in color. Elevated reporting limits (RLs) are provided. Data is being reported with this narration.

MW-09 (500-204478-4)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CHI
314.0	Perchlorate (IC)	EPA	TAL SAC
6020A	Metals (ICP/MS)	SW846	TAL CHI
7470A	Mercury (CVAA)	SW846	TAL CHI
9012B	Cyanide, Total andor Amenable	SW846	TAL CHI
9038	Sulfate, Turbidimetric	SW846	TAL CHI
9251	Chloride	SW846	TAL CHI
Nitrate by calc	Nitrogen, Nitrate-Nitrite	SM	TAL CHI
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CHI
SM 4500 F C	Fluoride	SM	TAL CHI
SM 4500 NO2 B	Nitrogen, Nitrite	SM	TAL CHI
SM 4500 NO3 F	Nitrogen, Nitrate	SM	TAL CHI
5030B	Purge and Trap	SW846	TAL CHI
7470A	Preparation, Mercury	SW846	TAL CHI
9010C	Cyanide, Distillation	SW846	TAL CHI
Soluble Metals	Preparation, Soluble	None	TAL CHI

Protocol References:

EPA = US Environmental Protection Agency
None = None
SM = "Standard Methods For The Examination Of Water And Wastewater"
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CHI = Eurofins TestAmerica, Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200
TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-204478-1	MW-05	Water	08/27/21 12:36	08/27/21 18:00
500-204478-2	Trip Blank	Water	08/27/21 00:00	08/27/21 18:00
500-204478-3	MW-08	Water	08/27/21 10:11	08/27/21 18:00
500-204478-4	MW-09	Water	08/27/21 11:27	08/27/21 18:00
500-204478-5	Duplicate	Water	08/27/21 15:04	08/27/21 18:00
500-204478-6	MW-11	Water	08/27/21 15:04	08/27/21 18:00
500-204478-7	Trip Blank	Water	08/30/21 00:00	08/31/21 10:57
500-204478-8	MW-10	Water	08/30/21 14:30	08/31/21 10:57
500-204478-9	MW-6	Water	08/30/21 17:36	08/31/21 10:57
500-204478-10	MW-7	Water	08/30/21 16:35	08/31/21 10:57
500-204478-11	MW-3	Water	08/30/21 10:53	08/31/21 10:57
500-204478-12	MW-4	Water	08/30/21 12:15	08/31/21 10:57

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-05
Date Collected: 08/27/21 12:36
Date Received: 08/27/21 18:00

Lab Sample ID: 500-204478-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 13:36	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 13:36	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 13:36	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 13:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*75 - 126*		*09/03/21 13:36*	*1*
Toluene-d8 (Surr)	*101*		*75 - 120*		*09/03/21 13:36*	*1*
4-Bromofluorobenzene (Surr)	*92*		*72 - 124*		*09/03/21 13:36*	*1*
Dibromofluoromethane	*99*		*75 - 120*		*09/03/21 13:36*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/07/21 19:15	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		08/31/21 11:26	08/31/21 13:34	1
Arsenic	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 13:34	1
Barium	**0.070**		0.0025		mg/L		08/31/21 11:26	08/31/21 13:34	1
Beryllium	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 13:34	1
Boron	**0.34**		0.050		mg/L		08/31/21 11:26	09/01/21 16:22	1
Cadmium	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 13:34	1
Chromium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 13:34	1
Cobalt	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 13:34	1
Copper	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 13:34	1
Iron	<0.10		0.10		mg/L		08/31/21 11:26	08/31/21 13:34	1
Lead	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 19:52	1
Manganese	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 13:34	1
Nickel	**0.0023**		0.0020		mg/L		08/31/21 11:26	08/31/21 19:52	1
Selenium	**0.0025**		0.0025		mg/L		08/31/21 11:26	08/31/21 13:34	1
Silver	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 13:34	1
Thallium	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 19:52	1
Vanadium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 13:34	1
Zinc	<0.020		0.020		mg/L		08/31/21 11:26	08/31/21 13:34	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 07:34	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/10/21 10:20	09/10/21 20:09	1
Sulfate	**130**		25		mg/L			09/20/21 13:47	5
Chloride	**290**		40		mg/L			09/20/21 14:54	20
Nitrogen, Nitrate	**1.2**		0.10		mg/L			09/20/21 15:50	1
Total Dissolved Solids	**910**		10		mg/L			08/31/21 05:09	1
Fluoride	**0.30**		0.10		mg/L			09/20/21 09:45	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			08/28/21 13:12	1
Nitrogen, Nitrate Nitrite	**1.2**		0.10		mg/L			09/20/21 11:52	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: Trip Blank

Date Collected: 08/27/21 00:00
Date Received: 08/27/21 18:00

Lab Sample ID: 500-204478-2

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 13:58	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 13:58	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 13:58	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 13:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*75 - 126*		*09/03/21 13:58*	*1*
Toluene-d8 (Surr)	*98*		*75 - 120*		*09/03/21 13:58*	*1*
4-Bromofluorobenzene (Surr)	*91*		*72 - 124*		*09/03/21 13:58*	*1*
Dibromofluoromethane	*99*		*75 - 120*		*09/03/21 13:58*	*1*

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-08
Date Collected: 08/27/21 10:11
Date Received: 08/27/21 18:00

Lab Sample ID: 500-204478-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 14:20	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 14:20	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 14:20	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 14:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*75 - 126*		*09/03/21 14:20*	*1*
Toluene-d8 (Surr)	*98*		*75 - 120*		*09/03/21 14:20*	*1*
4-Bromofluorobenzene (Surr)	*93*		*72 - 124*		*09/03/21 14:20*	*1*
Dibromofluoromethane	*100*		*75 - 120*		*09/03/21 14:20*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/07/21 19:37	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		08/31/21 11:26	08/31/21 13:58	1
Arsenic	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 13:58	1
Barium	**0.050**		0.0025		mg/L		08/31/21 11:26	08/31/21 13:58	1
Beryllium	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 13:58	1
Boron	**0.17**		0.050		mg/L		08/31/21 11:26	09/01/21 16:39	1
Cadmium	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 13:58	1
Chromium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 13:58	1
Cobalt	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 13:58	1
Copper	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 13:58	1
Iron	<0.10		0.10		mg/L		08/31/21 11:26	08/31/21 13:58	1
Lead	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 13:58	1
Manganese	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 13:58	1
Nickel	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 19:57	1
Selenium	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 13:58	1
Silver	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 13:58	1
Thallium	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 13:58	1
Vanadium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 13:58	1
Zinc	<0.020		0.020		mg/L		08/31/21 11:26	08/31/21 13:58	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 07:36	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	**0.0068**		0.0050		mg/L		09/10/21 10:20	09/10/21 20:26	1
Sulfate	**95**		25		mg/L			09/20/21 13:48	5
Chloride	**160**		10		mg/L			09/20/21 14:46	5
Nitrogen, Nitrate	**0.90**		0.10		mg/L			09/20/21 15:50	1
Total Dissolved Solids	**600**		10		mg/L			08/31/21 05:11	1
Fluoride	**0.26**		0.10		mg/L			09/20/21 09:54	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			08/28/21 13:12	1
Nitrogen, Nitrate Nitrite	**0.90**		0.10		mg/L			09/20/21 11:58	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-09

Date Collected: 08/27/21 11:27
Date Received: 08/27/21 18:00

Lab Sample ID: 500-204478-4

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 14:42	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 14:42	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 14:42	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 14:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*75 - 126*		*09/03/21 14:42*	*1*
Toluene-d8 (Surr)	*98*		*75 - 120*		*09/03/21 14:42*	*1*
4-Bromofluorobenzene (Surr)	*91*		*72 - 124*		*09/03/21 14:42*	*1*
Dibromofluoromethane	*101*		*75 - 120*		*09/03/21 14:42*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.020		0.020		mg/L			09/07/21 20:22	5

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		08/31/21 11:26	08/31/21 14:02	1
Arsenic	**0.0028**		0.0010		mg/L		08/31/21 11:26	08/31/21 14:02	1
Barium	**0.0098**		0.0025		mg/L		08/31/21 11:26	08/31/21 14:02	1
Beryllium	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 14:02	1
Boron	**0.31**		0.050		mg/L		08/31/21 11:26	09/01/21 16:53	1
Cadmium	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:02	1
Chromium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 14:02	1
Cobalt	**0.042**		0.0010		mg/L		08/31/21 11:26	08/31/21 14:02	1
Copper	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 14:02	1
Iron	**660**		10		mg/L		08/31/21 11:26	09/02/21 11:55	100
Lead	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:02	1
Manganese	**1.3**		0.0025		mg/L		08/31/21 11:26	08/31/21 14:02	1
Nickel	**0.075**		0.0020		mg/L		08/31/21 11:26	08/31/21 19:59	1
Selenium	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 14:02	1
Silver	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:02	1
Thallium	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 14:02	1
Vanadium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 14:02	1
Zinc	**0.66**		0.020		mg/L		08/31/21 11:26	08/31/21 14:02	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 07:39	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/10/21 10:20	09/10/21 20:28	1
Sulfate	**3300**		500		mg/L			09/20/21 15:20	100
Chloride	**220**		10		mg/L			09/20/21 14:47	5
Nitrogen, Nitrate	<0.10		0.10		mg/L			09/20/21 16:57	1
Total Dissolved Solids	**4900**		13		mg/L			08/31/21 05:14	1
Fluoride	**0.69**		0.10		mg/L			09/20/21 09:58	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			08/28/21 13:25	1
Nitrogen, Nitrate Nitrite	<0.10		0.10		mg/L			09/20/21 12:01	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: Duplicate

Date Collected: 08/27/21 15:04
Date Received: 08/27/21 18:00

Lab Sample ID: 500-204478-5

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 15:04	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 15:04	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 15:04	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 15:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*75 - 126*		*09/03/21 15:04*	*1*
Toluene-d8 (Surr)	*99*		*75 - 120*		*09/03/21 15:04*	*1*
4-Bromofluorobenzene (Surr)	*91*		*72 - 124*		*09/03/21 15:04*	*1*
Dibromofluoromethane	*100*		*75 - 120*		*09/03/21 15:04*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/07/21 19:59	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		08/31/21 11:26	08/31/21 14:05	1
Arsenic	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 14:05	1
Barium	**0.049**		0.0025		mg/L		08/31/21 11:26	08/31/21 14:05	1
Beryllium	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 14:05	1
Boron	**0.53**		0.050		mg/L		08/31/21 11:26	09/01/21 16:56	1
Cadmium	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:05	1
Chromium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 14:05	1
Cobalt	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 14:05	1
Copper	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 14:05	1
Iron	**0.18**		0.10		mg/L		08/31/21 11:26	08/31/21 14:05	1
Lead	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:05	1
Manganese	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 14:05	1
Nickel	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 20:02	1
Selenium	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 14:05	1
Silver	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:05	1
Thallium	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 14:05	1
Vanadium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 14:05	1
Zinc	<0.020		0.020		mg/L		08/31/21 11:26	08/31/21 14:05	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 07:41	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/10/21 10:20	09/10/21 20:29	1
Sulfate	**96**		25		mg/L			09/20/21 13:49	5
Chloride	**190**		10		mg/L			09/20/21 14:47	5
Nitrogen, Nitrate	**0.37**		0.10		mg/L			09/20/21 16:57	1
Total Dissolved Solids	**600**		10		mg/L			08/31/21 05:16	1
Fluoride	**0.25**		0.10		mg/L			09/20/21 10:01	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			08/28/21 13:26	1
Nitrogen, Nitrate Nitrite	**0.37**		0.10		mg/L			09/20/21 12:03	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-11

Date Collected: 08/27/21 15:04
Date Received: 08/27/21 18:00

Lab Sample ID: 500-204478-6

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 15:26	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 15:26	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 15:26	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 15:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*75 - 126*		*09/03/21 15:26*	*1*
Toluene-d8 (Surr)	*99*		*75 - 120*		*09/03/21 15:26*	*1*
4-Bromofluorobenzene (Surr)	*93*		*72 - 124*		*09/03/21 15:26*	*1*
Dibromofluoromethane	*99*		*75 - 120*		*09/03/21 15:26*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/08/21 16:56	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		08/31/21 11:26	08/31/21 14:08	1
Arsenic	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 14:08	1
Barium	**0.049**		0.0025		mg/L		08/31/21 11:26	08/31/21 14:08	1
Beryllium	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 14:08	1
Boron	**0.54**		0.050		mg/L		08/31/21 11:26	09/01/21 17:00	1
Cadmium	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:08	1
Chromium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 14:08	1
Cobalt	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 14:08	1
Copper	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 14:08	1
Iron	<0.10		0.10		mg/L		08/31/21 11:26	08/31/21 14:08	1
Lead	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:08	1
Manganese	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 14:08	1
Nickel	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 20:03	1
Selenium	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 14:08	1
Silver	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 14:08	1
Thallium	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 14:08	1
Vanadium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 14:08	1
Zinc	<0.020		0.020		mg/L		08/31/21 11:26	08/31/21 14:08	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 07:43	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/10/21 10:20	09/10/21 20:31	1
Sulfate	**94**		25		mg/L			09/20/21 13:49	5
Chloride	**190**		10		mg/L			09/20/21 14:47	5
Nitrogen, Nitrate	**0.46**		0.10		mg/L			09/20/21 16:57	1
Total Dissolved Solids	**510**		10		mg/L			08/31/21 05:19	1
Fluoride	**0.25**		0.10		mg/L			09/20/21 10:04	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			08/28/21 13:27	1
Nitrogen, Nitrate Nitrite	**0.46**		0.10		mg/L			09/20/21 12:05	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: Trip Blank

Date Collected: 08/30/21 00:00
Date Received: 08/31/21 10:57

Lab Sample ID: 500-204478-7

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 15:48	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 15:48	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 15:48	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 15:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 126*		*09/03/21 15:48*	*1*
Toluene-d8 (Surr)	*97*		*75 - 120*		*09/03/21 15:48*	*1*
4-Bromofluorobenzene (Surr)	*91*		*72 - 124*		*09/03/21 15:48*	*1*
Dibromofluoromethane	*101*		*75 - 120*		*09/03/21 15:48*	*1*

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-10

Date Collected: 08/30/21 14:30
Date Received: 08/31/21 10:57

Lab Sample ID: 500-204478-8

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 16:10	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 16:10	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 16:10	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 16:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*75 - 126*		*09/03/21 16:10*	*1*
Toluene-d8 (Surr)	*97*		*75 - 120*		*09/03/21 16:10*	*1*
4-Bromofluorobenzene (Surr)	*90*		*72 - 124*		*09/03/21 16:10*	*1*
Dibromofluoromethane	*100*		*75 - 120*		*09/03/21 16:10*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/08/21 18:02	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		09/13/21 12:24	09/13/21 13:16	1
Arsenic	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:16	1
Barium	**0.050**		0.0025		mg/L		09/13/21 12:24	09/13/21 13:16	1
Beryllium	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:16	1
Boron	**0.23**		0.050		mg/L		09/13/21 12:24	09/13/21 13:16	1
Cadmium	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:16	1
Chromium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:16	1
Cobalt	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:16	1
Copper	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:16	1
Iron	<0.10		0.10		mg/L		09/13/21 12:24	09/13/21 13:16	1
Lead	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:16	1
Manganese	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:16	1
Nickel	**0.0026**		0.0020		mg/L		09/13/21 12:24	09/13/21 13:16	1
Selenium	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:16	1
Silver	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:16	1
Thallium	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:16	1
Vanadium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:16	1
Zinc	<0.020		0.020		mg/L		09/13/21 12:24	09/13/21 13:16	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 08:00	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/10/21 14:59	09/10/21 19:50	1
Sulfate	**160**		25		mg/L			09/20/21 13:49	5
Chloride	**330**		40		mg/L			09/20/21 14:56	20
Nitrogen, Nitrate	**1.9**		0.10		mg/L			09/20/21 16:57	1
Total Dissolved Solids	**990**		10		mg/L			09/02/21 02:56	1
Fluoride	**0.36**		0.10		mg/L			09/20/21 10:07	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			09/01/21 08:49	1
Nitrogen, Nitrate Nitrite	**1.9**		0.10		mg/L			09/20/21 12:07	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-6
Date Collected: 08/30/21 17:36
Date Received: 08/31/21 10:57

Lab Sample ID: 500-204478-9
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 16:32	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 16:32	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 16:32	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 16:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*75 - 126*		*09/03/21 16:32*	*1*
Toluene-d8 (Surr)	*98*		*75 - 120*		*09/03/21 16:32*	*1*
4-Bromofluorobenzene (Surr)	*92*		*72 - 124*		*09/03/21 16:32*	*1*
Dibromofluoromethane	*101*		*75 - 120*		*09/03/21 16:32*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/08/21 18:25	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		09/13/21 12:24	09/13/21 13:19	1
Arsenic	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:19	1
Barium	**0.15**		0.0025		mg/L		09/13/21 12:24	09/13/21 13:19	1
Beryllium	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:19	1
Boron	**0.21**		0.050		mg/L		09/13/21 12:24	09/13/21 13:19	1
Cadmium	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:19	1
Chromium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:19	1
Cobalt	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:19	1
Copper	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:19	1
Iron	<0.10		0.10		mg/L		09/13/21 12:24	09/13/21 13:19	1
Lead	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:19	1
Manganese	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:19	1
Nickel	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:19	1
Selenium	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:19	1
Silver	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:19	1
Thallium	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:19	1
Vanadium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:19	1
Zinc	<0.020		0.020		mg/L		09/13/21 12:24	09/13/21 13:19	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 08:08	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/13/21 13:10	09/13/21 17:52	1
Sulfate	**91**		25		mg/L			09/20/21 13:50	5
Chloride	**220**		10		mg/L			09/20/21 14:48	5
Nitrogen, Nitrate	**0.54**		0.10		mg/L			09/20/21 16:57	1
Total Dissolved Solids	**700**		10		mg/L			09/02/21 03:03	1
Fluoride	**0.25**		0.10		mg/L			09/20/21 10:21	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			09/01/21 08:50	1
Nitrogen, Nitrate Nitrite	**0.54**		0.10		mg/L			09/20/21 12:13	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-7

Date Collected: 08/30/21 16:35
Date Received: 08/31/21 10:57

Lab Sample ID: 500-204478-10

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 13:10	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 13:10	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 13:10	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 13:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*75 - 126*		*09/03/21 13:10*	*1*
Toluene-d8 (Surr)	*96*		*75 - 120*		*09/03/21 13:10*	*1*
4-Bromofluorobenzene (Surr)	*82*		*72 - 124*		*09/03/21 13:10*	*1*
Dibromofluoromethane	*116*		*75 - 120*		*09/03/21 13:10*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/08/21 18:47	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		09/13/21 12:24	09/13/21 13:23	1
Arsenic	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:23	1
Barium	**0.11**		0.0025		mg/L		09/13/21 12:24	09/13/21 13:23	1
Beryllium	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:23	1
Boron	**0.18**		0.050		mg/L		09/13/21 12:24	09/13/21 13:23	1
Cadmium	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:23	1
Chromium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:23	1
Cobalt	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:23	1
Copper	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:23	1
Iron	**0.30**		0.10		mg/L		09/13/21 12:24	09/13/21 13:23	1
Lead	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:23	1
Manganese	**0.0079**		0.0025		mg/L		09/13/21 12:24	09/13/21 13:23	1
Nickel	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:23	1
Selenium	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:23	1
Silver	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:23	1
Thallium	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:23	1
Vanadium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:23	1
Zinc	<0.020		0.020		mg/L		09/13/21 12:24	09/13/21 13:23	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 08:21	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/13/21 13:10	09/13/21 17:56	1
Sulfate	**74**		25		mg/L			09/20/21 13:50	5
Chloride	**190**		10		mg/L			09/20/21 14:48	5
Nitrogen, Nitrate	**0.36**		0.10		mg/L			09/20/21 16:57	1
Total Dissolved Solids	**670**		10		mg/L			09/02/21 03:09	1
Fluoride	**0.26**		0.10		mg/L			09/20/21 10:24	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			09/01/21 08:50	1
Nitrogen, Nitrate Nitrite	**0.36**		0.10		mg/L			09/20/21 12:16	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-3

Date Collected: 08/30/21 10:53
Date Received: 08/31/21 10:57

Lab Sample ID: 500-204478-11

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 13:38	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 13:38	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 13:38	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 13:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*116*		*75 - 126*		*09/03/21 13:38*	*1*
Toluene-d8 (Surr)	*98*		*75 - 120*		*09/03/21 13:38*	*1*
4-Bromofluorobenzene (Surr)	*82*		*72 - 124*		*09/03/21 13:38*	*1*
Dibromofluoromethane	*114*		*75 - 120*		*09/03/21 13:38*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/08/21 19:09	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		09/13/21 12:24	09/13/21 13:26	1
Arsenic	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:26	1
Barium	**0.12**		0.0025		mg/L		09/13/21 12:24	09/13/21 13:26	1
Beryllium	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:26	1
Boron	**0.21**		0.050		mg/L		09/13/21 12:24	09/13/21 13:26	1
Cadmium	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:26	1
Chromium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:26	1
Cobalt	**0.0013**		0.0010		mg/L		09/13/21 12:24	09/13/21 13:26	1
Copper	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:26	1
Iron	<0.10		0.10		mg/L		09/13/21 12:24	09/13/21 13:26	1
Lead	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:26	1
Manganese	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:26	1
Nickel	**0.0093**		0.0020		mg/L		09/13/21 12:24	09/13/21 13:26	1
Selenium	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:26	1
Silver	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:26	1
Thallium	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:26	1
Vanadium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:26	1
Zinc	<0.020		0.020		mg/L		09/13/21 12:24	09/13/21 13:26	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 08:23	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/13/21 13:10	09/13/21 17:58	1
Sulfate	**150**		25		mg/L			09/20/21 15:20	5
Chloride	**280**		40		mg/L			09/20/21 14:57	20
Nitrogen, Nitrate	**0.95**		0.10		mg/L			09/20/21 16:57	1
Total Dissolved Solids	**950**		10		mg/L			09/02/21 03:11	1
Fluoride	**0.36**		0.10		mg/L			09/20/21 10:27	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			09/01/21 08:51	1
Nitrogen, Nitrate Nitrite	**0.95**		0.10		mg/L			09/20/21 12:18	1

Client Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Client Sample ID: MW-4

Date Collected: 08/30/21 12:15
Date Received: 08/31/21 10:57

Lab Sample ID: 500-204478-12

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 14:06	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 14:06	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 14:06	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 14:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*75 - 126*		*09/03/21 14:06*	*1*
Toluene-d8 (Surr)	*97*		*75 - 120*		*09/03/21 14:06*	*1*
4-Bromofluorobenzene (Surr)	*82*		*72 - 124*		*09/03/21 14:06*	*1*
Dibromofluoromethane	*116*		*75 - 120*		*09/03/21 14:06*	*1*

Method: 314.0 - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/08/21 19:31	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		09/13/21 12:24	09/13/21 13:29	1
Arsenic	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:29	1
Barium	**0.12**		0.0025		mg/L		09/13/21 12:24	09/13/21 13:29	1
Beryllium	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:29	1
Boron	**0.31**		0.050		mg/L		09/13/21 12:24	09/13/21 13:29	1
Cadmium	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:29	1
Chromium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:29	1
Cobalt	**0.0055**		0.0010		mg/L		09/13/21 12:24	09/13/21 13:29	1
Copper	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:29	1
Iron	<0.10		0.10		mg/L		09/13/21 12:24	09/13/21 13:29	1
Lead	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:29	1
Manganese	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:29	1
Nickel	**0.0062**		0.0020		mg/L		09/13/21 12:24	09/13/21 13:29	1
Selenium	**0.0028**		0.0025		mg/L		09/13/21 12:24	09/13/21 13:29	1
Silver	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:29	1
Thallium	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:29	1
Vanadium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:29	1
Zinc	<0.020		0.020		mg/L		09/13/21 12:24	09/13/21 13:29	1

Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 08:25	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/13/21 13:10	09/13/21 18:00	1
Sulfate	**170**		25		mg/L			09/20/21 15:21	5
Chloride	**320**		40		mg/L			09/20/21 14:59	20
Nitrogen, Nitrate	**1.6**		0.10		mg/L			09/20/21 16:57	1
Total Dissolved Solids	**710**		10		mg/L			09/02/21 03:14	1
Fluoride	**0.41**		0.10		mg/L			09/20/21 10:30	1
Nitrogen, Nitrite	<0.020		0.020		mg/L			09/01/21 08:51	1
Nitrogen, Nitrate Nitrite	**1.6**		0.10		mg/L			09/20/21 12:20	1

Definitions/Glossary

Client: KPRG and Associates, Inc. Job ID: 500-204478-1
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Qualifiers

General Chemistry

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Association Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

GC/MS VOA

Analysis Batch: 617186

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Total/NA	Water	8260B	
500-204478-2	Trip Blank	Total/NA	Water	8260B	
500-204478-3	MW-08	Total/NA	Water	8260B	
500-204478-4	MW-09	Total/NA	Water	8260B	
500-204478-5	Duplicate	Total/NA	Water	8260B	
500-204478-6	MW-11	Total/NA	Water	8260B	
500-204478-7	Trip Blank	Total/NA	Water	8260B	
500-204478-8	MW-10	Total/NA	Water	8260B	
500-204478-9	MW-6	Total/NA	Water	8260B	
MB 500-617186/7	Method Blank	Total/NA	Water	8260B	
LCS 500-617186/5	Lab Control Sample	Total/NA	Water	8260B	
500-204478-9 MS	MW-6	Total/NA	Water	8260B	
500-204478-9 MSD	MW-6	Total/NA	Water	8260B	

Analysis Batch: 617195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-10	MW-7	Total/NA	Water	8260B	
500-204478-11	MW-3	Total/NA	Water	8260B	
500-204478-12	MW-4	Total/NA	Water	8260B	
MB 500-617195/6	Method Blank	Total/NA	Water	8260B	
LCS 500-617195/4	Lab Control Sample	Total/NA	Water	8260B	

HPLC/IC

Analysis Batch: 522907

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Total/NA	Water	314.0	
500-204478-3	MW-08	Total/NA	Water	314.0	
500-204478-4	MW-09	Total/NA	Water	314.0	
500-204478-5	Duplicate	Total/NA	Water	314.0	
MB 320-522907/5	Method Blank	Total/NA	Water	314.0	
LCS 320-522907/6	Lab Control Sample	Total/NA	Water	314.0	
MRL 320-522907/4	Lab Control Sample	Total/NA	Water	314.0	

Analysis Batch: 523145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-6	MW-11	Total/NA	Water	314.0	
500-204478-8	MW-10	Total/NA	Water	314.0	
500-204478-9	MW-6	Total/NA	Water	314.0	
500-204478-10	MW-7	Total/NA	Water	314.0	
500-204478-11	MW-3	Total/NA	Water	314.0	
500-204478-12	MW-4	Total/NA	Water	314.0	
MB 320-523145/13	Method Blank	Total/NA	Water	314.0	
LCS 320-523145/14	Lab Control Sample	Total/NA	Water	314.0	
MRL 320-523145/12	Lab Control Sample	Total/NA	Water	314.0	
500-204478-6 MS	MW-11	Total/NA	Water	314.0	
500-204478-6 MSD	MW-11	Total/NA	Water	314.0	

QC Association Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Metals

Prep Batch: 616710

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	Soluble Metals	
500-204478-3	MW-08	Dissolved	Water	Soluble Metals	
500-204478-4	MW-09	Dissolved	Water	Soluble Metals	
500-204478-5	Duplicate	Dissolved	Water	Soluble Metals	
500-204478-6	MW-11	Dissolved	Water	Soluble Metals	
MB 500-616710/1-A	Method Blank	Soluble	Water	Soluble Metals	
LCS 500-616710/2-A	Lab Control Sample	Soluble	Water	Soluble Metals	
500-204478-1 MS	MW-05	Dissolved	Water	Soluble Metals	
500-204478-1 MSD	MW-05	Dissolved	Water	Soluble Metals	
500-204478-1 DU	MW-05	Dissolved	Water	Soluble Metals	

Analysis Batch: 616907

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	6020A	616710
500-204478-3	MW-08	Dissolved	Water	6020A	616710
500-204478-4	MW-09	Dissolved	Water	6020A	616710
500-204478-5	Duplicate	Dissolved	Water	6020A	616710
500-204478-6	MW-11	Dissolved	Water	6020A	616710
MB 500-616710/1-A	Method Blank	Soluble	Water	6020A	616710
LCS 500-616710/2-A	Lab Control Sample	Soluble	Water	6020A	616710
500-204478-1 MS	MW-05	Dissolved	Water	6020A	616710
500-204478-1 MSD	MW-05	Dissolved	Water	6020A	616710
500-204478-1 DU	MW-05	Dissolved	Water	6020A	616710

Analysis Batch: 616924

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	6020A	616710
500-204478-3	MW-08	Dissolved	Water	6020A	616710
500-204478-4	MW-09	Dissolved	Water	6020A	616710
500-204478-5	Duplicate	Dissolved	Water	6020A	616710
500-204478-6	MW-11	Dissolved	Water	6020A	616710
MB 500-616710/1-A	Method Blank	Soluble	Water	6020A	616710
LCS 500-616710/2-A	Lab Control Sample	Soluble	Water	6020A	616710
500-204478-1 MS	MW-05	Dissolved	Water	6020A	616710
500-204478-1 MSD	MW-05	Dissolved	Water	6020A	616710
500-204478-1 DU	MW-05	Dissolved	Water	6020A	616710

Analysis Batch: 617082

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	6020A	616710
500-204478-3	MW-08	Dissolved	Water	6020A	616710
500-204478-4	MW-09	Dissolved	Water	6020A	616710
500-204478-5	Duplicate	Dissolved	Water	6020A	616710
500-204478-6	MW-11	Dissolved	Water	6020A	616710
MB 500-616710/1-A	Method Blank	Soluble	Water	6020A	616710
LCS 500-616710/2-A	Lab Control Sample	Soluble	Water	6020A	616710
500-204478-1 MS	MW-05	Dissolved	Water	6020A	616710
500-204478-1 MSD	MW-05	Dissolved	Water	6020A	616710
500-204478-1 DU	MW-05	Dissolved	Water	6020A	616710

QC Association Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Metals

Analysis Batch: 617131

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-4	MW-09	Dissolved	Water	6020A	616710

Prep Batch: 617501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	7470A	
500-204478-3	MW-08	Dissolved	Water	7470A	
500-204478-4	MW-09	Dissolved	Water	7470A	
500-204478-5	Duplicate	Dissolved	Water	7470A	
500-204478-6	MW-11	Dissolved	Water	7470A	
500-204478-8	MW-10	Dissolved	Water	7470A	
500-204478-9	MW-6	Dissolved	Water	7470A	
500-204478-10	MW-7	Dissolved	Water	7470A	
500-204478-11	MW-3	Dissolved	Water	7470A	
500-204478-12	MW-4	Dissolved	Water	7470A	
MB 500-617501/12-A	Method Blank	Total/NA	Water	7470A	
LCS 500-617501/13-A	Lab Control Sample	Total/NA	Water	7470A	
500-204478-8 MS	MW-10	Dissolved	Water	7470A	
500-204478-8 MSD	MW-10	Dissolved	Water	7470A	
500-204478-8 DU	MW-10	Dissolved	Water	7470A	

Analysis Batch: 617674

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	7470A	617501
500-204478-3	MW-08	Dissolved	Water	7470A	617501
500-204478-4	MW-09	Dissolved	Water	7470A	617501
500-204478-5	Duplicate	Dissolved	Water	7470A	617501
500-204478-6	MW-11	Dissolved	Water	7470A	617501
500-204478-8	MW-10	Dissolved	Water	7470A	617501
500-204478-9	MW-6	Dissolved	Water	7470A	617501
500-204478-10	MW-7	Dissolved	Water	7470A	617501
500-204478-11	MW-3	Dissolved	Water	7470A	617501
500-204478-12	MW-4	Dissolved	Water	7470A	617501
MB 500-617501/12-A	Method Blank	Total/NA	Water	7470A	617501
LCS 500-617501/13-A	Lab Control Sample	Total/NA	Water	7470A	617501
500-204478-8 MS	MW-10	Dissolved	Water	7470A	617501
500-204478-8 MSD	MW-10	Dissolved	Water	7470A	617501
500-204478-8 DU	MW-10	Dissolved	Water	7470A	617501

Prep Batch: 618339

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-8	MW-10	Dissolved	Water	Soluble Metals	
500-204478-9	MW-6	Dissolved	Water	Soluble Metals	
500-204478-10	MW-7	Dissolved	Water	Soluble Metals	
500-204478-11	MW-3	Dissolved	Water	Soluble Metals	
500-204478-12	MW-4	Dissolved	Water	Soluble Metals	
MB 500-618339/1-A	Method Blank	Soluble	Water	Soluble Metals	
LCS 500-618339/2-A	Lab Control Sample	Soluble	Water	Soluble Metals	

Analysis Batch: 618501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-8	MW-10	Dissolved	Water	6020A	618339

QC Association Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Metals (Continued)

Analysis Batch: 618501 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-9	MW-6	Dissolved	Water	6020A	618339
500-204478-10	MW-7	Dissolved	Water	6020A	618339
500-204478-11	MW-3	Dissolved	Water	6020A	618339
500-204478-12	MW-4	Dissolved	Water	6020A	618339
MB 500-618339/1-A	Method Blank	Soluble	Water	6020A	618339
LCS 500-618339/2-A	Lab Control Sample	Soluble	Water	6020A	618339

General Chemistry

Analysis Batch: 616526

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	SM 4500 NO2 B	
500-204478-3	MW-08	Dissolved	Water	SM 4500 NO2 B	
500-204478-4	MW-09	Dissolved	Water	SM 4500 NO2 B	
500-204478-5	Duplicate	Dissolved	Water	SM 4500 NO2 B	
500-204478-6	MW-11	Dissolved	Water	SM 4500 NO2 B	
MB 500-616526/9	Method Blank	Total/NA	Water	SM 4500 NO2 B	
LCS 500-616526/10	Lab Control Sample	Total/NA	Water	SM 4500 NO2 B	
500-204478-4 MS	MW-09	Dissolved	Water	SM 4500 NO2 B	
500-204478-4 MSD	MW-09	Dissolved	Water	SM 4500 NO2 B	

Analysis Batch: 616592

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	SM 2540C	
500-204478-3	MW-08	Dissolved	Water	SM 2540C	
500-204478-4	MW-09	Dissolved	Water	SM 2540C	
500-204478-5	Duplicate	Dissolved	Water	SM 2540C	
500-204478-6	MW-11	Dissolved	Water	SM 2540C	
MB 500-616592/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 500-616592/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 616922

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-8	MW-10	Dissolved	Water	SM 4500 NO2 B	
500-204478-9	MW-6	Dissolved	Water	SM 4500 NO2 B	
500-204478-10	MW-7	Dissolved	Water	SM 4500 NO2 B	
500-204478-11	MW-3	Dissolved	Water	SM 4500 NO2 B	
500-204478-12	MW-4	Dissolved	Water	SM 4500 NO2 B	
MB 500-616922/9	Method Blank	Total/NA	Water	SM 4500 NO2 B	
LCS 500-616922/10	Lab Control Sample	Total/NA	Water	SM 4500 NO2 B	
500-204478-8 MS	MW-10	Dissolved	Water	SM 4500 NO2 B	
500-204478-8 MSD	MW-10	Dissolved	Water	SM 4500 NO2 B	

Analysis Batch: 617000

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-8	MW-10	Dissolved	Water	SM 2540C	
500-204478-9	MW-6	Dissolved	Water	SM 2540C	
500-204478-10	MW-7	Dissolved	Water	SM 2540C	
500-204478-11	MW-3	Dissolved	Water	SM 2540C	
500-204478-12	MW-4	Dissolved	Water	SM 2540C	
MB 500-617000/1	Method Blank	Total/NA	Water	SM 2540C	

QC Association Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

General Chemistry (Continued)

Analysis Batch: 617000 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 500-617000/2	Lab Control Sample	Total/NA	Water	SM 2540C	
500-204478-8 MS	MW-10	Dissolved	Water	SM 2540C	
500-204478-8 DU	MW-10	Dissolved	Water	SM 2540C	
500-204478-9 DU	MW-6	Dissolved	Water	SM 2540C	

Prep Batch: 618075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	9010C	
500-204478-3	MW-08	Dissolved	Water	9010C	
500-204478-4	MW-09	Dissolved	Water	9010C	
500-204478-5	Duplicate	Dissolved	Water	9010C	
500-204478-6	MW-11	Dissolved	Water	9010C	
MB 500-618075/1-A	Method Blank	Total/NA	Water	9010C	
HLCS 500-618075/2-A	Lab Control Sample	Total/NA	Water	9010C	
LCS 500-618075/3-A	Lab Control Sample	Total/NA	Water	9010C	
LLCS 500-618075/4-A	Lab Control Sample	Total/NA	Water	9010C	

Prep Batch: 618125

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-8	MW-10	Dissolved	Water	9010C	
MB 500-618125/1-A	Method Blank	Total/NA	Water	9010C	
HLCS 500-618125/2-A	Lab Control Sample	Total/NA	Water	9010C	
LCS 500-618125/3-A	Lab Control Sample	Total/NA	Water	9010C	
LLCS 500-618125/4-A	Lab Control Sample	Total/NA	Water	9010C	

Analysis Batch: 618146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-8	MW-10	Dissolved	Water	9012B	618125
MB 500-618125/1-A	Method Blank	Total/NA	Water	9012B	618125
HLCS 500-618125/2-A	Lab Control Sample	Total/NA	Water	9012B	618125
LCS 500-618125/3-A	Lab Control Sample	Total/NA	Water	9012B	618125
LLCS 500-618125/4-A	Lab Control Sample	Total/NA	Water	9012B	618125

Analysis Batch: 618148

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	9012B	618075
500-204478-3	MW-08	Dissolved	Water	9012B	618075
500-204478-4	MW-09	Dissolved	Water	9012B	618075
500-204478-5	Duplicate	Dissolved	Water	9012B	618075
500-204478-6	MW-11	Dissolved	Water	9012B	618075
MB 500-618075/1-A	Method Blank	Total/NA	Water	9012B	618075
HLCS 500-618075/2-A	Lab Control Sample	Total/NA	Water	9012B	618075
LCS 500-618075/3-A	Lab Control Sample	Total/NA	Water	9012B	618075
LLCS 500-618075/4-A	Lab Control Sample	Total/NA	Water	9012B	618075

Prep Batch: 618351

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-9	MW-6	Dissolved	Water	9010C	
500-204478-10	MW-7	Dissolved	Water	9010C	
500-204478-11	MW-3	Dissolved	Water	9010C	
500-204478-12	MW-4	Dissolved	Water	9010C	

QC Association Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

General Chemistry (Continued)

Prep Batch: 618351 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 500-618351/1-A	Method Blank	Total/NA	Water	9010C	
HLCS 500-618351/2-A	Lab Control Sample	Total/NA	Water	9010C	
LCS 500-618351/3-A	Lab Control Sample	Total/NA	Water	9010C	
LLCS 500-618351/4-A	Lab Control Sample	Total/NA	Water	9010C	
500-204478-9 MS	MW-6	Dissolved	Water	9010C	
500-204478-9 MSD	MW-6	Dissolved	Water	9010C	

Analysis Batch: 618442

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-9	MW-6	Dissolved	Water	9012B	618351
500-204478-10	MW-7	Dissolved	Water	9012B	618351
500-204478-11	MW-3	Dissolved	Water	9012B	618351
500-204478-12	MW-4	Dissolved	Water	9012B	618351
MB 500-618351/1-A	Method Blank	Total/NA	Water	9012B	618351
HLCS 500-618351/2-A	Lab Control Sample	Total/NA	Water	9012B	618351
LCS 500-618351/3-A	Lab Control Sample	Total/NA	Water	9012B	618351
LLCS 500-618351/4-A	Lab Control Sample	Total/NA	Water	9012B	618351
500-204478-9 MS	MW-6	Dissolved	Water	9012B	618351
500-204478-9 MSD	MW-6	Dissolved	Water	9012B	618351

Analysis Batch: 619345

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	SM 4500 F C	
500-204478-3	MW-08	Dissolved	Water	SM 4500 F C	
500-204478-4	MW-09	Dissolved	Water	SM 4500 F C	
500-204478-5	Duplicate	Dissolved	Water	SM 4500 F C	
500-204478-6	MW-11	Dissolved	Water	SM 4500 F C	
500-204478-8	MW-10	Dissolved	Water	SM 4500 F C	
500-204478-9	MW-6	Dissolved	Water	SM 4500 F C	
500-204478-10	MW-7	Dissolved	Water	SM 4500 F C	
500-204478-11	MW-3	Dissolved	Water	SM 4500 F C	
500-204478-12	MW-4	Dissolved	Water	SM 4500 F C	
MB 500-619345/3	Method Blank	Total/NA	Water	SM 4500 F C	
LCS 500-619345/4	Lab Control Sample	Total/NA	Water	SM 4500 F C	
500-204478-1 MS	MW-05	Dissolved	Water	SM 4500 F C	
500-204478-1 MSD	MW-05	Dissolved	Water	SM 4500 F C	

Analysis Batch: 619387

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	SM 4500 NO3 F	
500-204478-3	MW-08	Dissolved	Water	SM 4500 NO3 F	
500-204478-4	MW-09	Dissolved	Water	SM 4500 NO3 F	
500-204478-5	Duplicate	Dissolved	Water	SM 4500 NO3 F	
500-204478-6	MW-11	Dissolved	Water	SM 4500 NO3 F	
500-204478-8	MW-10	Dissolved	Water	SM 4500 NO3 F	
500-204478-9	MW-6	Dissolved	Water	SM 4500 NO3 F	
500-204478-10	MW-7	Dissolved	Water	SM 4500 NO3 F	
500-204478-11	MW-3	Dissolved	Water	SM 4500 NO3 F	
500-204478-12	MW-4	Dissolved	Water	SM 4500 NO3 F	
MB 500-619387/12	Method Blank	Total/NA	Water	SM 4500 NO3 F	
LCS 500-619387/13	Lab Control Sample	Total/NA	Water	SM 4500 NO3 F	

QC Association Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

General Chemistry (Continued)

Analysis Batch: 619387 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1 MS	MW-05	Dissolved	Water	SM 4500 NO3 F	
500-204478-1 MSD	MW-05	Dissolved	Water	SM 4500 NO3 F	

Analysis Batch: 619403

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	9038	
500-204478-3	MW-08	Dissolved	Water	9038	
500-204478-4	MW-09	Dissolved	Water	9038	
500-204478-5	Duplicate	Dissolved	Water	9038	
500-204478-6	MW-11	Dissolved	Water	9038	
500-204478-8	MW-10	Dissolved	Water	9038	
500-204478-9	MW-6	Dissolved	Water	9038	
500-204478-10	MW-7	Dissolved	Water	9038	
500-204478-11	MW-3	Dissolved	Water	9038	
500-204478-12	MW-4	Dissolved	Water	9038	
MB 500-619403/15	Method Blank	Total/NA	Water	9038	
LCS 500-619403/16	Lab Control Sample	Total/NA	Water	9038	
500-204478-1 MS	MW-05	Dissolved	Water	9038	
500-204478-1 MSD	MW-05	Dissolved	Water	9038	

Analysis Batch: 619404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	9251	
500-204478-3	MW-08	Dissolved	Water	9251	
500-204478-4	MW-09	Dissolved	Water	9251	
500-204478-5	Duplicate	Dissolved	Water	9251	
500-204478-6	MW-11	Dissolved	Water	9251	
500-204478-8	MW-10	Dissolved	Water	9251	
500-204478-9	MW-6	Dissolved	Water	9251	
500-204478-10	MW-7	Dissolved	Water	9251	
500-204478-11	MW-3	Dissolved	Water	9251	
500-204478-12	MW-4	Dissolved	Water	9251	
MB 500-619404/16	Method Blank	Total/NA	Water	9251	
LCS 500-619404/17	Lab Control Sample	Total/NA	Water	9251	
500-204478-1 MS	MW-05	Dissolved	Water	9251	
500-204478-1 MSD	MW-05	Dissolved	Water	9251	

Analysis Batch: 619406

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204478-1	MW-05	Dissolved	Water	Nitrate by calc	
500-204478-3	MW-08	Dissolved	Water	Nitrate by calc	
500-204478-4	MW-09	Dissolved	Water	Nitrate by calc	
500-204478-5	Duplicate	Dissolved	Water	Nitrate by calc	
500-204478-6	MW-11	Dissolved	Water	Nitrate by calc	
500-204478-8	MW-10	Dissolved	Water	Nitrate by calc	
500-204478-9	MW-6	Dissolved	Water	Nitrate by calc	
500-204478-10	MW-7	Dissolved	Water	Nitrate by calc	
500-204478-11	MW-3	Dissolved	Water	Nitrate by calc	
500-204478-12	MW-4	Dissolved	Water	Nitrate by calc	

Surrogate Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(75-126)	(75-120)	(72-124)	(75-120)
500-204478-1	MW-05	90	101	92	99
500-204478-2	Trip Blank	94	98	91	99
500-204478-3	MW-08	92	98	93	100
500-204478-4	MW-09	94	98	91	101
500-204478-5	Duplicate	93	99	91	100
500-204478-6	MW-11	92	99	93	99
500-204478-7	Trip Blank	96	97	91	101
500-204478-8	MW-10	93	97	90	100
500-204478-9	MW-6	95	98	92	101
500-204478-9 MS	MW-6	94	97	93	101
500-204478-9 MSD	MW-6	96	97	95	103
500-204478-10	MW-7	115	96	82	116
500-204478-11	MW-3	116	98	82	114
500-204478-12	MW-4	115	97	82	116
LCS 500-617186/5	Lab Control Sample	88	100	93	96
LCS 500-617195/4	Lab Control Sample	111	98	81	109
MB 500-617186/7	Method Blank	95	97	93	101
MB 500-617195/6	Method Blank	112	97	82	114

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 500-617186/7
Matrix: Water
Analysis Batch: 617186

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 10:18	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 10:18	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 10:18	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 10:18	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*75 - 126*		*09/03/21 10:18*	*1*
Toluene-d8 (Surr)	*97*		*75 - 120*		*09/03/21 10:18*	*1*
4-Bromofluorobenzene (Surr)	*93*		*72 - 124*		*09/03/21 10:18*	*1*
Dibromofluoromethane	*101*		*75 - 120*		*09/03/21 10:18*	*1*

Lab Sample ID: LCS 500-617186/5
Matrix: Water
Analysis Batch: 617186

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.0500	0.0480		mg/L		96	70 - 120
Toluene	0.0500	0.0502		mg/L		100	70 - 125
Ethylbenzene	0.0500	0.0516		mg/L		103	70 - 123
Xylenes, Total	0.100	0.102		mg/L		102	70 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*88*		*75 - 126*
Toluene-d8 (Surr)	*100*		*75 - 120*
4-Bromofluorobenzene (Surr)	*93*		*72 - 124*
Dibromofluoromethane	*96*		*75 - 120*

Lab Sample ID: 500-204478-9 MS
Matrix: Water
Analysis Batch: 617186

Client Sample ID: MW-6
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	<0.00050		0.0500	0.0453		mg/L		91	70 - 120
Toluene	<0.00050		0.0500	0.0454		mg/L		91	70 - 125
Ethylbenzene	<0.00050		0.0500	0.0475		mg/L		95	70 - 123
Xylenes, Total	<0.0010		0.100	0.0928		mg/L		93	70 - 125

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*75 - 126*
Toluene-d8 (Surr)	*97*		*75 - 120*
4-Bromofluorobenzene (Surr)	*93*		*72 - 124*
Dibromofluoromethane	*101*		*75 - 120*

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 500-204478-9 MSD
Matrix: Water
Analysis Batch: 617186

Client Sample ID: MW-6
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<0.00050		0.0500	0.0485		mg/L		97	70 - 120	7	20
Toluene	<0.00050		0.0500	0.0485		mg/L		97	70 - 125	7	20
Ethylbenzene	<0.00050		0.0500	0.0495		mg/L		99	70 - 123	4	20
Xylenes, Total	<0.0010		0.100	0.0976		mg/L		98	70 - 125	5	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 126*
Toluene-d8 (Surr)	*97*		*75 - 120*
4-Bromofluorobenzene (Surr)	*95*		*72 - 124*
Dibromofluoromethane	*103*		*75 - 120*

