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Our ref: 12576482-LTR-3

February 02, 2024

Mr. Brian Rath
Environmental Engineer Senior
Solid Waste and Contaminated Sites Section
MidAmerican Energy Company
502 E. 9th Street
Des Moines, Iowa 50319

2023 IDNR Template Tables
Neal North Energy Center CCR Monofill
Sergeant Bluff, Iowa
Permit 97-SDP-12-95P

Dear Brian,

As recently discussed, GHD has prepared Table 7 and Table 9 using the general format provided in the Iowa Department of Natural Resources' (IDNR's) *Annual Water Quality Report Template for Non-Municipal Landfills*. Table 7 and Table 9, provided in Attachment 1, are modified as approved in your January 31, 2024 email to Kevin Armstrong of GHD and Josh Love of MidAmerican Energy Company. Additionally, in Attachment 2, the 2023 groundwater monitoring results are compared to the Maximum Contaminant Level (MCL) or Health Advisory Lifetime (HAL) as described in 567 Iowa Administrative Code Chapter 103, paragraph 103.1(4)d.

Attachment 3 provides a crosswalk table to reference the items provided in the Annual Groundwater Monitoring and Corrective Action Report prepared under the Federal CCR rule with the IDNR's *Annual Water Quality Report Template for Non-Municipal Landfills*.

If you have any questions regarding these tables, please contact Kevin Armstrong.

Sincerely,

A handwritten signature in black ink that reads "Kevin J. Armstrong".

Kevin Armstrong
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A handwritten signature in black ink that reads "Michael Alowitz".

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KA/mg/LTR-3

Copy to: Justin Terrell, MidAmerican Energy Company
Josh Love, MidAmerican Energy Company

Attachments

Attachment 1

IDNR Template Table 7 and Table 9

Table 7

**Summary of Ongoing and Newly Identified Control Limit Exceedances
2023 Annual Water Quality Report
Neal North Energy Center - Active CCR Monofill
Permit No. 97-SDP-12-95P**

Well	Constituent	Units	Most recent result	Background Standard	Groundwater Protection Standard 40 CFR §257.95(h)
MW-5R	None	mg/L	None	None	None
MW-11	None	mg/L	None	None	None
MW-19	Calcium	mg/L	334	248	None
	pH, lab	s.u.	6.7 J	6.87 J - 7.9 J	None
	Sulfate	mg/L	736	322	None
	Total Dissolved Solids	mg/L	2360	1160	None
	Lithium	mg/L	0.234	0.171	0.04
MW-21	Calcium	mg/L	474	248	None
	pH, lab	s.u.	6.7 J	6.87 J - 7.9 J	None
	Sulfate	mg/L	1550	322	None
	Total Dissolved Solids	mg/L	3110	1160	None
	Lithium	mg/L	0.301	0.171	0.04
MW-23	None	mg/L	None	None	None
MW-25	Sulfate	mg/L	422	322	None
MW-57	None	mg/L	None	None	None
MW-59S	None	mg/L	None	None	None
MW-60S	None	mg/L	None	None	None

Comments:
None.

Table 9

Historic Control Limit & GWPS Exceedances
 2023 Annual Water Quality Report
 Neal North Energy Center - Active CCR Monofill
 Permit No. 97-SDP-12-95P

Key: gray =CL; black =GWPS		March	May	September	February	May	July	October	March	June	September	March/April	September
Well	Constituent	2020	2020	2020	2021	2