Lab Sample ID: MB 500-617195/6
Matrix: Water
Analysis Batch: 617195

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.00050		0.00050		mg/L			09/03/21 10:23	1
Toluene	<0.00050		0.00050		mg/L			09/03/21 10:23	1
Ethylbenzene	<0.00050		0.00050		mg/L			09/03/21 10:23	1
Xylenes, Total	<0.0010		0.0010		mg/L			09/03/21 10:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*75 - 126*		*09/03/21 10:23*	*1*
Toluene-d8 (Surr)	*97*		*75 - 120*		*09/03/21 10:23*	*1*
4-Bromofluorobenzene (Surr)	*82*		*72 - 124*		*09/03/21 10:23*	*1*
Dibromofluoromethane	*114*		*75 - 120*		*09/03/21 10:23*	*1*

Lab Sample ID: LCS 500-617195/4
Matrix: Water
Analysis Batch: 617195

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.0500	0.0483		mg/L		97	70 - 120
Toluene	0.0500	0.0484		mg/L		97	70 - 125
Ethylbenzene	0.0500	0.0490		mg/L		98	70 - 123
Xylenes, Total	0.100	0.0973		mg/L		97	70 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*111*		*75 - 126*
Toluene-d8 (Surr)	*98*		*75 - 120*
4-Bromofluorobenzene (Surr)	*81*		*72 - 124*
Dibromofluoromethane	*109*		*75 - 120*

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MB 320-522907/5
Matrix: Water
Analysis Batch: 522907

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/07/21 14:04	1

Lab Sample ID: LCS 320-522907/6
Matrix: Water
Analysis Batch: 522907

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	0.0499	0.0536		mg/L		107	85 - 115

Lab Sample ID: MRL 320-522907/4
Matrix: Water
Analysis Batch: 522907

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	3.99	<4.0		ug/L		92	75 - 125

Lab Sample ID: MB 320-523145/13
Matrix: Water
Analysis Batch: 523145

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	<0.0040		0.0040		mg/L			09/08/21 16:11	1

Lab Sample ID: LCS 320-523145/14
Matrix: Water
Analysis Batch: 523145

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	0.0499	0.0537		mg/L		108	85 - 115

Lab Sample ID: MRL 320-523145/12
Matrix: Water
Analysis Batch: 523145

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	3.99	<4.0		ug/L		90	75 - 125

Lab Sample ID: 500-204478-6 MS
Matrix: Water
Analysis Batch: 523145

Client Sample ID: MW-11
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	<0.0040		0.0499	0.0497		mg/L		100	80 - 120

Lab Sample ID: 500-204478-6 MSD
Matrix: Water
Analysis Batch: 523145

Client Sample ID: MW-11
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	<0.0040		0.0499	0.0501		mg/L		101	80 - 120	1	20

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: 500-204478-1 MS
Matrix: Water
Analysis Batch: 616907

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	<0.0030		0.500	0.459		mg/L		92	75 - 125
Arsenic	<0.0010		0.100	0.104		mg/L		104	75 - 125
Barium	0.070		0.500	0.566		mg/L		99	75 - 125
Beryllium	<0.0010		0.0500	0.0444		mg/L		89	75 - 125
Cadmium	<0.00050		0.0500	0.0491		mg/L		98	75 - 125
Chromium	<0.0050		0.200	0.195		mg/L		97	75 - 125
Cobalt	<0.0010		0.500	0.474		mg/L		95	75 - 125
Copper	<0.0020		0.250	0.250		mg/L		100	75 - 125
Iron	<0.10		1.00	0.991		mg/L		99	75 - 125
Manganese	<0.0025		0.500	0.485		mg/L		97	75 - 125
Selenium	0.0025		0.100	0.116		mg/L		114	75 - 125
Silver	<0.00050		0.0500	0.0489		mg/L		98	75 - 125
Vanadium	<0.0050		0.500	0.483		mg/L		97	75 - 125
Zinc	<0.020		0.500	0.504		mg/L		101	75 - 125

Lab Sample ID: 500-204478-1 MS
Matrix: Water
Analysis Batch: 616924

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	<0.00050		0.100	0.0870		mg/L		87	75 - 125
Nickel	0.0023		0.500	0.512		mg/L		102	75 - 125
Thallium	<0.0020		0.100	0.104		mg/L		104	75 - 125

Lab Sample ID: 500-204478-1 MS
Matrix: Water
Analysis Batch: 617082

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	0.34		1.00	1.47		mg/L		112	75 - 125

Lab Sample ID: 500-204478-1 MSD
Matrix: Water
Analysis Batch: 616907

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	<0.0030		0.500	0.469		mg/L		94	75 - 125	2	20
Arsenic	<0.0010		0.100	0.106		mg/L		106	75 - 125	2	20
Barium	0.070		0.500	0.564		mg/L		99	75 - 125	0	20
Beryllium	<0.0010		0.0500	0.0433		mg/L		87	75 - 125	3	20
Cadmium	<0.00050		0.0500	0.0501		mg/L		100	75 - 125	2	20
Chromium	<0.0050		0.200	0.197		mg/L		99	75 - 125	1	20
Cobalt	<0.0010		0.500	0.477		mg/L		95	75 - 125	1	20
Copper	<0.0020		0.250	0.255		mg/L		102	75 - 125	2	20
Iron	<0.10		1.00	0.989		mg/L		99	75 - 125	0	20
Manganese	<0.0025		0.500	0.491		mg/L		98	75 - 125	1	20
Selenium	0.0025		0.100	0.118		mg/L		116	75 - 125	2	20
Silver	<0.00050		0.0500	0.0474		mg/L		95	75 - 125	3	20
Vanadium	<0.0050		0.500	0.486		mg/L		97	75 - 125	1	20

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 500-204478-1 MSD
Matrix: Water
Analysis Batch: 616907

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Zinc	<0.020		0.500	0.522		mg/L		104	75 - 125	3	20

Lab Sample ID: 500-204478-1 MSD
Matrix: Water
Analysis Batch: 616924

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	<0.00050		0.100	0.0950		mg/L		95	75 - 125	9	20
Nickel	0.0023		0.500	0.495		mg/L		99	75 - 125	3	20
Thallium	<0.0020		0.100	0.109		mg/L		109	75 - 125	5	20

Lab Sample ID: 500-204478-1 MSD
Matrix: Water
Analysis Batch: 617082

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	0.34		1.00	1.31		mg/L		96	75 - 125	12	20

Lab Sample ID: 500-204478-1 DU
Matrix: Water
Analysis Batch: 616907

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.0030		<0.0030		mg/L		NC	20
Arsenic	<0.0010		<0.0010		mg/L		NC	20
Barium	0.070		0.0685		mg/L		2	20
Beryllium	<0.0010		<0.0010		mg/L		NC	20
Cadmium	<0.00050		<0.00050		mg/L		NC	20
Chromium	<0.0050		<0.0050		mg/L		NC	20
Cobalt	<0.0010		<0.0010		mg/L		NC	20
Copper	<0.0020		<0.0020		mg/L		NC	20
Iron	<0.10		<0.10		mg/L		NC	20
Manganese	<0.0025		<0.0025		mg/L		NC	20
Selenium	0.0025		<0.0025		mg/L		NC	20
Silver	<0.00050		<0.00050		mg/L		NC	20
Vanadium	<0.0050		<0.0050		mg/L		NC	20
Zinc	<0.020		<0.020		mg/L		NC	20

Lab Sample ID: 500-204478-1 DU
Matrix: Water
Analysis Batch: 616924

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Lead	<0.00050		<0.00050		mg/L		NC	20
Nickel	0.0023		0.00243		mg/L		6	20
Thallium	<0.0020		<0.0020		mg/L		NC	20

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 500-204478-1 DU
Matrix: Water
Analysis Batch: 617082

Client Sample ID: MW-05
Prep Type: Dissolved
Prep Batch: 616710

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Boron	0.34		0.358		mg/L		4	20

Lab Sample ID: MB 500-616710/1-A
Matrix: Water
Analysis Batch: 616907

Client Sample ID: Method Blank
Prep Type: Soluble
Prep Batch: 616710

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		08/31/21 11:26	08/31/21 12:43	1
Arsenic	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 12:43	1
Barium	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 12:43	1
Beryllium	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 12:43	1
Cadmium	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 12:43	1
Chromium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 12:43	1
Cobalt	<0.0010		0.0010		mg/L		08/31/21 11:26	08/31/21 12:43	1
Copper	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 12:43	1
Iron	<0.10		0.10		mg/L		08/31/21 11:26	08/31/21 12:43	1
Manganese	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 12:43	1
Selenium	<0.0025		0.0025		mg/L		08/31/21 11:26	08/31/21 12:43	1
Silver	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 12:43	1
Vanadium	<0.0050		0.0050		mg/L		08/31/21 11:26	08/31/21 12:43	1
Zinc	<0.020		0.020		mg/L		08/31/21 11:26	08/31/21 12:43	1

Lab Sample ID: MB 500-616710/1-A
Matrix: Water
Analysis Batch: 616924

Client Sample ID: Method Blank
Prep Type: Soluble
Prep Batch: 616710

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	<0.00050		0.00050		mg/L		08/31/21 11:26	08/31/21 19:35	1
Nickel	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 19:35	1
Thallium	<0.0020		0.0020		mg/L		08/31/21 11:26	08/31/21 19:35	1

Lab Sample ID: MB 500-616710/1-A
Matrix: Water
Analysis Batch: 617082

Client Sample ID: Method Blank
Prep Type: Soluble
Prep Batch: 616710

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<0.050		0.050		mg/L		08/31/21 11:26	09/01/21 15:29	1

Lab Sample ID: LCS 500-616710/2-A
Matrix: Water
Analysis Batch: 616907

Client Sample ID: Lab Control Sample
Prep Type: Soluble
Prep Batch: 616710

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.500	0.452		mg/L		90	80 - 120
Arsenic	0.100	0.0938		mg/L		94	80 - 120
Barium	0.500	0.473		mg/L		95	80 - 120
Beryllium	0.0500	0.0463		mg/L		93	80 - 120
Cadmium	0.0500	0.0475		mg/L		95	80 - 120
Chromium	0.200	0.190		mg/L		95	80 - 120

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 500-616710/2-A
Matrix: Water
Analysis Batch: 616907

Client Sample ID: Lab Control Sample
Prep Type: Soluble
Prep Batch: 616710

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	0.500	0.478		mg/L		96	80 - 120
Copper	0.250	0.242		mg/L		97	80 - 120
Iron	1.00	0.960		mg/L		96	80 - 120
Manganese	0.500	0.474		mg/L		95	80 - 120
Selenium	0.100	0.0954		mg/L		95	80 - 120
Silver	0.0500	0.0477		mg/L		95	80 - 120
Vanadium	0.500	0.467		mg/L		93	80 - 120
Zinc	0.500	0.483		mg/L		97	80 - 120

Lab Sample ID: LCS 500-616710/2-A
Matrix: Water
Analysis Batch: 616924

Client Sample ID: Lab Control Sample
Prep Type: Soluble
Prep Batch: 616710

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	0.100	0.101		mg/L		101	80 - 120
Nickel	0.500	0.421		mg/L		84	80 - 120
Thallium	0.100	0.102		mg/L		102	80 - 120

Lab Sample ID: LCS 500-616710/2-A
Matrix: Water
Analysis Batch: 617082

Client Sample ID: Lab Control Sample
Prep Type: Soluble
Prep Batch: 616710

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	0.977		mg/L		98	80 - 120

Lab Sample ID: MB 500-618339/1-A
Matrix: Water
Analysis Batch: 618501

Client Sample ID: Method Blank
Prep Type: Soluble
Prep Batch: 618339

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.0030		0.0030		mg/L		09/13/21 12:24	09/13/21 13:09	1
Arsenic	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:09	1
Barium	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:09	1
Beryllium	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:09	1
Boron	<0.050		0.050		mg/L		09/13/21 12:24	09/13/21 13:09	1
Cadmium	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:09	1
Chromium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:09	1
Cobalt	<0.0010		0.0010		mg/L		09/13/21 12:24	09/13/21 13:09	1
Copper	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:09	1
Iron	<0.10		0.10		mg/L		09/13/21 12:24	09/13/21 13:09	1
Lead	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:09	1
Manganese	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:09	1
Nickel	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:09	1
Selenium	<0.0025		0.0025		mg/L		09/13/21 12:24	09/13/21 13:09	1
Silver	<0.00050		0.00050		mg/L		09/13/21 12:24	09/13/21 13:09	1
Thallium	<0.0020		0.0020		mg/L		09/13/21 12:24	09/13/21 13:09	1
Vanadium	<0.0050		0.0050		mg/L		09/13/21 12:24	09/13/21 13:09	1
Zinc	<0.020		0.020		mg/L		09/13/21 12:24	09/13/21 13:09	1

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 500-618339/2-A
Matrix: Water
Analysis Batch: 618501

Client Sample ID: Lab Control Sample
Prep Type: Soluble
Prep Batch: 618339

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.500	0.475		mg/L		95	80 - 120
Arsenic	0.100	0.0945		mg/L		94	80 - 120
Barium	0.500	0.491		mg/L		98	80 - 120
Beryllium	0.0500	0.0485		mg/L		97	80 - 120
Boron	1.00	0.986		mg/L		99	80 - 120
Cadmium	0.0500	0.0493		mg/L		99	80 - 120
Chromium	0.200	0.199		mg/L		100	80 - 120
Cobalt	0.500	0.498		mg/L		100	80 - 120
Copper	0.250	0.251		mg/L		100	80 - 120
Iron	1.00	0.998		mg/L		100	80 - 120
Lead	0.100	0.105		mg/L		105	80 - 120
Manganese	0.500	0.499		mg/L		100	80 - 120
Nickel	0.500	0.498		mg/L		100	80 - 120
Selenium	0.100	0.0977		mg/L		98	80 - 120
Silver	0.0500	0.0512		mg/L		102	80 - 120
Thallium	0.100	0.104		mg/L		104	80 - 120
Vanadium	0.500	0.489		mg/L		98	80 - 120
Zinc	0.500	0.500		mg/L		100	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 500-617501/12-A
Matrix: Water
Analysis Batch: 617674

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 617501

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		09/07/21 13:05	09/08/21 07:26	1

Lab Sample ID: LCS 500-617501/13-A
Matrix: Water
Analysis Batch: 617674

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 617501

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00200	0.00214		mg/L		107	80 - 120

Lab Sample ID: 500-204478-8 MS
Matrix: Water
Analysis Batch: 617674

Client Sample ID: MW-10
Prep Type: Dissolved
Prep Batch: 617501

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00100	0.000939		mg/L		94	75 - 125

Lab Sample ID: 500-204478-8 MSD
Matrix: Water
Analysis Batch: 617674

Client Sample ID: MW-10
Prep Type: Dissolved
Prep Batch: 617501

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00100	0.000923		mg/L		92	75 - 125	2	20

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 500-204478-8 DU
Matrix: Water
Analysis Batch: 617674

Client Sample ID: MW-10
Prep Type: Dissolved
Prep Batch: 617501

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Mercury	<0.00020			<0.00020		mg/L				NC	20

Method: 9012B - Cyanide, Total andor Amenable

Lab Sample ID: MB 500-618075/1-A
Matrix: Water
Analysis Batch: 618148

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 618075

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/10/21 10:20	09/10/21 19:33	1

Lab Sample ID: HLCS 500-618075/2-A
Matrix: Water
Analysis Batch: 618148

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618075

Analyte			Spike Added	HLCS Result	HLCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cyanide, Total			0.400	0.417		mg/L		104	90 - 110		

Lab Sample ID: LCS 500-618075/3-A
Matrix: Water
Analysis Batch: 618148

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618075

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cyanide, Total			0.100	0.105		mg/L		105	85 - 115		

Lab Sample ID: LLCS 500-618075/4-A
Matrix: Water
Analysis Batch: 618148

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618075

Analyte			Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cyanide, Total			0.0500	0.0481		mg/L		96	75 - 125		

Lab Sample ID: MB 500-618125/1-A
Matrix: Water
Analysis Batch: 618146

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 618125

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/10/21 14:59	09/10/21 19:21	1

Lab Sample ID: HLCS 500-618125/2-A
Matrix: Water
Analysis Batch: 618146

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618125

Analyte			Spike Added	HLCS Result	HLCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cyanide, Total			0.400	0.390		mg/L		97	90 - 110		

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 9012B - Cyanide, Total andor Amenable (Continued)

Lab Sample ID: LCS 500-618125/3-A
Matrix: Water
Analysis Batch: 618146

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618125

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.100	0.0973		mg/L		97	85 - 115

Lab Sample ID: LLCS 500-618125/4-A
Matrix: Water
Analysis Batch: 618146

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618125

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.0500	0.0498		mg/L		100	75 - 125

Lab Sample ID: MB 500-618351/1-A
Matrix: Water
Analysis Batch: 618442

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 618351

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		09/13/21 13:10	09/13/21 17:35	1

Lab Sample ID: HLCS 500-618351/2-A
Matrix: Water
Analysis Batch: 618442

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618351

Analyte	Spike Added	HLCS Result	HLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.400	0.362		mg/L		91	90 - 110

Lab Sample ID: LCS 500-618351/3-A
Matrix: Water
Analysis Batch: 618442

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618351

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.100	0.102		mg/L		102	85 - 115

Lab Sample ID: LLCS 500-618351/4-A
Matrix: Water
Analysis Batch: 618442

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618351

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.0500	0.0528		mg/L		106	75 - 125

Lab Sample ID: 500-204478-9 MS
Matrix: Water
Analysis Batch: 618442

Client Sample ID: MW-6
Prep Type: Dissolved
Prep Batch: 618351

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	<0.0050		0.0500	0.0537		mg/L		100	75 - 125

Lab Sample ID: 500-204478-9 MSD
Matrix: Water
Analysis Batch: 618442

Client Sample ID: MW-6
Prep Type: Dissolved
Prep Batch: 618351

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	<0.0050		0.0500	0.0520		mg/L		96	75 - 125	3	20

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 9038 - Sulfate, Turbidimetric

Lab Sample ID: MB 500-619403/15
Matrix: Water
Analysis Batch: 619403

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<5.0		5.0		mg/L			09/20/21 13:41	1

Lab Sample ID: LCS 500-619403/16
Matrix: Water
Analysis Batch: 619403

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	20.0	20.5		mg/L		102	88 - 123

Lab Sample ID: 500-204478-1 MS
Matrix: Water
Analysis Batch: 619403

Client Sample ID: MW-05
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	130		20.0	154	4	mg/L		97	75 - 125

Lab Sample ID: 500-204478-1 MSD
Matrix: Water
Analysis Batch: 619403

Client Sample ID: MW-05
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	130		20.0	153	4	mg/L		94	75 - 125	0	20

Method: 9251 - Chloride

Lab Sample ID: MB 500-619404/16
Matrix: Water
Analysis Batch: 619404

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<2.0		2.0		mg/L			09/20/21 14:36	1

Lab Sample ID: LCS 500-619404/17
Matrix: Water
Analysis Batch: 619404

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	19.9		mg/L		99	80 - 120

Lab Sample ID: 500-204478-1 MS
Matrix: Water
Analysis Batch: 619404

Client Sample ID: MW-05
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	290		20.0	309	4	mg/L		78	75 - 125

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: 9251 - Chloride (Continued)

Lab Sample ID: 500-204478-1 MSD
Matrix: Water
Analysis Batch: 619404

Client Sample ID: MW-05
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	290		20.0	310	4	mg/L		82	75 - 125	0	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 500-616592/1
Matrix: Water
Analysis Batch: 616592

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<10		10		mg/L			08/31/21 04:33	1

Lab Sample ID: LCS 500-616592/2
Matrix: Water
Analysis Batch: 616592

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	250	278		mg/L		111	80 - 120

Lab Sample ID: MB 500-617000/1
Matrix: Water
Analysis Batch: 617000

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<10		10		mg/L			09/02/21 02:51	1

Lab Sample ID: LCS 500-617000/2
Matrix: Water
Analysis Batch: 617000

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	250	246		mg/L		98	80 - 120

Lab Sample ID: 500-204478-8 MS
Matrix: Water
Analysis Batch: 617000

Client Sample ID: MW-10
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	990		250	1230		mg/L		94	75 - 125

Lab Sample ID: 500-204478-8 DU
Matrix: Water
Analysis Batch: 617000

Client Sample ID: MW-10
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	990		1020		mg/L		2	5

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: 500-204478-9 DU
Matrix: Water
Analysis Batch: 617000

Client Sample ID: MW-6
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	700			704		mg/L				0.9	5

Method: SM 4500 F C - Fluoride

Lab Sample ID: MB 500-619345/3
Matrix: Water
Analysis Batch: 619345

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.10		0.10		mg/L			09/20/21 09:40	1

Lab Sample ID: LCS 500-619345/4
Matrix: Water
Analysis Batch: 619345

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Fluoride			10.0	10.6		mg/L		106	90 - 119		

Lab Sample ID: 500-204478-1 MS
Matrix: Water
Analysis Batch: 619345

Client Sample ID: MW-05
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Fluoride	0.30		5.00	5.51		mg/L		104	75 - 125		

Lab Sample ID: 500-204478-1 MSD
Matrix: Water
Analysis Batch: 619345

Client Sample ID: MW-05
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	0.30		5.00	5.54		mg/L		105	75 - 125	1	20

Method: SM 4500 NO2 B - Nitrogen, Nitrite

Lab Sample ID: MB 500-616526/9
Matrix: Water
Analysis Batch: 616526

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Nitrite	<0.020		0.020		mg/L			08/28/21 13:11	1

Lab Sample ID: LCS 500-616526/10
Matrix: Water
Analysis Batch: 616526

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrogen, Nitrite			0.100	0.106		mg/L		106	90 - 113		

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: SM 4500 NO2 B - Nitrogen, Nitrite (Continued)

Lab Sample ID: MB 500-616922/9
Matrix: Water
Analysis Batch: 616922

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Nitrite	<0.020		0.020		mg/L			09/01/21 08:48	1

Lab Sample ID: LCS 500-616922/10
Matrix: Water
Analysis Batch: 616922

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Nitrite	0.100	0.109		mg/L		109	90 - 113

Lab Sample ID: 500-204478-4 MS
Matrix: Water
Analysis Batch: 616526

Client Sample ID: MW-09
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Nitrite	<0.020		0.100	0.104		mg/L		104	75 - 125

Lab Sample ID: 500-204478-4 MSD
Matrix: Water
Analysis Batch: 616526

Client Sample ID: MW-09
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrogen, Nitrite	<0.020		0.100	0.103		mg/L		103	75 - 125	1	20

Lab Sample ID: 500-204478-8 MS
Matrix: Water
Analysis Batch: 616922

Client Sample ID: MW-10
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Nitrite	<0.020		0.100	0.0962		mg/L		96	75 - 125

Lab Sample ID: 500-204478-8 MSD
Matrix: Water
Analysis Batch: 616922

Client Sample ID: MW-10
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrogen, Nitrite	<0.020		0.100	0.0960		mg/L		96	75 - 125	0	20

Method: SM 4500 NO3 F - Nitrogen, Nitrate

Lab Sample ID: MB 500-619387/12
Matrix: Water
Analysis Batch: 619387

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Nitrate Nitrite	<0.10		0.10		mg/L			09/20/21 11:48	1

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Job ID: 500-204478-1

Method: SM 4500 NO3 F - Nitrogen, Nitrate (Continued)

Lab Sample ID: LCS 500-619387/13
Matrix: Water
Analysis Batch: 619387

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrogen, Nitrate Nitrite			1.00	0.940		mg/L		94	80 - 120		

Lab Sample ID: 500-204478-1 MS
Matrix: Water
Analysis Batch: 619387

Client Sample ID: MW-05
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrogen, Nitrate Nitrite	1.2		1.00	2.25		mg/L		100	75 - 125		

Lab Sample ID: 500-204478-1 MSD
Matrix: Water
Analysis Batch: 619387

Client Sample ID: MW-05
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrogen, Nitrate Nitrite	1.2		1.00	2.44		mg/L		120	75 - 125	8	20

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park IL 60484
Phone 708-534-5200 Fax 708-534-5211

Chain of Custody Record

eurofins Environment Testing America

500-204478 COC

Client Information	Sampler: Mark Wilson	Lab PM: Mockler Diana J	COC No: 500-94079-41750 1
Client Contact: Erin Bulson	Phone: 630-325-1300	E-Mail: Diana Mockler@Eurofinset.com	Page: Page 1 of 2
Company: KPRG and Associates Inc	PWSID:		Job #: 500-204478
Address: 14665 West Lisbon Road Suite 1A	Due Date Requested:		
City: Brookfield	TAT Requested (days):		
State Zip: WI 53005	Compliance Project: Δ Yes Δ No		
Phone:	PO #: 4500051862		
Email: erinb@kprginc com	WO #:		
Project Name: Midwest Generation Joliet Groundwater	Project #: 50005078		
Site:	SSOW#:		

Preservation Codes

A	HCL	M	Hexane
B	NaOH	N	None
C	Zn Acetate	O	AsNaO2
D	Nitric Acid	P	Na2O4S
E	NaHSO4	Q	Na2SO3
F	MeOH	R	Na2S2O3
G	Amchlor	S	H2SO4
H	Ascorbic Acid	T	TSP Dodecahydrate
I	Ice	U	Acetone
J	DI Water	V	MCAA
K	EDTA	W	pH 4-5
L	EDA	Z	other (specify)

Other

Analysis Requested

	Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020, 7470A	2540C, 4500_F_C, 9251	SM4500_NO2_B - Nitrogen, Nitrite	9014 - Total Cyanide	SM4500_NO3_F - Nitrogen, Nitrate Nitrite	8260B - BTEX	314.0 - Perchlorate	9056A - Sulfate	Total Number of containers	Special Instructions/Note
				Preservation Code:				D	N	N	B	S	A	N	N		
	MW-01				Water												
	MW-02				Water												
	MW-03				Water												
	MW-04				Water												
1	MW-05	8-27-21	1236	G	Water	Y		X	X	X	X	X	X	X	X		
2	~~MW-06~~ Trip Blank				Water								X				
	MW-07				Water												
3	MW-08	8-27-21	1011	G	Water	Y		X	X	X	X	X	X	X	X		
4	MW-09	8-27-21	1127	G	Water	Y		X	X	X	X	X	X	X	X		
5	~~MW-10~~ Duplicate	8-27-21	1504	G	Water	Y		X	X	X	X	X	X	X	X		
6	MW 11	8-27-21	1504	G	Water	Y		X	X	X	X	X	X	X	X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by	Date	Time	Method of Shipment:
Relinquished by: Mark Wilson	Date/Time: 8-27-21/1800	Company: KPRG	Received by: Faiwa Buckley
Relinquished by:	Date/Time:	Company:	Received by:
Relinquished by:	Date/Time:	Company:	Received by:

Date/Time: 8/27/21 1800	Company: ETACHI			
Date/Time:	Company:			
Date/Time:	Company:			

Custody Seals Intact: Δ Yes Δ No | Custody Seal No

Cooler Temperature(s) °C and Other Remarks: 2.6, 5.4

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park IL 60484
Phone 708-534-5200 Fax 708-534-5211

Chain of Custody Record

eurofins Environment Testing America

500-204478 COC

Client Information	Sampler: Mark Wilson	Lab PM: Mockler Diana J	ing No(s):	COC No: 500-94079-41750 2
Client Contact: Erin Bulson	Phone: 630-325-1300	E-Mail: Diana.Mockler@Eurofinset.com	in.	Page: Page 2 of 2
Company: KPRG and Associates Inc	PWSID			Job #: 500-204478

Address	Due Date Requested	Analysis Requested	Preservation Codes
14665 West Lisbon Road Suite 1A			A HCL M Hexane B NaOH N None C Zn Acetate O AsNaO2 D Nitric Acid P Na2O4S E NaHSO4 Q Na2SO3 F MeOH R Na2S2O3 G Amchlor S H2SO4 H Ascorbic Acid T TSP Dodecahydrate I Ice U Acetone J DI Water V MCAA K EDTA W pH 4-5 L EDA Z other (specify) Other:
City: Brookfield	TAT Requested (days):		
State Zip: WI 53005	Compliance Project: Δ Yes Δ No		
Phone	PO #: 4500051862		
Email: erinb@kprginc com	WO #:		
Project Name: Midwest Generation Joliet Groundwater	Project #: 50005078		
Site	SSOW#:		

	Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020, 7470A	2540C, 4500_F_C, 9251	SM4500_NO2_B - Nitrogen, Nitrite	9014 - Total Cyanide	SM4500_NO3_F - Nitrogen, Nitrate Nitrite	8260B - BTEX	314.0 - Perchlorate	9056A - Sulfate											Total Number of containers	Special Instructions/Note
				Preservation Code:				D	N	N	B	S	A	N	N												
	Duplicate	8-30-21	1430		Water	Y		X	X	X	X	X	X	X	X												
7	Trip Blank				Water								X														
8	MW-10	8-30-21	1431	G	Water	Y		X	X	X	X	X	X	X	X												
9	MW-6	8-30-21	1736	G	Water	Y		X	X	X	X	X	X	X	X												
10	MW-7	8-30-21	1635	G	Water	Y		X	X	X	X	X	X	X	X												
11	MW-3	8-30-21	1053	G	Water	Y		X	X	X	X	X	X	X	X												
12	MW-4	8-30-21	1215	G	Water	Y		X	X	X	X	X	X	X	X												

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by	Date	Time	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		8-31-21 0930	KPRG	P. Ned	8/31/21 0930	EA
2	P. Ned	8/31/21 1057	EA	Stephanie Hernandez	8/31/21 1057	ETA CHI
3		Date/Time	Company	Received by	Date/Time	Company

Custody Seals Intact. Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks
		1.3, 3.2, 2.5

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Phone: 708-534-5200 Fax: 708-534-5211

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Mockler, Diana J	Carrier Tracking No(s):	COC No: 500-152001.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Diana.Mockler@Eurofinset.com	State of Origin: Illinois	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Illinois		Job #: 500-204478-1
Address: 880 Riverside Parkway, ,	Due Date Requested: 9/13/2021			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: Joliet #29 Station Ash Ponds (CCA)	Project #: 50005078			
Site:	SSOW#:			

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-05 (500-204478-1)	8/27/21	12:36 Central		Water			X	1	
MW-08 (500-204478-3)	8/27/21	10:11 Central		Water			X	1	
MW-09 (500-204478-4)	8/27/21	11:27 Central		Water			X	1	
Duplicate (500-204478-5)	8/27/21	15:04 Central		Water			X	1	
MW-11 (500-204478-6)	8/27/21	15:04 Central		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Allison Scott	8/30/21 1130	EDF-CHL		8/31/21 9:50	
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: 1452445 | Cooler Temperature(s) °C and Other Remarks: 2.0c

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Phone: 708-534-5200 Fax: 708-534-5211

Chain of Custody Record

eurofins Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Mockler, Diana J	Carrier Tracking No(s):	COC No: 500-152053.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Diana.Mockler@Eurofinset.com	State of Origin: Illinois	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): NELAP - Illinois		Job #: 500-204478-1
Address: 880 Riverside Parkway, ,	Due Date Requested: 9/13/2021			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: Joliet #29 Station Ash Ponds (CCA)	Project #: 50005078			
Site:	SSOW#:			

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	314.0/ Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-10 (500-204478-8)	8/30/21	14:30 Central		Water			X	1	
MW-6 (500-204478-9)	8/30/21	17:36 Central		Water			X	1	
MW-7 (500-204478-10)	8/30/21	16:35 Central		Water			X	1	
MW-3 (500-204478-11)	8/30/21	10:53 Central		Water			X	1	
MW-4 (500-204478-12)	8/30/21	12:15 Central		Water			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	8/31/21 1445	EHACEL	[signature]	9/1/21 10:05	GTADC
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ▲ Yes ▲ No	Custody Seal No.: 1452456	Cooler Temperature(s) °C and Other Remarks: 0.9c

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: KPRG and Associates, Inc.

Job Number: 500-204478-1

Login Number: 204478
List Number: 1
Creator: Hernandez, Stephanie

List Source: Eurofins TestAmerica, Chicago

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.6,5.4,1.3,3.2,2.5
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	False	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: KPRG and Associates, Inc.

Job Number: 500-204478-1

Login Number: 204478
List Number: 2
Creator: Simmons, Jason C

List Source: Eurofins TestAmerica, Sacramento
List Creation: 08/31/21 04:33 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1452445
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.0C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: KPRG and Associates, Inc.

Job Number: 500-204478-1

Login Number: 204478
List Number: 3
Creator: Simmons, Jason C

List Source: Eurofins TestAmerica, Sacramento
List Creation: 09/01/21 12:18 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1452456
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.9c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KPRG and Associates, Inc. Job ID: 500-204478-1
Project/Site: Joliet #29 Station Ash Ponds (CCA)

Laboratory: Eurofins TestAmerica, Chicago

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Illinois	NELAP	IL00035	04-29-22

Laboratory: Eurofins TestAmerica, Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Illinois	NELAP	200060	03-18-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
314.0		Water	Perchlorate

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Sacramento
Sample Receiving Notes

500-204478 Field Sheet

Tracking # : 1893 4453 1270

Job: _____

SO / PO / FO / SAT / 2-Day / Ground / UPS / CDO / Courier
GSO / OnTrac / Goldstreak / USPS / Other _____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations.
File in the job folder with the COC.

Therm. ID: 201 Corr. Factor: (+ / -) 0 °C

Ice 1 Wet 1 Gel _____ Other _____

Cooler Custody Seal: 1452445

Cooler ID: —

Temp Observed: 2.0 °C Corrected: 2.0 °C

From: Temp Blank ☐ Sample ☑

Opening/Processing The Shipment	Yes	No	NA
Cooler compromised/tampered with?	☐	☑	☐
Cooler Temperature is acceptable?	☑	☐	☐
Frozen samples show signs of thaw?	☐	☐	☑

Initials: LB Date: 8/31/21

Unpacking/Labeling The Samples	Yes	No	NA
CoC is complete w/o discrepancies?	☑	☐	☐
Samples compromised/tampered with?	☐	☑	☐
Sample containers have legible labels?	☑	☐	☐
Sample custody seal?	☐	☐	☑
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided?	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Samples w/o discrepancies?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials: LB Date: 8/31/21

Notes: _____

Trizma Lot #(s): _____

Login Completion	Yes	No	NA
Receipt Temperature on COC?	☑	☐	☐
Samples received within hold time?	☑	☐	☐
NCM Filed?	☐	☐	☑
Log Release checked in TALS?	☑	☐	☐

Initials: LB Date: 8/31/21

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Sacramento Sample Receiving Notes

500-204478 Field Sheet

Tracking # : 1893445314O9

Job: _____

SO / PO / FO / SAT / 2-Day / Ground / UPS / CDO / Courier

GSO / OnTrac / Goldstreak / USPS / Other _____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations.
File in the job folder with the COC.

Therm. ID: L-07 Corr. Factor: (+ / -) - °C

Ice 1 Wet 1 Gel _____ Other _____

Cooler Custody Seal: 1452456

Cooler ID: -

Temp Observed: 0.9 °C Corrected: 0.9 °C

From: Temp Blank ☐ Sample ☑

Opening/Processing The Shipment	Yes	No	NA
Cooler compromised/tampered with?	☐	☑	☐
Cooler Temperature is acceptable?	☑	☐	☐
Frozen samples show signs of thaw?	☐	☐	☑

Initials: [illegible] Date: 9/1/21

Unpacking/Labeling The Samples	Yes	No	NA
CoC is complete w/o discrepancies?	☑	☐	☐
Samples compromised/tampered with?	☐	☑	☐
Sample containers have legible labels?	☑	☐	☐
Sample custody seal?	☐	☐	☑
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided?	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Samples w/o discrepancies?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials: [illegible] Date: 9-1-21

Notes: _____

Trizma Lot #(s): _____

Login Completion	Yes	No	NA
Receipt Temperature on COC?	☑	☐	☐
Samples received within hold time?	☑	☐	☐
NCM Filed?	☐	☐	☑
Log Release checked in TALS?	☑	☐	☐

Initials: [illegible] Date: 9-1-21

EXHIBIT 34

Weaver Consultants Group

Michael B. Maxwell, LPG

Environmental Operations Manager

EDUCATION

B.A. Geological Science, State University of New York, College at Geneseo, 1994

M.S. Geology, University of Iowa, 1996

REGISTRATIONS

Licensed Professional Geologist (LPG): Indiana, Illinois, and Wisconsin

CERTINFICATIONS

OSHA 40-Hour HAZWOPER Certification

OSHA 8-Hour HAZWOPER Annual Refresher

Certified Hazardous Materials Manager (CHMM)

Professional Summary

Mr. Maxwell serves as the Environmental Operations Manager for Weaver Consultants Group. He has over twenty-six years of professional consulting experience in conducting and managing a wide variety of environmental and solid/hazardous waste facility projects. These projects have included detailed environmental studies and closures of solid and hazardous waste disposal facilities, as well as industrial manufacturing operations regulated under RCRA and CERCLA. He has successfully completed numerous environmental projects including: multi-phase environmental site assessments, risk-based corrective action and closure, UST closures, hazardous and solid waste regulatory compliance/permitting, and corrective action, routine groundwater monitoring, groundwater assessment reports, and hydrogeological investigations. He has also played the key supporting/management role in preparation of Expert Reports and testimony as an Expert Witness related to various legal cases involving regulatory compliance/ investigations/remediation under CERCLA (Superfund) and various state voluntary cleanup program regulations.

Select Project Experience

Mr. Maxwell is project director for permitting, design, and compliance activities at an industrial waste (coal ash) disposal facility in northwest Indiana. The facility is regulated under two different permits and is also part of a larger RI/FS investigation conducted within the local municipality under an Agreed Order with USEPA based on the CERCLA regulations. Activities managed include detection, assessment, and corrective action groundwater/surface water planning/monitoring, and supplemental closure, including wetlands investigations, phytoremediation, and permitting.

Mr. Maxwell assisted with the preparation of an Expert Witness Report and subsequent deposition testimony associated with CERCLA liability, cost allocation, appropriateness, and costs associated with the selected remedy related to a former zinc smelter located in the Metro East Area in Illinois.

He has also played the key supporting role in the preparation of Expert Opinions and deposition testimony in support of defendants involved in toxic tort and property damage litigation claims related to historic use of chlorinated solvents at an industrial facility in St. Louis, MO. The facility and surrounding residential neighborhood has been extensively investigated over the last 25 plus years under a prior Consent Degree with the State of Missouri and ongoing investigation/remediation under a separate Consent Decree with USEPA, which requires extensive investigation/remediation activities modeled after CERCLA.

Mr. Maxwell has been involved in over 100 state voluntary remediation program projects at sites in the Midwest and Mid-Atlantic. These projects have utilized a range of closure strategies, often involving site-specific fate and transport modeling, risk assessment, remediation, land use controls, and engineered barriers. Many of

these projects were completed to support property transactions with aggressive schedules and risk mitigation requirements.

He has provided environmental consulting services related to compliance with the closure and groundwater monitoring requirements under 40 CFR 257 Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals From Electric Utilities rules (Federal CCR Regulations). Mr. Maxwell assisted in the design and installation of the initial groundwater monitoring system, including preparation of the Groundwater Sampling and Analysis Plan, oversaw the collection of the initial eight rounds of background data, as well as the statistical evaluation of the groundwater monitoring data. The groundwater monitoring data was intended to support the preparation and regulatory approval of Closure Plans for the facilities. He was also involved in addressing various technical comments provided by the state regulators concerning the Closure Plans for both facilities. Services provided to local Indiana utility and general contractor that prepared the Closure Plans.

Mr. Maxwell managed the review of Groundwater Monitoring Reports prepared under the Federal CCR Regulations for two former Coal Ash Impoundment sites in northern New Jersey. The former surface impoundments were closed by removal as part of the facilities being redeveloped into commercial/industrial mixed-use properties. Liability protections were attained for the site owner under the New Jersey Voluntary Cleanup Program.

He prepared a Technical Impracticability (TI) Waiver related to the remedial approach selected in the Record of Decision (ROD) to address a complex chlorinated solvents groundwater plume at a rail yard Superfund site located in northern Indiana. Supporting information for the TI waiver was obtained from a number of other chlorinated solvent groundwater remediation projects in vicinity of the railyard. The TI Waiver was utilized as the basis for the issuance of an Amended ROD by USEPA. The Amended ROD waived the prior requirement to restore the aquifer to drinking water standards throughout the plumes and required various other source control measures, aquifer flushing, groundwater monitoring, and further investigation/remediation within certain parts of the Superfund site.

Mr. Maxwell has managed Phase II ESA activities and developed a Response Action Plan (RAP) compliant with the Maryland Voluntary Cleanup Program for a 48-acre parcel of prime real estate not far from the I-95 corridor that is part of a larger 3,300 acre redevelopment of a former steel mill located in Baltimore, MD. The environmental due diligence and risk management activities are being performed to support attainment of a NFA Letter that will be acceptable to the current landowner, developer, and future lessee.

He has performed site investigation and Indiana Voluntary Remediation Program (VRP) closure activities for a large glass manufacturing facility in Central Indiana. Site Investigation activities resulted in remediation of select facility areas to control for impacts attributable to semi-volatile organic compounds, PCB's and inorganic constituents. Additional site measures included removal of contaminated creek sediments and implementation of a comprehensive groundwater investigation. The Remediation Completion Report was approved by IDEM and a Comprehensive Certificate of Completion has been issued under the Indiana VRP.

Mr. Maxwell supervised a team of over five technical staff involved in the due diligence review of the environmental conditions associated with a portfolio of nearly 300 commercial/industrial properties owned by a Real Estate Investment Trust in support of a proposed asset transfer totaling approximately $3.4 billion. The results of the due diligence review were presented in a master spreadsheet that highlighted key environmental issues associated with each property. The review was completed within a compressed timeline of 3 weeks in order to meet the client specified closing schedule.

He was project manager for a LUST remediation project for a 2-acre parcel in the west suburbs of Chicago formerly containing a gasoline station and various other commercial buildings. Remedial and site development activities completed at the site included the demolition of the previous gas station and other commercial

buildings, UST removal, along with the excavation and disposal of greater than 2,000 tons of petroleum impacted soils. The costs incurred for the remedial activities were eligible for reimbursement under the Illinois LUST Fund and over $200,000 were approved for payment from the LUST Fund. The remediation activities allowed for the timely redevelopment of the property as a drug store for a nationwide chain.

Mr. Maxwell has managed remedial and report writing activities for the remediation and redevelopment of a high profile 7.5-acre Brownfield redevelopment property on Goose Island within the City of Chicago. The undeveloped site was entered into the Illinois SRP for purposes of securing a Comprehensive NFR Letter. A Draft NFR Letter was attained in a timely manner, allowing for the closing of the real estate transaction. Implementation of risk-based remediation strategies, including soil management zone, engineered barriers, and institutional controls instead of active remediation saved the property owner millions of dollars. The final NFR Letter from the state agency has been issued.

He has prepared two petitions to delist multi-source leachates that were considered listed hazardous wastes under RCRA. The documents include a risk assessment of the petitioned waste using the Delisting Risk Assessment Software (DRAS) developed by USEPA. Also, Mr. Maxwell provided testimony relating to the technical content of the Delisting Petition at a hearing before the Illinois Pollution Control Board. One Delisting Petition has been approved by the Illinois Pollution Control Board and the other is under review by USEPA Region VII.

Mr. Maxwell has supervised technical support staff involved in hydrogeologic site investigations designed to comply with detailed solid and hazardous waste permitting requirements in Indiana. The specific activities included the field drilling program, data evaluation, and preparation of the hydrogeologic site investigation for inclusion in the permit applications. The reports were subsequently approved by the state agency and assisted the client in attaining expansion and/or renewal permits.

He has both performed and supervised numerous projects relating to permitting and regulatory compliance at a Hazardous Waste Disposal Facility in northwest Indiana. Tasks completed included: RCRA permit compliance, RCRA permit modifications, permit renewals, preparation of assessment monitoring reports and preparation of Alternate Source Demonstration Reports. The Alternate Source Demonstration Reports documented that the hazardous waste landfill was not the cause of statistically significant concentrations of barium and cyanide in groundwater. The reports were subsequently approved by state regulators, which avoided implementation of costly compliance groundwater monitoring at the facility.

Mr. Maxwell has prepared various report documents supporting RCRA Corrective Action activities at two steel finishing facility properties located in Portage, IN. The RCRA Facility Investigation (RFI) Workplan detailed proposed investigation and corrective action activities at numerous solid waste management units (SWMUs) identified on the property containing the active steel finishing mill, as well as the property that formerly contained various waste disposal lagoons associated with the mill.

The reports prepared by Mr. Maxwell have resulted in the regulatory closure under RCRA in the form of the attainment of No Further Action (NFA) Letters for two individual SWMUs and three interim status RCRA Units located on the property that formerly contained various waste disposal lagoons. The closure of these SWMUs allowed for 50 acres of land along Lake Michigan to ultimately become part of the Indiana Dunes National Lakeshore.

The various reports and evaluations prepared by Mr. Maxwell have resulted in the regulatory closure under RCRA in the form of the issuance of NFA Letters for 12 SWMUs located on property containing an active steel finishing mill. The technical evaluation which demonstrates that site conditions were eligible for closure included application of Indiana's Risk-Integrated System of Closure (RISC), as well as the more recently implemented Indiana Remediation Closure Guidance.

He is responsible for all aspects of groundwater monitoring projects at over two dozen solid and hazardous waste disposal facilities, including: groundwater sampling, interpretation of analytical results, statistical evaluation, and report writing.

Mr. Maxwell is presently managing implementation of a comprehensive groundwater monitoring and free product recovery program at various RCRA land disposal units located at a 4,000-acre steelmaking/finishing facility in northwest Indiana. Quarterly groundwater monitoring is being performed at over 100 monitoring points by a team of environmental professionals. Closure has also been approved under the Indiana State Cleanup Program for a historical LUST Incident on an adjacent railyard.

He has prepared an Alternate Concentration Limit (ACL) Demonstration for a closed RCRA Solid Waste Disposal facility in southern Indiana. The ACLs were shown to be protective of human health and the environment using various risk-based methodologies, including: Risk-Based Corrective Action (RBCA), and the state of Indiana Risk Integrated System of Closure. The ACL Demonstration was subsequently approved by IDEM.

Industry Publications/Presentations

“Synthetic Soils from Industrial and Municipal Wastes, For the Reclamation of Strip Mines in Southern Iowa”, presented at the Geological Society of America North-Central Meeting, Ames, IA, May 1996.

“Side-by-Side Comparison of Two Groundwater Sampling Methodologies: A Quantitative Review of Analytical Data from Groundwater Samples Collected Simultaneously Using Micropurge ‘Low Flow’ and Traditional Standard Groundwater Sampling Techniques”, presented at the National Groundwater Association 2010 Ground Water Summit, Denver, CO, April 2010.

Michael Maxwell, LPG | mmaxwell@wcgrp.com | 312.617.5858

EXHIBIT 35

THOMAS J. DEHLIN, P.E.

Project Engineer
Energy & Industrial Group

Education

M.S., Civil & Environmental Engineering – University of Illinois at Urbana-Champaign – 2013

B.S., Civil & Environmental Engineering – University of Illinois at Urbana-Champaign – 2012

Registrations

Professional Engineer – Illinois (License No. 062.069314)

Professional Engineer – Wyoming (License No. 17542)

Proficiencies

- Design of new coal combustion residual (CCR) surface impoundments
- Evaluation of existing CCR surface impoundments
- Design of closure schemes for CCR surface impoundments
- Design of shallow and deep foundation systems
- Design of structural steel framing systems
- Structural analysis

Responsibilities

As a project engineer, Mr. Dehlin is responsible for providing technical support for and supervision of civil engineering-related design criteria, calculations, specifications, and construction drawings. He is primarily responsible for projects related to the management of coal combustion residuals at coal-fired power plants and for analyzing existing and designing new structural systems for power plants and heavy industrial facilities. Mr. Dehlin prepares and reviews evaluations of existing CCR surface impoundments, designs for new CCR surface impoundments and final cover systems over existing CCR surface impoundments, and designs for reinforced concrete foundations and structural steel framing systems.

Experience

Mr. Dehlin has seven years of experience in civil engineering services and has been actively involved in coal combustion residual management projects since the U.S. Environmental Protection Agency finalized the Federal CCR Rule, “Standards for the Disposal of Coal Combustion Residuals In Landfills and Surface Impoundments” (40 CFR 257 Subpart D), in April 2015. He has evaluated new and existing CCR surface impoundments for compliance with the Federal CCR Rule’s location, design, and operating criteria; has participated in annual inspections of existing CCR surface impoundments; and has designed

new CCR surface impoundments and final cover systems for closing existing CCR surface impoundments. He has also prepared and reviewed design drawings, construction specifications, and permit applications for new CCR surface impoundments and final cover systems for closing existing CCR surface impoundments.

Mr. Dehlin's relevant experience with Sargent & Lundy (since 2014) includes:

Coal-Fired Power Plant, Wyoming (2017 – Present)

- Design for conversion of an existing low-volume waste pond into a zero-liquid discharge CCR surface impoundment for evaporation and storage of CCR and non-CCR wastestreams (total impoundment area greater than 250 acres)
- Development of project design criteria, construction specifications, and permit applications

Five Coal-Fired Power Plants, Illinois and Texas (2016 – Present)

- Development of conceptual designs and budgetary cost estimates for several different CCR management technologies to replace six ash ponds at three coal-fired power plants
- Served as Owner's Engineer to develop hazard potential classification assessments, histories of construction, structural stability assessments, safety factor assessments, inflow design flood control system plans, and closure and post-closure plans for six federally-regulated ash ponds

Three Coal-Fired Power Plants, Indiana (2015 – Present)

- Design for final cover systems to close two ash pond systems comprised of 12 total ash ponds (total impoundment area greater than 160 acres), including development of construction specifications and permit applications and participation in public meetings on closure designs
- Participate in annual inspections of six federally-regulated ash ponds and preparation of annual inspection reports for compliance with the Federal CCR Rule
- Design and development of construction specifications for new emergency spillways for two ash ponds at one coal-fired power plant
- Served as Owner's Engineer to develop periodic hazard potential classification assessments, histories of construction, structural stability assessments, safety factor assessments, inflow design flood control system plans, emergency action plans, closure and post-closure plans, and location restriction compliance documentation for nine federally-regulated ash ponds

EXHIBIT 36

Fungi. Fungi include yeasts, molds, and mushrooms. They depend on organic matter for carbon, nitrogen, and other elements. Their numbers can be very large, as much as 10 to 20 million per gram of dry soil, and their population is constantly changing. Placing geomembranes in decomposing organic residue often causes concern about degradation. However, the high-molecular-weight polymers generally used for geomembranes seem very insensitive to such degradation. ASTM G21 deals with the resistance of plastics to fungi.

Bacteria. Bacteria are single-cell organisms, among the simplest and smallest known forms of life. They rarely exceed 5 μm in length and are usually round, rodlike, or spiral in shape. Their numbers are enormous: more than 1 billion per gram of soil. They participate in all organic transformations, and thus the discussion on fungi could essentially be repeated here. The test method for evaluation of resistance of plastics to bacteria is ASTM G22.

As with fungi, the greatest concern about bacteria regarding geomembranes is not polymeric degradation, but fouling and clogging of the drainage systems often constructed in conjunction with the liner.

Chemical. The chemical resistance of a geomembrane vis-a-vis the substance(s) it is meant to contain is always important, and often it is the foremost aspect of the design process. For example, in domestic-waste or hazardous waste containment, the pollutant will interface directly with the geomembrane. Thus the geomembrane's resistance must be assured for the life of the facility. This situation has long been recognized, and resin producers and manufacturers have evaluated many situations. This has resulted in various chemical resistance charts, such as Table 5.8, which lists generic

TABLE 5.8 GENERAL CHEMICAL RESISTANCE GUIDELINES OF SOME COMMONLY USED GEOMEMBRANES

	Geomembrane Type							
	HDPE		PVC		CSPE-R		EPDM-R	
Chemical	38°C	70°C	38°C	70°C	38°C	70°C	38°C	70°C
General								
Allphatic hydrocarbons	✓	✓						
Aromatic hydrocarbons	✓	✓						
Chlorinated solvents	✓	✓					✓	
Oxygenated solvents	✓	✓					✓	✓
Crude petroleum solvents	✓	✓						
Alcohols	✓	✓	✓	✓			✓	✓
Acids								
Organic	✓	✓	✓	✓	✓		✓	✓
Inorganic	✓	✓	✓	✓	✓		✓	✓
Heavy Metals	✓	✓	✓	✓	✓		✓	✓
Salts	✓	✓	✓	✓	✓		✓	✓

Abbreviation: ✓ = generally good resistance.

Source: After Vandervoort [28].

chemicals against many common geomembranes on a relative basis. These charts and their tests are sometimes incorrectly called *chemical compatibility* charts or tests. To a chemist, compatibility is when two substances properly mix with one another; this is exactly the opposite of the trend we are considering in this section. *Chemical resistance* is the preferred term. Although such tables are generally reliable, there are many circumstances where geomembrane-specific testing is required:

- When the chemical is not a single-component material and possible synergistic effects are unknown.
- When the composition of the resulting chemical is simply not known, as in landfill leachates before the facility is constructed.
- When the geomembrane is not a single-component material but is made from a blend of materials.
- When the geomembrane is modified at the seams or is seamed with material that is different from that of the geomembrane sheets.
- When the containment must function over a very long period and the leachate may change over time during the course of the service lifetime.
- When untested circumstances, such as extreme heat or cold conditions, exist at the particular site.
- When the chart or table does not list new types and/or formulations of geomembranes; for example, Table 5.8 does not list LLDPE, fPP, and fPP-R.

Thus there exists a need for a specific test procedure. Chemical resistance tests on geomembranes for the specific conditions mentioned above require four important decisions to be made: the selection of the particular liquid to be used, the precise details of coupon incubation (temperature, atmosphere, orientation, and removal), the manner and type of specimen testing, and the assessment of the results of the testing.

The selection of the liquid is surely site-specific. A large database is given in [4], but the range of ingredients is enormous. Clearly, there is no typical leachate. What liquid is selected is a matter of agreement among the various parties involved. Often it is a difficult decision, and when the situation is critical it is decided on a worst-case basis. Thus the most aggressive liquid chemicals envisioned (e.g., various organic solvents) in the highest possible concentrations are often used for the incubating liquid.

The coupon incubation can sometimes be done in open containers or tubs, but generally it is being done in closed containers of the type shown in Figure 5.12. Here the container is sealed with the liquid circulating and being constantly monitored as to its consistency and temperature. There is no available headspace in the container, which means that organic solvents cannot escape from the completely filled chamber. Individual coupons are removed at 30, 60, 90, and 120 days, according to ASTM D5322 and D5496, and then cut into test specimens for evaluation.

There are many types of test(s) used to quantify the geomembrane's performance after chemical incubation. The following are most common:

- *Physical property tests:* These are for thickness, mass, length, width, and hardness and are the easiest and most straightforward to perform.

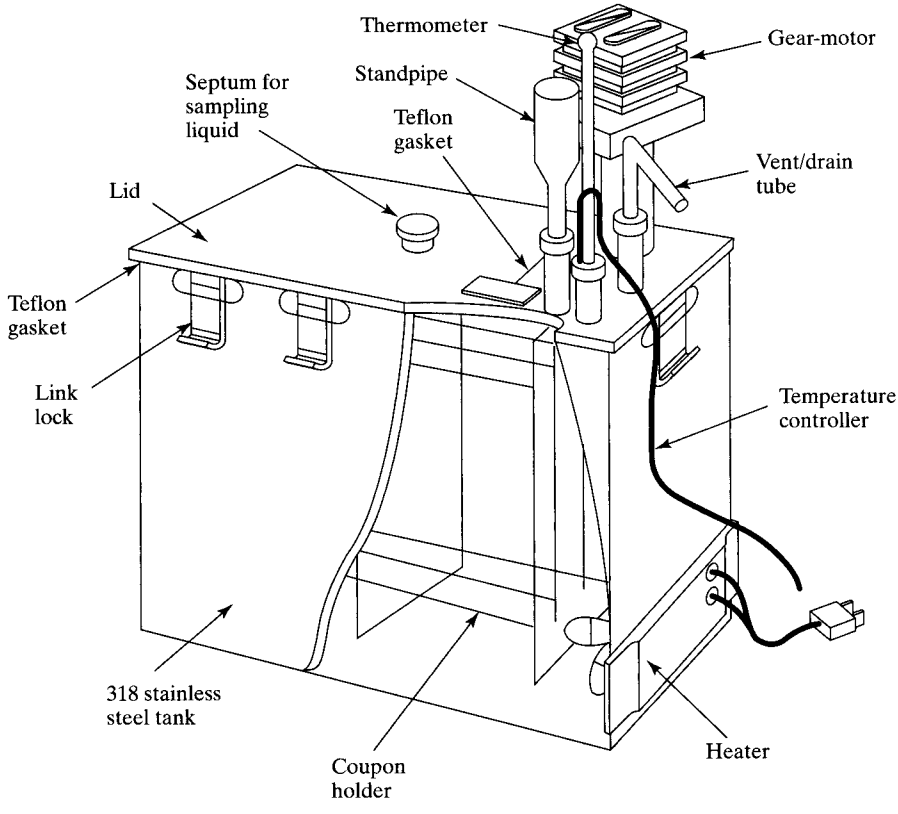
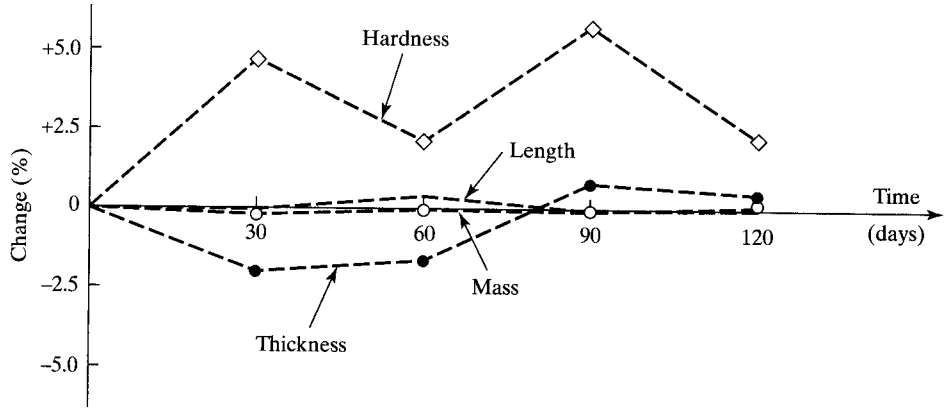


Figure 5.12 Schematic of incubation container for evaluating chemical resistance behavior of geomembranes. (After Metrecon [4])

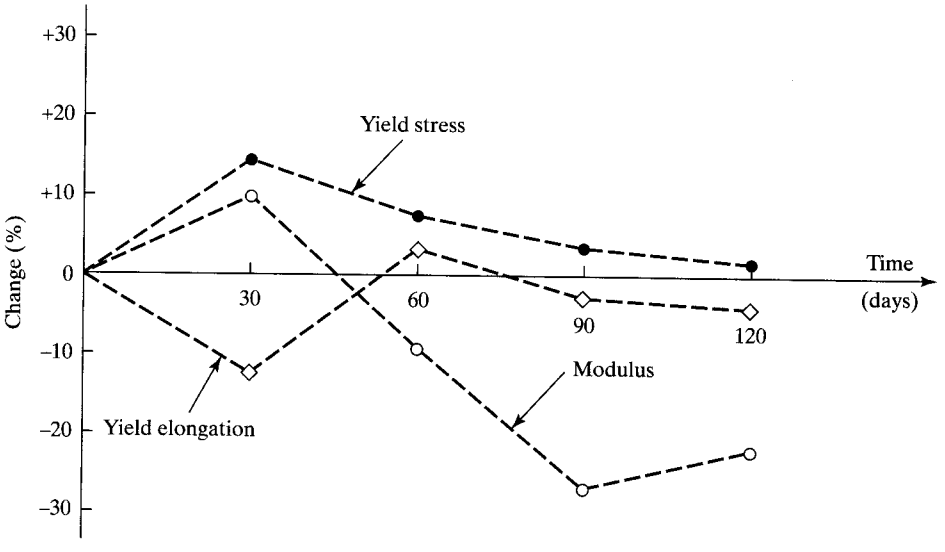
- *Mechanical property tests:* The tensile test properties of strength at yield and/or break, elongation at yield and/or break, and modulus along with tear, puncture, and impact are the usual values measured. These are done as previously described.
- *Transport property tests:* Perhaps the most sensitive tests to perform (and undoubtedly the most difficult) are tests for water- or solvent-vapor transmission through the incubated geomembranes.

If a specific procedure, such as ASTM D5747, is followed, the test methods to be used will be prescribed and referenced accordingly. ISO 175 also covers the topic of chemical resistance to liquids.

For the assessment of the test results, the response curves for the above-mentioned tests should be plotted as the percent change in the measured property from the original versus the duration of incubation. Figure 5.13 shows such response curves for HDPE in a municipal solid-waste leachate at 50°C. The curves presented are the type often seen, in that the changes in the physical properties are significantly less than the



(a) Change in physical properties



(b) Change in mechanical properties

Figure 5.13 Immersion behavior of HDPE samples to landfill leachate at 50°C up to 120 days. (After Tisinger [29])

changes in mechanical properties and no consistent trend is established, either a uniform increase or decrease. In this particular set of tests, the 23°C incubation data behaved similarly (see Tisinger [29]). If the geomembrane is reactive to the leachate, we expect uniform behavioral changes and the changes at the higher temperature to be greater than those at the lower temperature. With no discernible trend to indicate a reaction, and hence degradation, of the geomembrane, it may be concluded that the scatter results from inherent variation in the materials and the test methods themselves.

Furthermore, the property that changed the greatest amount, the modulus values in Figure 5.13(b) is subject to the greatest amount of judgmental error of all the values presented. While there are no established rules on allowable variation from the original test properties (see Table 5.9 for suggested values), it is clear that polyethylene will be more resistant to most organic solvents and aggressive chemicals than will other common geomembrane polymers. Furthermore, the higher the density, the better the chemical resistance. Thus high density polyethylene (HDPE) geomembranes are the material-of-choice for most landfill liners.

Thermal. Various properties of geomembranes, as they are made from polymers, are sensitive to changes in temperature. Both warm and cold temperatures have their own unique effects.

Warm Temperatures. Geomembrane materials exposed to heat can be subjected to changes in physical, mechanical, or chemical properties. The magnitude and duration of exposure determine the extent of this change. ASTM D794 covers the recommended procedure for determining permanent effects of heat on plastics—a tubular oven method (ASTM D1870), which consists of an oven with a coupon rack to

TABLE 5.9 SUGGESTED LIMIT OF CHANGES OF DIFFERENT TEST VALUES FOR INCUBATED GEOMEMBRANES

(a) Thermoset and Thermoplastic Polymers except HDPE (after Little [30])

Property	Resistant	Not Resistant
Permeation rate ($g/m^2/hr$)	<0.9	>0.9
Change in weight (%)	<10	>10
Change in volume (%)	<10	>10
Change in tensile strength (%)	<20	>20
Change in elongation at break (%)	<30	>30
Change in 100% or 200% modulus (%)	<30	>30
Change in hardness (points)	<10	>10

(b) Semicrystalline Polymers (such as HDPE)

	O'Toole [31]		Little [30]		Koerner	
Property	Resistant	Not Resistant	Resistant	Not Resistant	Resistant	Not Resistant
Permeation rate (g/m^2-hr.)	—	—	<0.9	≥0.9	<0.9	≥0.9
Change in weight (%)	<0.5	>1.0	<3	≥3	<2	≥2
Change in volume (%)	<0.2	>0.5	<1	≥1	<1	≥1
Change in yield strength (%)	<10	>20	<20	≥20	<20	≥20
Change in yield elongation (%)	—	—	<20	≥20	<30	≥30
Change in modulus (%)	—	—	—	—	<30	≥30
Change in tear strength (%)	—	—	—	—	<20	≥20
Change in puncture strength (%)	—	—	—	—	<30	≥30

EXHIBIT 37

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Migration of dilute aqueous organic pollutants through HDPE geomembranes ☆

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Abstract

The migration of the dilute aqueous organic contaminants through HDPE geomembranes is examined. Semi-empirical methods to estimate partition and diffusion coefficients for organic contaminants in dilute aqueous solutions with respect to high-density polyethylene (HDPE) geomembranes are proposed. These methods were evaluated by performing sorption and diffusion tests on a 2.0 mm thick HDPE geomembrane using three chlorinated hydrocarbons (dichloromethane, 1,2-dichloroethane and trichloroethylene) and four aromatic hydrocarbons (benzene, toluene, ethylbenzene and xylenes). The results show that the partition coefficient (S_{gf}) can be fairly well estimated using the method based *n*-octanol/water coefficient of the contaminant and even better by that based on the chemical molecular weight. This suggests that these methods may be used as starting point to estimate the migration of organic contaminants through HDPE geomembranes.

Keywords: Partitioning; Diffusion; Permeation; Organic chemicals; HDPE geomembranes

1. Introduction

Most regulations for modern landfills recommend a composite liner together with an attenuation layer as a barrier system against contaminant migration. These composite liners typically include a geomembrane liner (GM) and either a compacted clay liner (CCL) or geosynthetic clay liner (GCL). The intended function

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of the geomembrane is to impede advective contaminant migration via the reduction of water flow and to provide a diffusive barrier to inorganic contaminants (Rowe, 2001). The assessment of the effectiveness of the geomembrane liner during the design process requires the estimation of the parameters controlling the diffusive migration, especially the partitioning, diffusion and permeation coefficients. These parameters are often obtained by performing sorption and/or diffusion tests. However, no simple methods have previously been available for estimating these parameters.

This paper discusses the migration of organic contaminants through a geomembrane, the factors that affect the process and the laboratory methods used to deduce the different parameters. The paper also proposes some semi-empirical methods for estimating the partition, diffusion and permeation coefficients.

2. Background and theoretical considerations

2.1. Migration of contaminant through geomembrane

The migration of contaminants through an intact geomembrane is a molecule activated process (diffusion) that can be envisioned to occur by steps or jumps over a series of potential barriers, following the path of least resistance. For dilute aqueous solutions, the process involves three key steps (Park and Nibras, 1993; Prasad et al., 1994; Haxo and Lahey, 1988): (i) partition of the contaminant between inner surface of the geomembrane and the medium containing the contaminant (adsorption); (ii) diffusion of the permeant through the geomembrane and, (iii) partition between the outer surface of the geomembrane and the outer medium (desorption). It is important to recognize that the extent of each phase depends on various parameters among which the most important are permeant/geomembrane system and temperature.

In the initiation of the migration process, the adsorption consists of the penetrant molecule removal from the fluid and its dispersion on or into the polymer (Rogers, 1985 and Naylor, 1989). This process can be described as the distribution of the permeant between two or more phases. It may involve absorption and incorporation in microvoids, cluster formation, solvation-shell formation and other modes of mixing. The distribution of the permeant between different sorption modes may change with concentration, temperature, time and swelling of the matrix due to the interaction between the polymer and the chemical. Thus, the extent to which permeant molecules are sorbed and their mode of sorption in a polymer depend upon the activity of the permeant within the polymer at equilibrium (Müller et al., 1998).

If a geomembrane in contact with a fluid reaches equilibrium, there will be a relationship between the final equilibrium concentration in the geomembrane, c_g [ML^{-3}], and the equilibrium concentration in the fluid, c_f, [ML^{-3}]. For the simplest case where the permeant does not interact with the polymer (e.g. as is the case for a HDPE geomembrane) or at low concentrations (Rogers, 1985) as in landfill leachates, the relationship between the concentration in the fluid and the

geomembrane is given by (Henry's law):

$$c_g = S_{gf} c_f, \tag{1}$$

where S_{gf} is called a partitioning coefficient [−] and in principle is a constant for the given molecule, fluid, geomembrane and temperature of interest.

At the second stage of the migration, the sorbed penetrant at the surface will diffuse within the material. The diffusion of contaminant in a geomembrane can be expressed by Fick's first law:

$$f = -D_g \frac{dc_g}{dz}, \tag{2}$$

where, f is the mass flux or rate of transfer per unit area of section $[ML^{-2}T^{-1}]$, D_g is the diffusion coefficient in the geomembrane $[L^2T^{-1}]$, c_g is the concentration of diffusing substance and z is the direction parallel to the direction of diffusion. In transient state, the governing differential equation is (Fick's second law):

$$\frac{\partial c_g}{\partial t} = D_g \frac{\partial^2 c_g}{\partial z^2}, \tag{3}$$

which must be solved for the appropriate boundary and initial conditions.

The last stage in the migration process is of the permeant desorption from the geomembrane to the outer solution. This stage is similar to the first with an inverted process and the contaminant concentration in the adjacent fluid can be expressed as:

$$c'_g = S'_{gf} c_f, \tag{4}$$

where S'_{gf} is the contaminant partitioning coefficient between the outside fluid and the geomembrane. In the simplest case where the two solutions are water or water-based solutions, these two partitioning coefficients may be assumed to be the same ($S_{gf} = S'_{gf}$).

When performing a diffusion test it is much more difficult to measure the concentration change in the geomembrane than analyzing the concentration in the solution. Thus, it is useful to express the diffusion equations in terms of the concentration in adjacent solutions. If one substitutes Eq. 1 into Eq. 3, the flux from a fluid on one side of the geomembrane to a similar fluid on the other side is given by:

$$f = -D_g \frac{dc_g}{dz} = -S_{gf} D_g \frac{dc_f}{dz} = -P_g \frac{dc_f}{dz}, \tag{5}$$

where P_g given by

$$P_g = S_{gf} D_g \tag{6}$$

is referred to in the polymer literature as permeability or permeation coefficient. In reality, P_g is a mass transfer coefficient that takes into account the partitioning and diffusion processes.

2.2. Factors affecting contaminant migration through geomembrane

Although the well-known principle of solubility discussed in terms of polarity: "like dissolves like" generally holds for polymers as well, its application to the diffusion and permeation parameters is more complex due to the kinetic nature of the transport process. However, it has been shown that in most polymer-penetrant systems, both diffusion and permeation coefficients exhibit a general increase with similarity between the components (August and Taztky, 1984; Rowe et al., 1995, 1996). Strongly polar penetrant molecules have very low transport rates through polyethylene, which is very non-polar. In general, the permeation affinity has the following order: alcohols < acids < nitroderivatives < aldhehydes < ketones < esters < ethers < aromatic hydrocarbons < halogenated hydrocarbons (August and Taztky, 1984). This has been confirmed by Rowe et al. (1996) who have studied diffusion of organic pollutants through HDPE geomembranes and observed that some organic compounds (methyl ethyl ketone, acetic acid) have migrated at much slower rates than the chlorinated solvents examined (dichloromethane, 1,1-dichloroethane, and 1,2-dichloroethane). Only negligible penetration of the heavy metal ions (Zn^{2+}, Ni^{2+}, Mn^{2+}, Cu^{2+}, Cd^{2+}, Pb^{2+}) from concentrated acid solutions was found (Holzlöhner and August, 1995) after 4 years of testing, so that HDPE geomembranes may be seen as virtually ideal barriers for heavy metals.

The concentration dependence of the diffusion coefficient D_g arises from the presence of permeant molecules within the polymer that weaken the interactions between adjacent polymer chains, which in turn leads to the commonly observed effects of plasticization. From immersion and permeation tests conducted on different geomembranes using neat (pure) and dilute solutions, Müller et al. (1998) found that the diffusion coefficient was considerably smaller for contaminants at low concentrations in aqueous solutions than for pure chemicals. The reported D_g values are approximately one order of magnitude lower for an aqueous solution than for a pure chemical.

The diffusion coefficient decreases with increasing permeant weight, size (molecular volume) and cross sectional area of the penetrant (Berens and Hopfenberg, 1982; Saleem et al., 1989; Aminabhavi and Naik, 1998). For example, Saleem et al. (1989) reported a decrease of D_g with the increase of molar volume for some aliphatic aromatic and chlorinated permeants through low-density polyethylene (LDPE). However, the magnitude of the decrease is higher for chlorinated chemicals than methyl substituted benzenes due to the bulky chlorine atom, which markedly reduces their mobility. The shape of the permeant has been reported to have a profound effect on diffusion (Berens and Hopfenberg, 1982; Saleem et al., 1989). Permeant with linear, flexible and symmetrical molecules have higher mobility than rigid molecules. For instance, Saleem et al. (1989) showed that the diffusion coefficient for *o*-xylene is lower than for *p*-xylene. This is attributed to the symmetrical structure of *p*-xylene compared to the distorted shape of *o*-xylene with its two adjacent methyl groups. Berens and Hopfenberg (1982) have shown that the diffusion of *n*-alkane and other elongated or flattened molecules are higher, by a factor of 10^3, than the diffusion of spherical molecules with similar molecular weight.

In regard to polymer properties, the diffusion of a contaminant is expected to decrease with density, chain rigidity and degree of cross-linking. In the case of HDPE geomembranes (semi-crystalline polymers), the crystalline zones act as impermeable barriers to permeating molecules in two ways (Naylor, 1989). First, crystalline regions act as excluded volumes for the sorption process and as impermeable barriers for diffusion. Secondly, they act as giant cross-linking regions with respect to those chains, which enter and leave those regions from the surrounding non-crystalline matrix in which sorption and diffusion take place. The restraints of cross-linking on the segmental mobility of the polymer make the diffusion process more dependent on size, shape and concentration of the permeant molecule (Naylor, 1989; Rogers, 1985).

Temperature is an important factor that influences the overall migration process. Energy is required to achieve this activated process. Thus, the permeation process may be highly temperature dependent. It has been well established (Naylor, 1989; Chainey, 1990) that over small ranges, temperature dependence of the diffusion, solubility and permeability coefficients can be described by the Arrhenius relationship:

$$D_g = D_{g0} e^{\left(\frac{-E_d}{RT}\right)}, \tag{7}$$

$$S_{gf} = S_{gf0} e^{\left(\frac{-\Delta H_s}{RT}\right)}, \tag{8}$$

$$P_g = P_{g0} e^{\left(\frac{-E_p}{RT}\right)}, \tag{9}$$

where E_d and E_p are the activation energies of diffusion and permeation, respectively, ΔH_s is the heat of solution of the penetrant in the polymer, and D_{g0}, S_{gf0} and P_{g0} are constants. It is expected that for many polymer–penetrant systems, plots of log D_g vs. the reciprocal of the absolute temperature are linear over a limited temperature range (Saleem et al., 1989; Aminabhavi and Naik, 1998).

3. Evaluation of migration parameters

3.1. Laboratory methods

The methods used to evaluate diffusion, solubility and partitioning coefficients can be classified in two categories: immersion/sorption methods and permeation/diffusion methods. The main difference between the two groups resides in the way the material is in contact with the permeant during these two tests.

In immersion/sorption tests, the geomembrane is immersed in a container filled with the permeant of interest such that both faces of the material are in contact with the permeant. Thus, the chemical permeates from both sides and then migrates within the material. As a consequence, equilibrium is reached faster than in permeation/diffusion tests. The different parameters are inferred using different

techniques as summarized in Table 1. Although these methods have been developed for pure chemicals, they have been successfully used with dilute solutions.

In permeation/diffusion methods the geomembrane divides the cell in two compartments, namely source and receptor. The source is filled with the permeant (or solution examined) while the reservoir is filled with a reference fluid of known composition. Thus, only one face of the geomembrane is in contact with the chemical or solution containing the contaminant such that the permeation takes place from the reservoir to the receptor. In this respect, these methods simulate more closely the transport process that is expected in a landfill application. The techniques used for evaluating different parameters are outlined in Table 1.

3.2. Estimation methods

Based on a number of theories of diffusion (e.g. free volume theory and molecular theory), several models have been proposed by various macromolecular researchers to predict the transport of molecules through polymer membranes. These methods have been reviewed in detail by Aminabhavi et al. (1988a, b). In general, these methods provide a good basis for understanding the diffusion process, which takes place within the geomembrane. However, due to their complexity, they are limited to macromolecular physics and chemistry and cannot be used easily and efficiently by geoenvironmental engineers. Therefore, empirical and semi-empirical models are needed to help geoenvironmental engineers select and evaluate geomembrane liners. One of the objectives of this paper is to propose several methods based on the permeant and/or geomembrane properties as summarized in Table 2 and discussed in the following paragraphs. The methods were derived based on D_g, S_{gf}, and P_g values available in the literature for the permeation of dilute organic contaminants through HDPE geomembranes.

3.2.1. Estimation based on n-octanol/water coefficient (k_{ow})

The *n*-octanol/water coefficient (k_{ow}) is a specific property of chemicals used to define their ability to partition between water and *n*-octanol (i.e. organic matter) when they are in solution. It may be seen as the measure of contaminant polarity and it reflects its lipophilicity. The higher the numerical value, which is usually expressed as a logarithm, the stronger the tendency of the chemical to accumulate in organic matter. Since a HDPE geomembrane is an organic material, one may anticipate a relationship between *n*-octanol/water coefficient and the permeation parameters (diffusion, partition, and solubility).

Many researchers have attempted to correlate partition S_{gf} to K_{ow}. For instance, Prasad et al. (1994), have shown that, for a limited number of chemicals, $\log S_{gf}$ is linearly related to $\log K_{ow}$. In contrast, Park and Nibras (1993) reported that for a broad range of pure organic solvents there is a second order polynomial relationship between $\log S_{gf}$ and $\log K_{ow}$. In order to extend these previous findings, an attempt is made in this paper to correlate S_{gf} values reported for HDPE geomembranes in the literature with K_{ow}. Fig. 1 shows a plot of $\log S_{gf}$ vs. $\log K_{ow}$. The excellent correlation ($r^2 = 0.97$) obtained between $\log S_{gf}$ and $\log K_{ow}$, regardless of the

Table 1
Techniques for measuring partitioning and diffusion coefficients (modified from Rowe, 1998)

Technique	Method	Comments/notes
Weight gain (sorption, immersion)	Monitor increase in mass of geomembrane immersed in fluid of interest from initial value m_0 until equilibrium at m_∞. Plot $(m_t - m_0)/(m_\infty - m_0)$ vs. $\sqrt{t}(or\sqrt{t/l})$ $S_{gf} = (\rho_g/C_{fF})\left((m_\infty/m_0) - 1\right)$ and $D_g = 0.0492\left(t_g^2/t_{0.5}\right)$ or $D_g = \pi\left(at_g/4m_\infty\right)^2$	Faster than alternative tests but each chemical must be examined separately. Suitable for pure solvent. For aqueous solutions, weight gain must be corrected for sorbed water. Prone to error due to mass loss when weighting (especially for VOCs) S_{gf} = partitioning coefficient (aqueous solution), c_{fF} = Final equilibrium fluid concentration ρ_g = geomembrane density $t_{0.5}$ = time to get $(m_t - m_0)/(m_\infty - m_0) = 0.5$ t_g = geomembrane thickness a = slope of initial linear portion of sorption curve.
Time lag	Monitor mass movement through geomembrane with time for test where C_{f1} = constant and $C_{f2} = 0$. Plot cumulative mass, F, through geomembrane against time and extrapolate steady state value to $F = 0$ to obtain the time lag τ. Slope of the steady state line gives the permeability coefficient P_g $D_g = \left(t_g^2/6\tau\right)$ and $S_{gf} = \left(P_g/D_g\right)$	Possibility of errors due to maintenance of C_{f1} = constant and $C_{f2} = 0$.
Diffusion/ permeation	Diffusion from solution on one side of geomembrane to solution on other side. Change in source and receptor solution monitored with time. At equilibrium: $S_{gf} = \left(\left[c_{f0}V_{s0} - c_{fF}(V_{sF} + V_{rF}) - \sum V_i c_i\right]/(At_g c_{fF})\right)$ D_g inferred from variation in source and receptor concentration with time.	Suitable for aqueous solutions (or leachate). May be used in conjunction with weight gain method to allow evaluation of parameters prior to equilibrium in the diffusion test. c_{f0} = Initial concentration in the source, c_{fF} = Final equilibrium concentration in source and receptor V_{s0} = Initial volume of source reservoirs V_{sF}, V_{rF} = Final volume of source and receptor reservoirs. $\Sigma V_i c_i$ = Mass removed by sampling events (V_i and c_i volume and concentration at each event. a, t_g, ρ_g = Geomembrane area and thickness and density respectively.

Table 2
Summary of proposed prediction methods

Method	Parameter	Eq.#	Relationship	r^2
n-Octanol/ water	S_{gf}	R1	$\log S_{gf} = -1.1523 + 1.2355 \log K_{ow}$	0.97
	D_g	R2	$\log D_g = -12.3624 + 0.9205 \log K_{ow} - 0.3424 (\log K_{ow})^2$	0.72
	P_g	R3	$\log P_g = -13.4476 + 2.2437 \log K_{ow} - 0.3910 (\log K_{ow})^2$	0.84
Molar weight	S_{gf}	R4a	Oxygenated: $\log S_{gf} = -3.8883 + 0.0363 M_w$	0.81
		R4b	Chlorinated: $\log S_{gf} = -2.0467 + 0.0305 M_w$	0.94
		R4c	Aromatic: $\log S_{gf} = -0.0776 + 0.0322 M_w$	0.95
		R4d	Aliphatic: $\log S_{gf} = -0.1107 + 0.0442 M_w$	0.91
	P_g	R5	$\log P_g = -25.6933 + 0.2633 M_w - 1.099 \times 10^{-3} (M_w)^2$	0.81

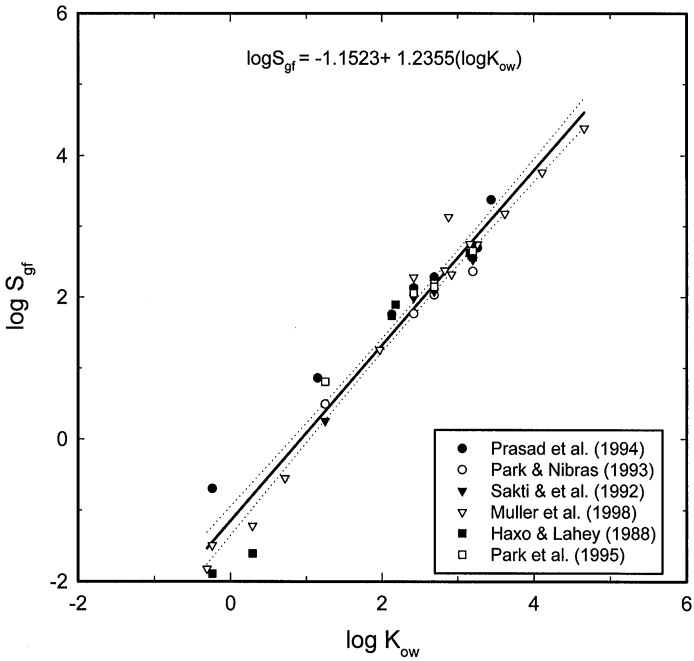

Fig. 1. Relationship between $\log K_{ow}$ and $\log S_{gf}$ for HDPE geomembranes.

properties of the geomembrane or test conditions, substantiates the fact that the partition coefficient is mainly controlled by contaminant characteristics as stated by Müller et al. (1998). As anticipated, as $\log K_{ow}$ increases, the chemical hydrophobia increases and hence the contaminant has a high attraction to the geomembrane.

The plot of $\log D_g$ against $\log K_{ow}$ shows more scatter in the data (Fig. 2) than was the case for S_{gf} (Fig. 1). It may be hypothesized that this scatter is due to a difference

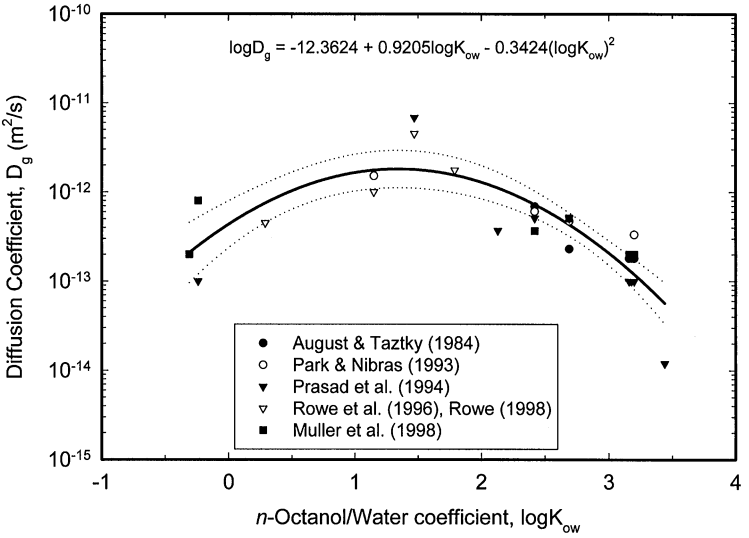

Fig. 2. Variation of diffusion coefficient D_g with *n*-octanol/water coefficient for aqueous organic contaminants.

in the geomembrane properties and that this difference in geomembrane properties (e.g. crystallinity) may have significant effect on the diffusion process. The plot also shows a decrease in D_g at high log K_{ow} values. This is likely due to the fact that chemicals with high log K_{ow} are mostly relatively large molecules (see Table 4) such that the diffusion is highly dependent on the molecule size. As mentioned in Section 2.1, molecular diffusion is an activated process that is completed by successive jumps. Thus, when permeant size increases, higher activation energy is required for diffusion to be completed. Similarly, the permeability (P_g) shows a relatively poor correlation with log K_{ow} (Fig. 3) but it is still better than that for diffusion because P_g is influenced by both the partitioning and diffusion coefficients.

3.2.2. Estimation based on chemical molecular weight (M_w)

In general, the sorption (and hence the partitioning coefficient) increases with the contaminant molecular weight. To better describe this variation, the chemicals were grouped in four main categories according to their molecule structures: aliphatic, aromatic, chlorinated and oxygenated. Fig. 4 shows the plot of log S_{gf} as a function of M_w and it can be seen that partitioning coefficient is dependent upon thechemical structure. This is attributed to the fact that the chemicals structure affects their solubility in water and hence log K_{ow}, and molecular weight. Consequently, aliphatic hydrocarbons with log $K_{ow} \geqslant 3.5$ have high partitioning coefficients followed by aromatic ($2 \leqslant \log K_{ow} \leqslant 3.5$), chlorinated or halogenated ($1 \leqslant \log K_{ow} \leqslant 3$) and finally oxygenated hydrocarbons which are highly soluble in water ($\log K_{ow} \leqslant 0.5$). The equations associated with the inferred relations are summarized in Table 2.

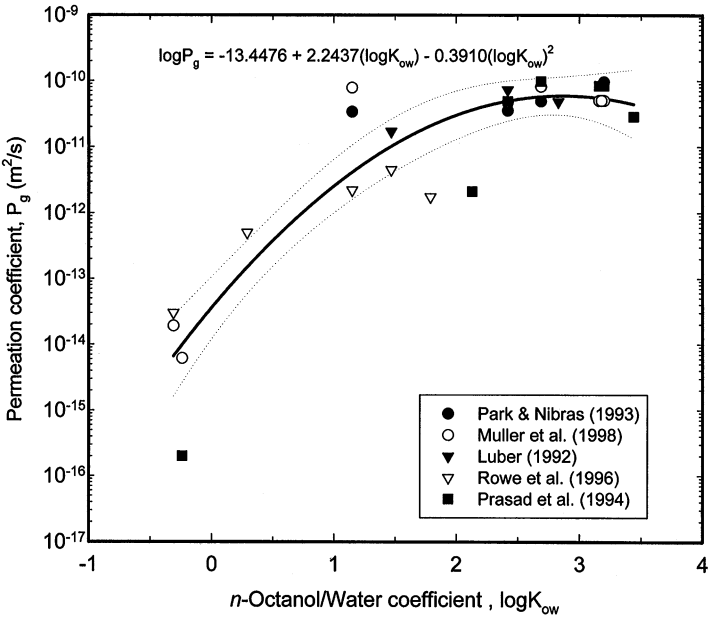

Fig. 3. Variation of permeation coefficient with *n*-octanol/water coefficient for aqueous organic solutions.

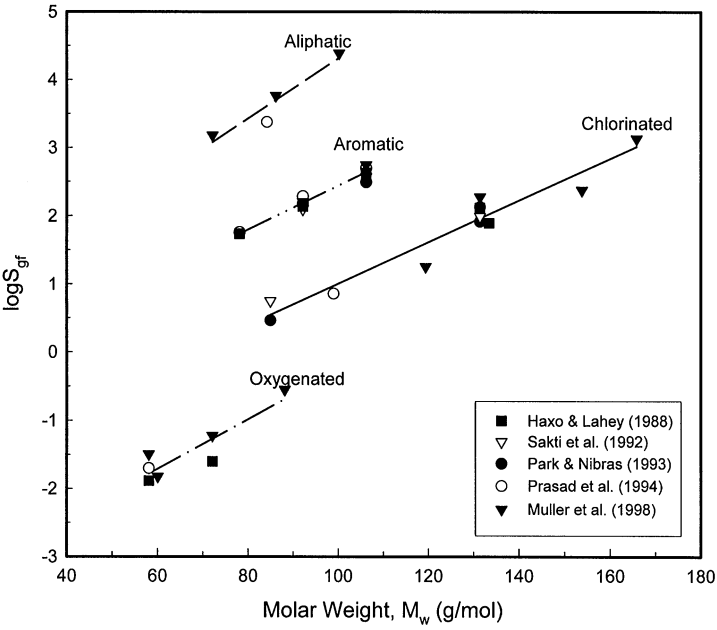

Fig. 4. Variation of partitioning coefficient (S_{gf}) with molar weight of organic compounds.

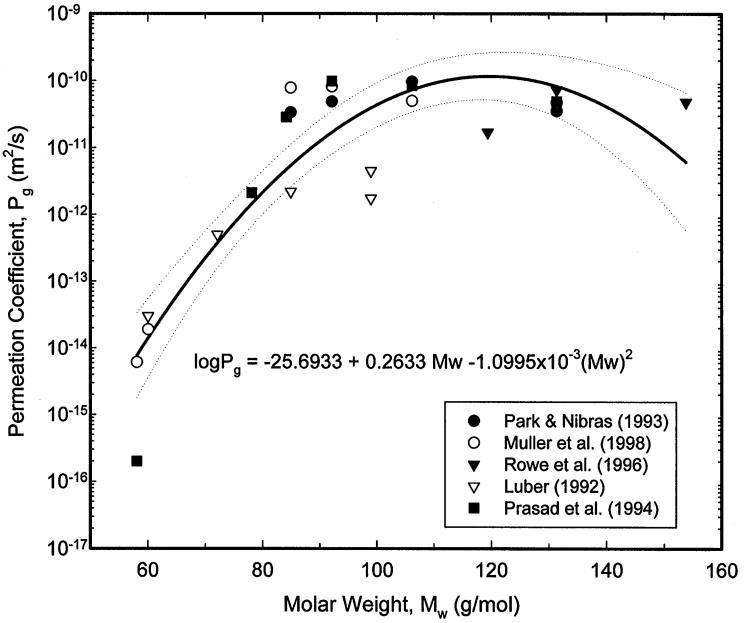

Fig. 5. Permeation coefficient variation with contaminant molar weight for organic aqueous solutions.

Correlating $\log D_g$ with M_w was unsuccessful due to the high degree of scatter in the data as found for $\log K_{ow}$. However, correlating P_g with M_w exhibited a fairly good trend as shown in Fig. 5 and the derived equation is presented in Table 2. As previously mentioned, the scatter observed for D_g is compensated by the relatively good data reported for S_{gf} making P_g less scattered.

4. Experimental investigations

4.1. Material and methods

The study was conducted using a 2.0 mm thick high-density polyethylene (HDPE) geomembrane provided by GSE Linings Inc. (Texas). Its relevant properties are presented in Table 3. Seven organic chemicals representative of chlorinated hydrocarbons (dichloromethane, 1,2-dichloroethane, and trichloroethylene) and aromatic hydrocarbons (benzene, toluene, ethylbenzene and xylenes) were examined. These chemicals are commonly found in municipal solid waste leachate (Rowe, 1995). The key properties of these laboratory grade (99% + purity) chemicals (purchased from Sigma-Aldrich, Mississauga, Ontario, Canada) are presented in Table 4.

Tests were conducted using dilute aqueous solutions prepared from high concentration mixed-stock solutions. The dilute solution concentrations ranged

Table 3
Properties of HDPE geomembrane used

Properties	Methods (ASTM)	Units	Test results
Thickness	D5199	mm	2.0
Density	D792	g/cc	0.940
Carbon black content	D1603	%	2.54
Carbon black dispersion	D3015		A1-A2
Oxidative induction time	D3895	min	133
Crystallinity	E794	%	47
Melt flow index	D1238	g/10 min	0.42
Puncture resistance	D4833	N	736
Stress cracking resistance	D5397	h	210
Initial tear resistance	D1004	N	354
Tensile properties	D638		
Strength		kN/m	
@ Yield			35
@ Break			77
Strain		%	
@ Yield			15.0
@ Break			863

Table 4
Selected properties[a] of organic contaminants tested

Chemicals	Molar weight (g/mole)	Density (g/cm^3)	Molar volume[b] (cm^3)	Aqueous solubility[c] (mg/l)	Log K_{ow}	Boiling Temp. (°C)	Dipole moment (debye)
Chlorinated hydrocarbons							
Dichloromethane	84.93	1.3266	64.02	20000	1.25	40.2	1.60
1,2-Dichloroethane	98.96	1.2530	78.98	8690	1.45	83.5	1.44
Trichloroethylene	131.39	1.4642	89.74	1100	2.53	87.2	0.77
Aromatic hydrocarbons							
Benzene	78.11	0.8765	89.11	1780	2.13	80.1	0.00
Toluene	92.14	0.8669	106.28	515	2.79	110.6	0.30
Ethylbenzene	106.17	0.8670	122.46	152	3.13	136.2	0.36
m-Xylene	106.17	0.8642	122.85	161.9	3.20	138.0	0.30
o-Xylene	106.17	0.8802	120.62	152	3.13	144.0	0.63
p-Xylene	106.17	0.8669	122.47	156	3.18	138.3	0.00

[a] From Montgomery and Welkom (1990).
[b] Calculated based on chemical density and molar weight.
[c] At 20°C.

from 2 to 5 mg/l. These concentrations are similar or exceed the level observed in typical landfill leachate as reported by Rowe (1995). During the test, chemical concentrations from both source and receptor were monitored with time. In order to minimize the effect of samplings on the total volume of reservoirs while providing the 0.8 ml required for gas chromatography analyses, small volumes were collected from

reservoirs and were diluted in 1% methanol/water solution. For diffusion tests, approximately 50 µl and 100 µl were collected from the source and the receptor respectively using airtight 0.5 ml syringes. For the control test, sorption samples were diluted in 4.0 ml nominal size glass vials sealed with open top cap equipped Teflon lined septa while samples from the receptor were mixed in 2 ml vials. In both cases, the vials were pre-filled with the stabilizing solution and then spiked with a designated amount of chloroform (yielding 25 µg/l) used as an internal standard in analytical quantification procedures. The dilute solutions formed were then allowed to mix at room temperature for 10–12 h. Tests were run at a laboratory temperature of $22 \pm 2^{\circ}C$ using glass cells having characteristics summarized in Table 5 and shown schematically in Fig. 6.

4.2. Analytical methods

Samples were analyzed using a Varian Gas Chromatography/Mass Spectrometer (GC/MS) consisting of a Saturn 2000 MS and a 3800 GC equipped with a 8200 CX

Table 5
Characteristics of test cells

Parameter	Units	Control cell	Sorption/ immersion cell	Diffusion cell	
				Source	Receptor
Height	cm	10.0 ± 0.5	10.0 ± 0.5	10.0 ± 0.5	3.0 ± 0.2
Diameter	cm	7.0 ± 0.2	7.0 ± 0.2	7.0 ± 0.2	7.0 ± 0.2
Volume	cm^3	385	385	385	115
Container Surface Area	cm^2	297	297	258	104
RWS[a]	cm^{-1}	0.77	0.77	0.67	0.90

[a] RWS = (Wall Surface Area/Volume)

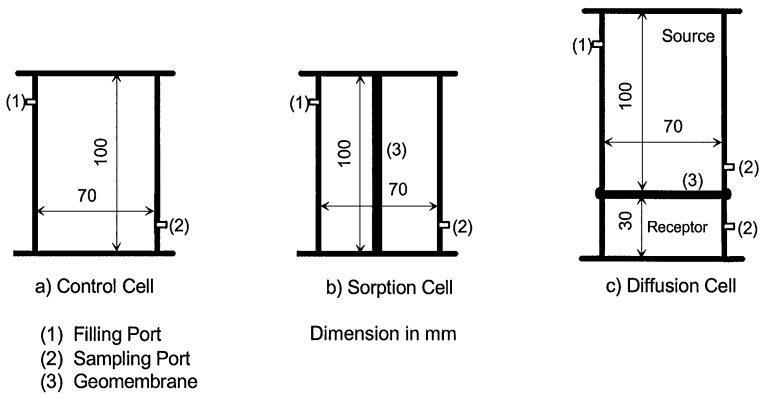

Fig. 6. Schematic of test cells used.

autosampler used in solid phase micro-extraction (SPME) and headspace modes. The chemical separations were done on a 30 m × 0.25 mm ID fused silica capillary column coated with a 0.25 μm DB-5 film using He carrier gas at flow rate of 1.3 ml/min. The Column temperature was programmed to hold the initial temperature of 35°C for 0.5 min, followed by two ramps of 10°C/min to 100°C, and 50°C/min to 200°C with a final hold of 3 min. The scan for chemical identification was performed in 35–200 mass units range.

The injection system consisted of a 8200 CX Varian autosampler equipped with a 100 μm poly-dimethylsiloxane (PDMS) solid phase micro extraction (SPME) fiber (Supelco Bellfonte, PA, USA). The sampling extraction was performed in headspace mode for 10 min from 2 ml vials, and then the fiber is desorbed in the injector port for 2 min. Chemical spectra were identified using the NIST spectra library, and calibrated and quantified using Varian Saturn 2000 Star Chromatography software (Version 5.05).

Contaminant concentrations were quantified based on calibration curves obtained through the analysis of standards of known concentrations that were regularly prepared during the tests. The standard stock cocktail was prepared by spiking a 50 ml glass serum bottle filled with methanol with each of the pure chemicals to achieve concentrations of about 1000 mg/l for the chlorinated hydrocarbons and 500 mg/l for aromatic hydrocarbons. This stock was further diluted in methanol to approximately 1 and 0.5 mg/l for chlorinated and aromatic compounds respectively. This dilute stock was used to prepare the standards used for GC calibration. Standards with concentrations varying from 2–100 μg/l were prepared with the internal chloroform concentrations the same as that used for the "unknown" samples collected for the test cells.

4.3. Procedures

4.3.1. Control cell

To evaluate losses that may be occurring during the test due either to the sampling events or due to chemical/cell material interaction, control tests were conducted in a cell identical to those used for the sorption test and the source compartment in diffusion tests (Fig. 6a). The cell was sealed and then filled with chemical solution at concentration levels of about 5 mg/l levels, similar to those used for the source solution in the diffusion and sorption tests. During the test, contaminant concentrations in solution were monitored by collecting and analyzing samples following the methodology presented in Section 4.2. The measured contaminant concentrations were then plotted as normalized concentrations relative to initial concentration.

4.3.2. Sorption test

In sorption/immersion tests, geomembrane samples with known masses were immersed in a cell filled with mixed dilute solution of contaminants (Fig. 6b). In contrast with the weight gain method where the geomembrane sample weight is monitored, in the present experiment, solution samples were collected through a

sample port and analyzed by GC/MS using the procedure described in Section 4.2. Contaminant concentrations were monitored with time until equilibrium (no significant concentration change for successive samples) is reached. At the end of the test, the cell was dismantled and the geomembrane was quickly and gently wiped with a tissue and it mass measured. This final mass was then used to ascertain the total mass gained due to sorption and was compared to mass inferred from equilibrium concentration in the solution.

If M_{s0} is the initial mass of contaminant in the solution $[M]$, contaminant mass balance at equilibrium can be written as follows:

$$M_{s0} = M_{sF} + M_{gF} + M_R, \tag{10}$$

where M_{sF} is the final mass of contaminant in the solution $[M]$; M_{gF} the mass uptake by the geomembrane $[M]$ and M_R the mass removed by sampling events. If one expresses the masses in terms of their respective concentrations and volumes, Eq. 10 becomes:

$$c_{f0}V_{f0} = c_{fF}V_{fF} + \frac{M_g}{\rho_g}c_{gF} + \Sigma V_i c_i \tag{11}$$

with c_{f0} = initial solution concentration $[ML^{-3}]$, c_{fF} = final equilibrium solution concentration $[ML^{-3}]$, V_{f0} = initial solution volume $[L^3]$; V_{fF} = final solution volume $[L^3]$; M_g = initial mass of geomembrane $[M]$, ρ_g = geomembrane density $[ML^{-3}]$, c_{gF} = final equilibrium concentration in geomembrane $[ML^{-3}]$ and $\sum V_i c_i$ = mass removed by sampling events $[M]$ (V_i and c_i are volume and concentration at each event). The partitioning coefficient can then be obtained by substituting Eq. 11 in Eq. (1) as follows:

$$S_{gf} = \frac{\left[c_{f0}V_{f0} - c_{fF}V_{fF} - \sum V_i c_i\right]\rho_g}{M_g c_{fF}}. \tag{12}$$

4.3.3. Diffusion test

Diffusion tests were performed in double compartment cells similar to those used by August and Taztky (1984), Haxo and Lahey (1988) and Rowe et al. (1995, 1996). According to August and Taztky (1984), this type of assembly is better suited for studying the diffusive properties of geomembranes in a landfill environment than other methods (gravimetric or immersion tests). The test apparatus shown in Fig. 6 consist of a closed system with a source and receptor reservoirs separated by the geomembrane examined. Cell characteristics are presented in Table 5. The two contaminant-free compartments and the geomembrane are sealed together using two-part epoxy adhesive type 2216 B/A (3 M St. Paul, Minnesota, USA) and cured for 7 days. Then, geomembrane-cell outside joints were covered by a thick silicone sealant. Once the silicone seal had hardened, the receptor was filled with contaminant-free megapure water (distilled deionized). Afterwards, the source reservoir was filled with a mixed dilute solution of dissolved chemicals. This filling process took approximately 5 min. The source solution was then quickly sampled for analysis. The measured initial chemical concentrations ranged from 2–5 mg/l. Each

compartment was equipped with a sampling port that allowed collection of samples for gas chromatography analyses. During the test, the concentrations in both source and receptor reservoirs were monitored with time and the results were plotted as normalized concentration relative to the initial source chemical concentrations.

The test approach was based on concepts and theory proposed by Rowe et al. (1988) for clayey soils and subsequently extended to geomembranes by Rowe et al. (1995, 1996). For these closed systems, at any time t, the mass of contaminant in the source solution is equal to the initial mass minus the mass that diffused through the geomembrane up to that time and can be written as:

$$c_{ss}(t) = c_{s0} - \frac{1}{H_{ss}} \int_0^t f_{ss}(\tau) d\tau, \tag{13}$$

where $c_{ss}(t)$ = concentration of contaminants in the source solution at time t [ML^{-3}]; c_{s0} = initial concentration in the source solution [ML^{-3}]; H_{ss} = reference height of source solution (volume of source fluid per unit area) [L]; $f_{ss}(\tau)$ = mass flux of contaminant into the geomembrane at time τ [$ML^{-2}T^{-1}$].

Similarly, the increase in contaminant concentrations in the receptor (due to their migration through the geomembrane) can be modeled by the following:

$$c_{rs}(t) = c_{r0} + \frac{1}{H_{rs}} \int_0^t f_{rs}(\tau) d\tau, \tag{14}$$

where $c_{rs}(t)$ = increase in concentration in the receptor solution with t [ML^{-3}]; H_{rs} = volume of the receptor reservoir per unit area [L], $f_{rs}(\tau)$ = mass flux of contaminant from geomembrane into the receptor at time τ [$ML^{-2}T^{-1}$] and c_{r0} = initial concentration in the receptor [ML^{-3}] (zero in the present study).

Diffusion (D_g) and partition (S_{gf}) coefficients were inferred by fitting a theoretical solution of the diffusion equation to the data measured using boundary conditions presented in Eqs. 12 and 13. S_{gf} values obtained from sorption tests were used as a starting point. Tests data were analyzed following the procedure described in detail elsewhere by Rowe et al. (1995) using the finite layer analysis program POLLUTE© v6.3.6 (Rowe and Booker, 1998) that specifically allows the modeling of the phase change and hence the partition coefficient.

5. Results and discussions

5.1. Control cell

Figs. 7 and 8 show the variation in chemical concentration as measured during the test period for chlorinated and aromatic hydrocarbons respectively. It is evident that most of the concentrations changed somewhat with time. The magnitude of the decrease was dependent on the chemical tested. For instance, among the chlorinated organic contaminants examined, only TCE experienced significant decrease in concentration (by about 25% of the initial concentration). The other compounds (DCM and 1,2-DCA) did not show any significant and measurable change

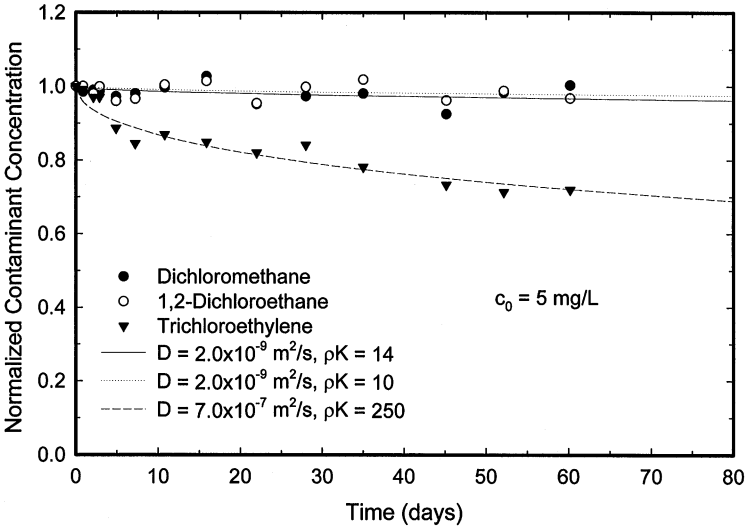

Fig. 7. Observed concentrations of chlorinated hydrocarbons in control cells.

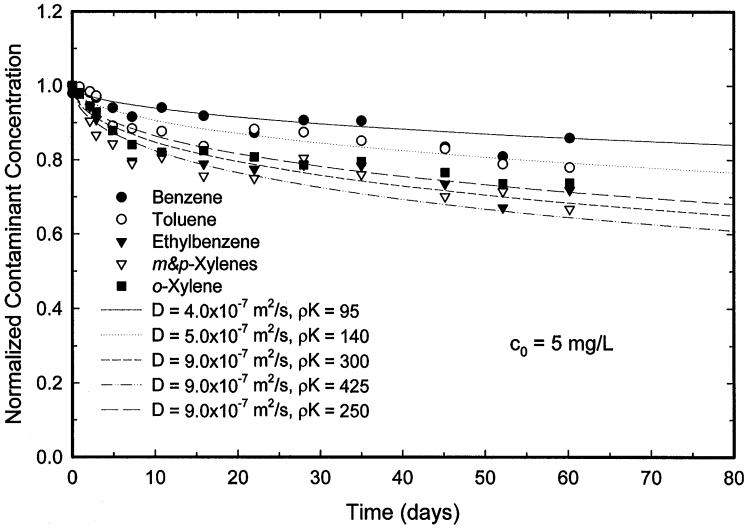

Fig. 8. Observed concentrations of aromatic hydrocarbons in control cells.

suggesting that these compounds were relatively stable in glass cells over the testing period. Similar observations have been reported by Rowe et al. (1995) for DCM solution placed in glass serum bottles and blank glass cells and monitored for up to 405 days. In contrast, concentrations of all aromatic hydrocarbons decreased during the testing period with a maximum decrease of 25% observed for *m* and *p*-xylenes

over the 60 day testing period. The decrease for other aromatic hydrocarbons is about 10, 17, 22 and 23% for benzene, toluene, *o*-xylene and ethylbenzene respectively.

The decline observed for aromatics and TCE may be attributed to their sorption into cell material (here glass) and other losses associated with sampling events and process. However, the negligible decrease in DCM and 1,2-DCA concentrations in the same control cells suggests that sorption onto cell glass may be dominant. These observations highlight the importance of the stability of compounds with respect to test cell materials. Therefore, in the immersion test, the mass of contaminant removed from the solution due to the sorption onto the cell must be considered when calculating different parameters. This also applies to diffusion tests with finite mass source for which the available diffusive mass may be reduced due to sorption onto the glass cell wall.

To account for these losses in diffusion tests with finite masses in the source reservoir, the control cells were modeled using an approach developed by Krol (2000). In this method, a fictitious layer is used as a means of removing mass from the system due to sorption onto the glass. To achieve this, the layer was modeled on top of the cell assuming a zero flux boundary condition above this fictitious layer. In the present case, a 5 mm thick layer was assumed and the theoretical curves were generated using POLLUTE© v6.3.6 (Rowe and Booker, 1998) as shown in Figs. 7 and 8. The inferred parameters (shown in legend) were subsequently used when modeling the diffusion tests performed in this study.

5.2. Sorption tests

The changes in contaminant concentrations monitored during the sorption tests plotted as normalized concentrations relative to the initial concentrations are shown in Figs. 9 and 10 for chlorinated and aromatic hydrocarbons respectively. Among the chlorinated, trichloroethylene (TCE) concentration decreased the most with the equilibrium concentration being 30% of the initial, followed by 1,2-dichloroethane (1,2-DCA) and dichloromethane (DCM) although they are very close with respective values of 75% and 95% of the initial concentrations. The equilibrium concentration for TCE is achieved in about 8 days whereas for DCM and 1,2-DCA it took up to 12 days before equilibrium was observed.

Among the aromatic hydrocarbons, ethylbenzene and xylenes showed the greatest decrease of about 90% of the initial concentration followed by toluene with a decrease of 80% and benzene with a concentration reduction of 60%. For compounds with high decrease (xylenes and ethylbenzene), the equilibrium concentration seems to be reached much faster. For instance, the equilibrium for *o*-xylene was reached after the first 5 days of the test while for benzene, the reduction extended such that the equilibrium was reached in up to 10 days.

Using Eq. 12, two sets of partitioning coefficients were calculated: non-corrected and corrected coefficients. For non-corrected S_{gf}, no consideration was given to the losses (this would correspond to the case where the presence of geomembrane samples, which have high affinity to the chemicals in the solution, would reduce their

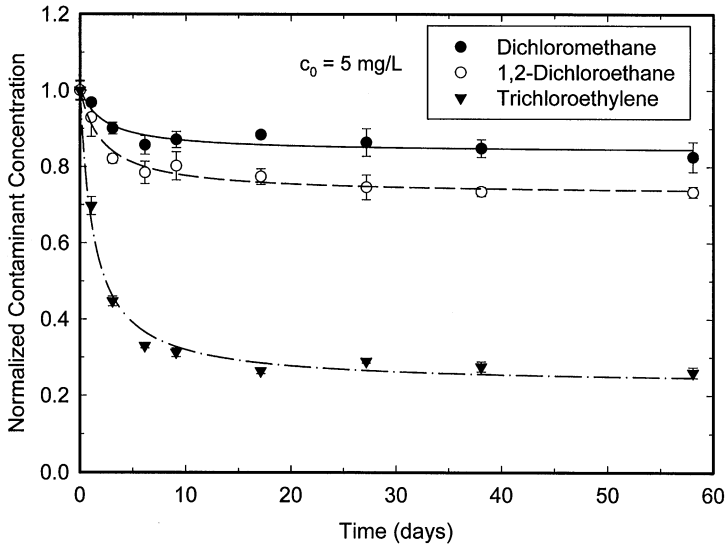

Fig. 9. Measured chlorinated hydrocarbons concentration during sorption tests.

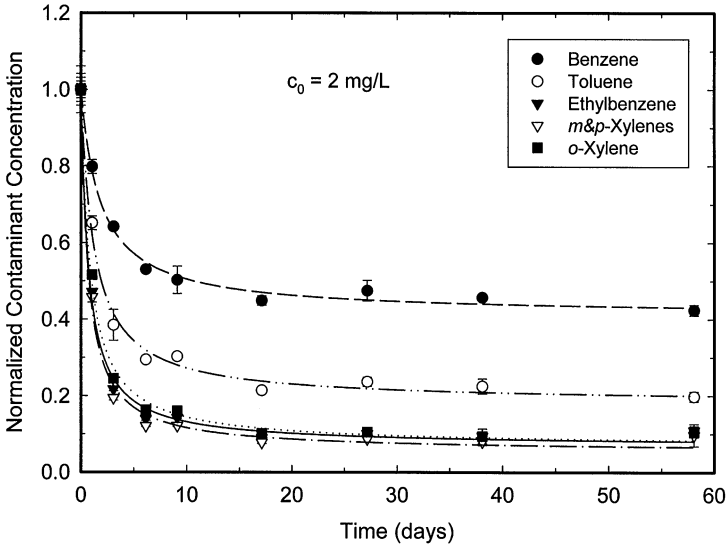

Fig. 10. Measured aromatic hydrocarbons concentration during sorption tests.

attraction to glass surface to negligible levels). The corrected values were calculated assuming that the mass loss to glass would occur even in the presence of geomembrane sample. In this case, the mass adsorbed onto the cell glass. This

Table 6
Estimated partitioning coefficient from sorption test

Chemicals	log K_{ow}**	Sorption test S_{gf}		Literature			
		Uncorrected	Corrected	a	b	c	d
Chlorinated hydrocarbons							
Dichloromethane	1.25	6.1	6.1	2.9			
1,2-Dichloroethane	1.45	9.4	9.4		7.2	10	
Trichloroethylene	2.53	87	59	82	135		131
Aromatic hydrocarbons							
Benzene	2.13	31	25				54
Toluene	2.79	120	95	150	192	160	137
Ethylbenzene	3.13	315	237				
m&p-Xylenes	3.19	408	300	310	498	556	376
o-Xylene	3.13	285	193				422

[a]Park and Nibras (1993); [b]Prasad et al. (1994); [c]Müller et al. (1998); [d]Haxo and Lahey, 1988; ** *n*-octanol/water partition coefficient.

mass lost by sorption was estimated based on monitored chemical final concentration in control cells at the end of the test. It is expected that the real case lies between these two limiting cases.

The calculated partition coefficients are presented in Table 6. For non-corrected values for chlorinated hydrocarbons, TCE has the highest $S_{gf} = 87$ followed by the 1,2-DCA and DCM with $S_{gf} = 9.4$ and 6.1 respectively. When corrected, the calculated S_{gf} values are about 59 for TCE while for 1,2-DCA and DCM, S_{gf} values remain unchanged due to the fact no significant losses were observed in the control cells. The highest non-corrected $S_{gf} = 408$ was observed for *m* and *p*-xylenes, followed by ethylbenzene ($S_{gf} = 315$), *o*-xylene ($S_{gf} = 237$), toluene ($S_{gf} = 120$). Benzene has the lowest $S_{gf} = 31$.

These values should be considered as upper and lower bound values for corrected and non-corrected partitioning coefficients. Indeed, it may be expected that when the geomembrane samples are immersed in the solution the sorption onto the cell wall will be substantially reduced because of the higher geomembrane affinity to organic contaminants examined.

Based on these results, it appears that the partitioning coefficient increases with the increases in *n*-octanol/water coefficient ($\log K_{ow}$). This is to be expected (as noted earlier) since an increase in $\log K_{ow}$ represents an increase of the hydrophobicity, and hence the ability of the chemical to partition with organic material. It is also evident that, for the chemicals examined, aromatic hydrocarbons have higher partitioning coefficients because of the relatively high $\log K_{ow}$ (2.13–3.20) compared to chlorinated hydrocarbons with $\log K_{ow}$ varying from 1.25 to 2.53.

5.3. Diffusion tests

Duplicate tests were performed. Contaminant concentrations measured in the source and the receptor over the 75 day testing period are shown in Figs. 11 and 12

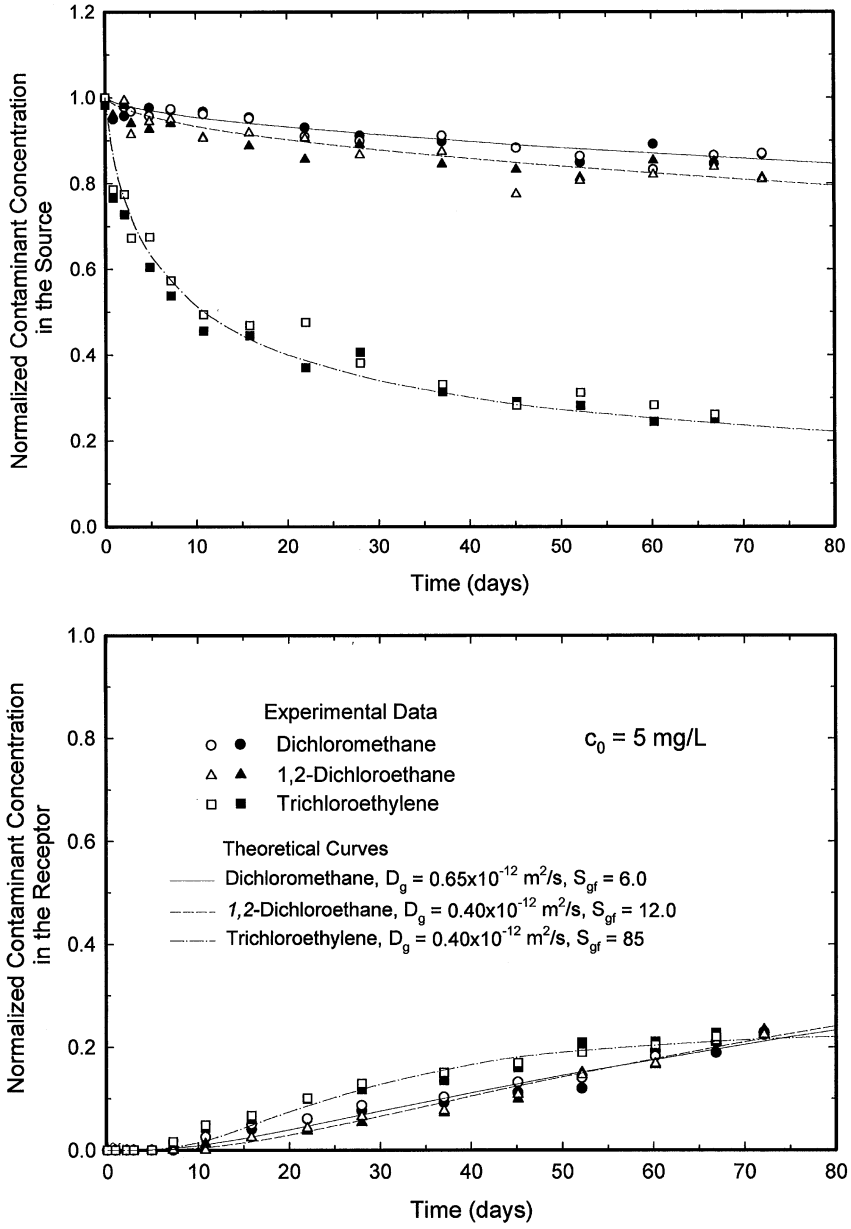

Fig. 11. Chlorinated hydrocarbons concentration change with time during the diffusion test.

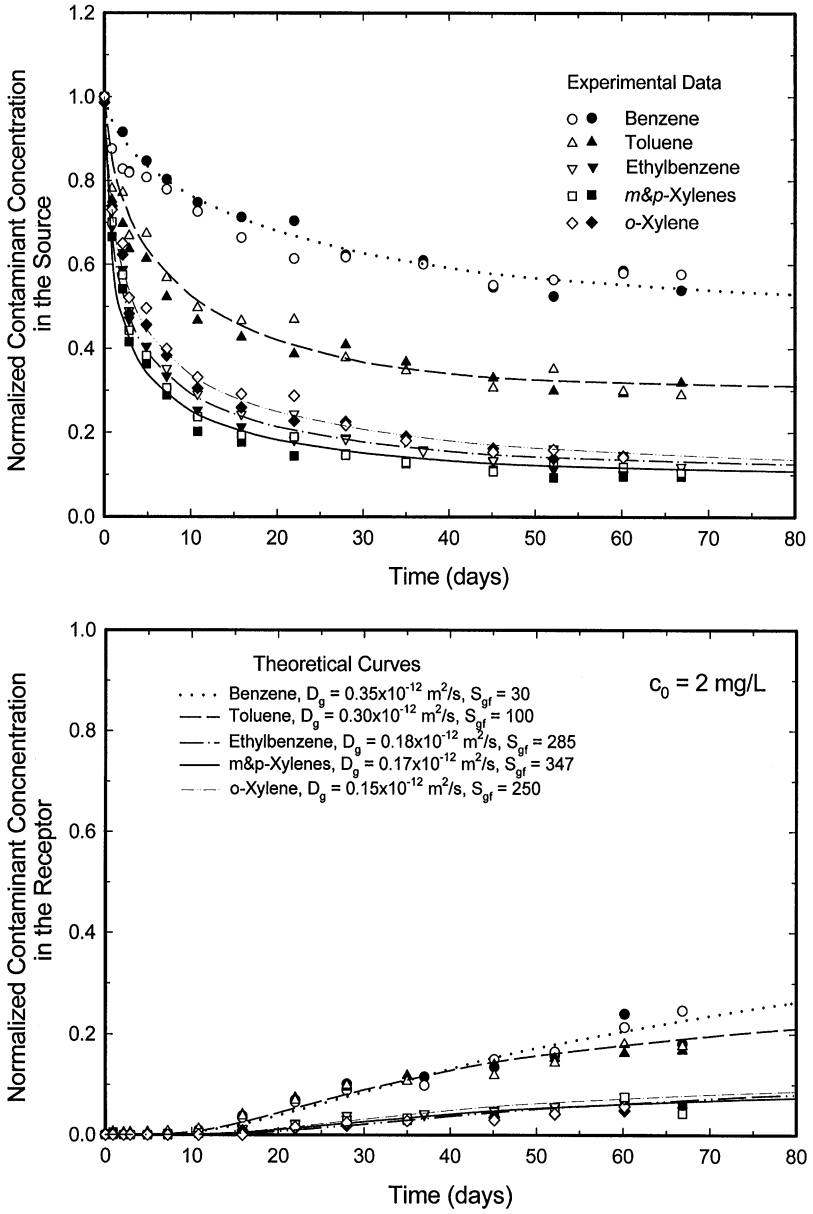

Fig. 12. Aromatic hydrocarbons concentration change with time during the diffusion test.

for chlorinated and aromatic hydrocarbons respectively. Concentrations are plotted as normalized concentration relative to the initial concentration and each data point represents the average of triplicate values quantified with GC analyses. Despite some scatter of the data, it can be seen that the source concentrations decrease with time

while the receptor concentrations increase with time as the chemicals diffuse through the geomembrane. In general, the decrease in the source concentration is controlled by the partitioning parameter while the increase in the receptor concentration is dominated by the permeation coefficient. The variations in the source and receptor are different for each contaminant indicating that the migration of the organic contaminants through a HDPE geomembrane is contaminant dependent.

Among the chlorinated compounds (Fig. 11), the greatest decrease was observed for trichloroethylene with concentration dropping to about 25% of the initial concentration. Dichloromethane (DCM) and 1,2-dichloroethane (1,2-DCA) experienced a much smaller decrease with the later having lower concentration of $0.8c_0$ and the former $0.85c_0$. Although all the chemicals breakthrough to the receptor at approximately the same time, the TCE concentration increased faster than the other two chlorinated hydrocarbons. The observations suggest that the migration properties of the DCM and 1,2-DCA are similar and that they permeate at slower rates than TCE.

The theoretical curves generated for chlorinated compounds by solving the diffusion equation with the appropriate boundary conditions (Eqs. 13 and 14) are also shown in Fig. 11 (lines). The inferred S_{gf} and D_g, and calculated P_g are summarized in Table 7. S_{gf}, D_g and P_g for DCM are respectively 6, 0.65×10^{-12} m^2/s, and 3.9×10^{-12} m^2/s while for 1,2-DCA, the values are 12, 0.40×10^{-12} m^2/s and 4.8×10^{-12} m^2/s. TCE parameters are 85, 0.4×10^{-12} m^2/s and 34.0×10^{-1} m^2/s. The values reported for DCM is at the upper end of the range of $1–3.0 \times 10^{-12}$ m^2/s reported by Rowe et al. (1996) for a 2 mm HDPE geomembrane using the same procedure. The 1,2 DCA permeation coefficient is similar to that reported by Rowe et al. (1996) with a value of 4.8×10^{-12} m^2/s that is within the reported range of $3–6 \times 10^{-12}$ m^2/s.

It appears that, under the experimental conditions used in this study, TCE permeates approximately 10 times faster than the other two chlorinated

Table 7
Inferred partitioning, diffusion and calculated permeation coefficients from diffusion tests

Contaminants	log K_{ow}[a]	S_{gf} (−)	D_g (-10^{12} m^2/s)	P_g (-10^{12} m^2/s)
Chlorinated hydrocarbons				
Dichloromethane	1.25	6	0.65	3.9
1,2-Dichloroethane	1.45	12	0.40	4.8
Trichloroethylene	2.53	85	0.40	34.0
Aromatic hydrocarbons				
Benzene	2.13	30	0.35	10.5
Toluene	2.79	100	0.30	30.0
Ethylbenzene	3.13	285	0.18	51.3
m and *p*-Xylene	3.19	347	0.17	59.0
o-Xylene	3.13	240	0.15	36.0

[a] *n*-octanol/water partition coefficient.

hydrocarbons examined. The permeation rate follows TCE > 1,2-DCA > DCM. This order may be explained in terms of the affinity between the different contaminants and the HDPE geomembrane as evident from Table 4. Of the three chlorinated contaminants, TCE is the less polar (0.77 debye) followed by 1,2-DCA (1.44 debye) and DCM (1.69 debye).

For all aromatic hydrocarbons, the source concentrations decreased significantly during the diffusing test (Fig. 12). The smallest decrease in the concentration to about 60% of the initial concentration was observed for benzene while the xylenes (*m* and *p*-xylenes and *o*-xylene) and ethylbenzene have the greatest decrease with concentrations dropping to about 20% of the initial concentration. The benzene and toluene concentrations increased the most in the receptor during the testing period. Ethylbenzene and xylenes increased the least.

Fig. 12 also shows the theoretical curves (lines) generated for these diffusion tests and the estimated parameters are presented in Table 7. The permeation coefficients have the following order: *m* and *p*-xylene > ethylbenzene > *o*-xylene > toluene > benzene. This order can be related to their affinity to the HDPE geomembrane examined and the hydrophobicity of the various chemicals. In general, the more hydrophobic the chemical (i.e. the greater is the *n*-octanol/water coefficient, $\log K_{ow}$), the more the organic compound partitions to the geomembrane. For the compounds examined, *m* and *p*-xylenes have the highest $\log K_{ow} = 3.19$ (average), followed by ethylbenzene and *o*-xylene with $\log K_{ow} = 3.13$; toluene $\log K_{ow} = 2.79$ and benzene $\log K_{ow} = 2.13$.

Two key observations can be made from the results reported herein. First, it can be seen from Fig. 12 that, although their permeation rates are greater, the concentrations of ethylbenzene and xylenes in the receptor are lower than benzene and toluene. As indicated in Eq. 5, it is the flux into the receptor that controls the concentration of the contaminants and this is both a function of P_g and the concentration gradient across the geomembrane implying that any decrease in one of these two parameters will result in smaller concentration in the receptor. It can be seen from the receptor profile that for these contaminants, the concentration decreases rapidly and significantly during the first days of testing reducing the concentration gradient. The concentration will continue to decrease because the total mass of chemical is limited in the source. Thus, the concentration in the receptor will be less than for chemicals with low partitioning coefficients.

The second observation is that all S_{gf} values reported in Table 7 lie between the two values (corrected and uncorrected) previously reported from the sorption test. This substantiates the statement made earlier that these two values should be considered as the upper and lower bound for the S_{gf}.

6. Comparison between measured and estimated parameters

To evaluate the effectiveness of the proposed estimation methods, the measured values are compared to the predicted values. Fig. 13a presents the plot of measured S_{gf} (form diffusion and sorption) relative to predicted S_{gf} based molecular weight

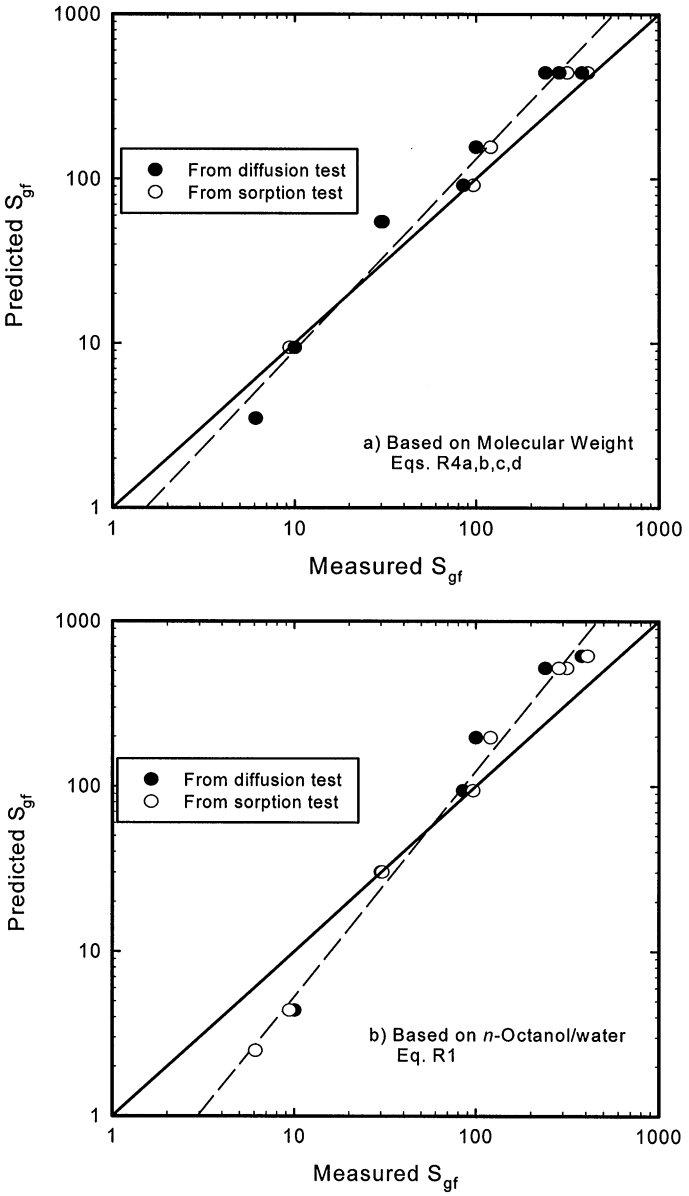

Fig. 13. Predicted and measured partitioning coefficient using different proposed relations.

relationships (Eqs. R4,a,b,c,d). The figure shows that the results are very close to 1 : 1 suggesting an excellent prediction. The predicted S_{gf} using *n*-octanol/water relation as a function of measured S_{gf} is shown in Fig. 13b. It can be seen that the log K_{ow} relationship underestimates S_{gf} for chemical, with low log K_{ow} and overestimates S_{gf} for high log K_{ow}.

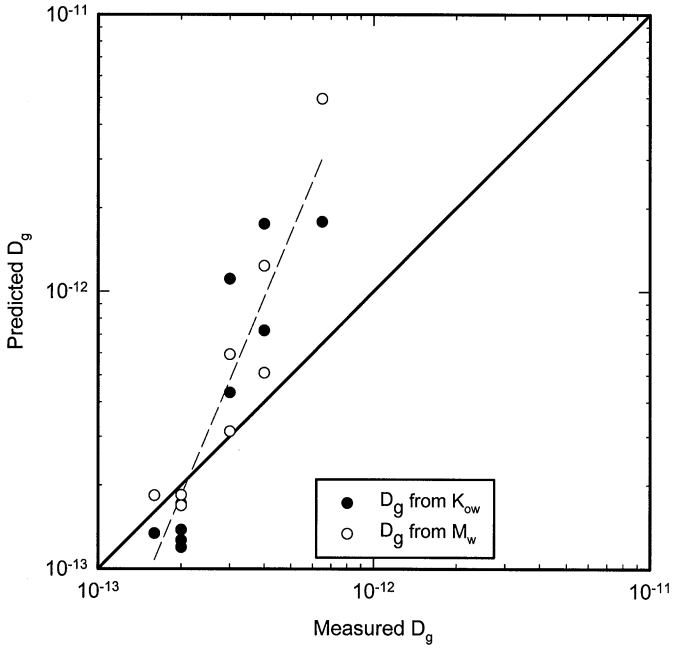

Fig. 14. Predicted and measured D_g using different proposed relations.

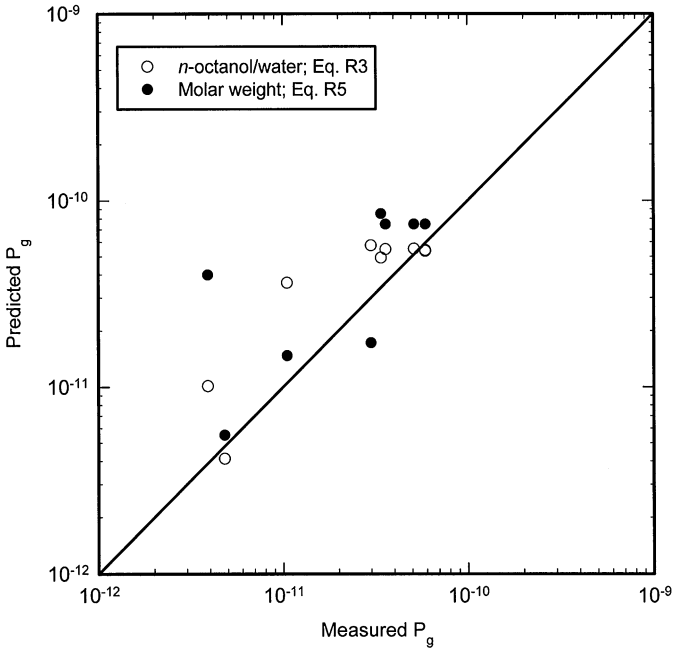

Fig. 15. Predicted and measured P_g using different proposed relations.

The Fig. 14 shows the plot of the diffusion coefficient D_g predicted against the measured D_g. It can be seen that there is a gap between the data and the 1 : 1 line plot that indicates a perfect prediction. This is because the relationship derived either based on $\log K_{ow}$ or M_w is only related to the properties of the chemical. But it is known that the properties (ie crystallinity, branching, cross-linking etc.) of the geomembrane greatly affect the diffusion coefficient. This seems to indicate that a more sophisticated model that can incorporate both the chemical (e.g. size, hydrophobicity) and geomembrane properties (e.g. crystallinity, branching) is needed.

Fig. 15 presents the variation of the predicted P_g with the measured P_g for diffusion tests. The plot shows that P_g values are significantly overestimated probably due to the over prediction observed for D_g. However, the discrepancy with the 1 : 1 line is less because of the good relationship provided with S_{gf}. This substantiates the fact that overall permeation is governed by the properties of both the geomembrane and chemicals.

7. Summary and conclusions

The partition and diffusion coefficients required to assess the effectiveness of a HDPE geomembrane as a diffusive barrier to organic contaminants have been presented and discussed. Based on the data presented, it appears that, for many organic contaminants, the diffusion coefficient typically lies in the range of 10^{-12}–$10^{-13}\,m^2/s$. It was found that partition coefficients show a very high variation depending on the chemical. This suggests that particular caution should be taken when choosing the partition coefficient. Various semi-empirical and empirical methods based on chemical molecular weight and the *n*-octanol/water coefficient ($\log K_{ow}$) have been proposed to estimate the diffusion, and partition coefficients. Laboratory sorption tests and diffusion tests conducted on a 2.0 mm HDPE geomembrane using three chlorinated hydrocarbons and four aromatic hydrocarbons demonstrated that S_{gf} could be estimated from the above methods.

8. For further reading

The following references are also of interest to the reader: Luber, 1992; Park et al., 1995; Sakti et al., 1992.

Acknowledgements

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EXHIBIT 38

(415 ILCS 5/3.135) (was 415 ILCS 5/3.94)

Sec. 3.135. Coal combustion by-product; CCB.

(a) "Coal combustion by-product" (CCB) means coal combustion waste when used beneficially in any of the following ways:

(1) The extraction or recovery of material compounds contained within CCB.

(2) The use of CCB as a raw ingredient or mineral filler in the manufacture of the following commercial products: cement; concrete and concrete mortars; cementious products including block, pipe and precast/prestressed components; asphalt or cementious roofing products; plastic products including pipes and fittings; paints and metal alloys; kiln fired products including bricks, blocks, and tiles; abrasive media; gypsum wallboard; asphaltic concrete, or asphalt based paving material.

(3) CCB used (A) in accordance with the Illinois Department of Transportation ("IDOT") standard specifications and subsection (a-5) of this Section or (B) under the approval of the Department of Transportation for IDOT projects.

(4) Bottom ash used as antiskid material, athletic tracks, or foot paths.

(5) Use in the stabilization or modification of soils providing the CCB meets the IDOT specifications for soil modifiers.

(6) CCB used as a functionally equivalent substitute for agricultural lime as a soil conditioner.

(6.5) CCB that is a synthetic gypsum that:

(A) has a calcium sulfate dihydrate content greater than 90%, by dry weight, and is generated by the lime or limestone forced oxidation process;

(B) is registered with the Illinois Department of Agriculture as a fertilizer or soil amendment and is used as a fertilizer or soil amendment;

(C) is a functionally equivalent substitute for mined gypsum (calcium sulfate dihydrate) used as a fertilizer or soil amendment;

(D) is used in accordance with, and applied at a rate consistent with, documented recommendations of a qualified agricultural professional or institution, including, but not limited to any of the following: certified crop adviser, agronomist, university researcher, federal Natural Resources Conservation Service Conservation Practice Standard regarding the amendment of soil properties with gypsum, or State-approved nutrient management plan; but in no case is applied at a rate greater than 5 dry tons per acre per year; and

(E) has not been mixed with any waste.

(7) Bottom ash used in non-IDOT pavement sub-base or base, pipe bedding, or foundation backfill.

(8) Structural fill, designed and constructed according to ASTM standard E2277-03 or Illinois Department of Transportation specifications, when used in an engineered application or combined with cement, sand, or water to produce a controlled strength fill material and covered with 12 inches of soil unless infiltration is prevented by the material itself or other cover material.

(9) Mine subsidence, mine fire control, mine sealing, and mine reclamation.

(a-5) Except to the extent that the uses are otherwise authorized by law without such restrictions, the uses specified in items (a)(3)(A) and (a)(7) through (9) shall be subject to

the following conditions:

(A) CCB shall not have been mixed with hazardous waste prior to use.

(B) CCB shall not exceed Class I Groundwater Standards for metals when tested utilizing test method ASTM D3987-85. The sample or samples tested shall be representative of the CCB being considered for use.

(C) Unless otherwise exempted, users of CCB for the purposes described in items (a)(3)(A) and (a)(7) through (9) of this Section shall provide notification to the Agency for each project utilizing CCB documenting the quantity of CCB utilized and certification of compliance with conditions (A) and (B) of this subsection. Notification shall not be required for users of CCB for purposes described in items (a)(1), (a)(2), (a)(3)(B), (a)(4), (a)(5) and (a)(6) of this Section, or as required specifically under a beneficial use determination as provided under this Section, or pavement base, parking lot base, or building base projects utilizing less than 10,000 tons, flowable fill/grout projects utilizing less than 1,000 cubic yards or other applications utilizing less than 100 tons.

(D) Fly ash shall be managed in a manner that minimizes the generation of airborne particles and dust using techniques such as moisture conditioning, granulating, inground application, or other demonstrated method.

(E) CCB is not to be accumulated speculatively. CCB is not accumulated speculatively if during the calendar year, the CCB used is equal to 75% of the CCB by weight or volume accumulated at the beginning of the period.

(F) CCB shall include any prescribed mixture of fly ash, bottom ash, boiler slag, flue gas desulfurization scrubber sludge, fluidized bed combustion ash, and stoker boiler ash and shall be tested as intended for use.

(b) To encourage and promote the utilization of CCB in productive and beneficial applications, upon request by the applicant, the Agency shall make a written beneficial use determination that coal-combustion waste is CCB when used in a manner other than those uses specified in subsection (a) of this Section if the applicant demonstrates that use of the coal-combustion waste satisfies all of the following criteria: the use will not cause, threaten, or allow the discharge of any contaminant into the environment; the use will otherwise protect human health and safety and the environment; and the use constitutes a legitimate use of the coal-combustion waste as an ingredient or raw material that is an effective substitute for an analogous ingredient or raw material.

The Agency's beneficial use determinations may allow the uses set forth in items (a)(3)(A) and (a)(7) through (9) of this Section without the CCB being subject to the restrictions set forth in subdivisions (a-5)(B) and (a-5)(E) of this Section.

Within 90 days after the receipt of an application for a beneficial use determination under this subsection (b), the Agency shall, in writing, approve, disapprove, or approve with conditions the beneficial use. Any disapproval or approval with conditions shall include the Agency's reasons for the disapproval or conditions. Failure of the Agency to issue a decision within 90 days shall constitute disapproval of the beneficial use request. These beneficial use determinations are subject to review under Section 40 of this Act.

Any approval of a beneficial use under this subsection (b) shall become effective upon the date of the Agency's written decision and remain in effect for a period of 5 years. If an

applicant desires to continue a beneficial use after the expiration of the 5-year period, the applicant must submit an application for renewal no later than 90 days prior to the expiration. The beneficial use approval shall be automatically extended unless denied by the Agency in writing with the Agency's reasons for disapproval, or unless the Agency has requested an extension for review, in which case the use will continue to be allowed until an Agency determination is made.

Coal-combustion waste for which a beneficial use is approved pursuant to this subsection (b) shall be considered CCB during the effective period of the approval, as long as it is used in accordance with the approval and any conditions.

Notwithstanding the other provisions of this subsection (b), written beneficial use determination applications for the use of CCB at sites governed by the federal Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87) or the rules and regulations thereunder, or by any law or rule or regulation adopted by the State of Illinois pursuant thereto, shall be reviewed and approved by the Office of Mines and Minerals within the Department of Natural Resources pursuant to 62 Ill. Adm. Code §§ 1700-1850. Further, appeals of those determinations shall be made pursuant to the Illinois Administrative Review Law.

The Board shall adopt rules establishing standards and procedures for the Agency's issuance of beneficial use determinations under this subsection (b). The Board rules may also, but are not required to, include standards and procedures for the revocation of the beneficial use determinations. Prior to the effective date of Board rules adopted under this subsection (b), the Agency is authorized to make beneficial use determinations in accordance with this subsection (b).

The Agency is authorized to prepare and distribute guidance documents relating to its administration of this Section. Guidance documents prepared under this subsection are not rules for the purposes of the Illinois Administrative Procedure Act.
(Source: P.A. 99-20, eff. 7-10-15.)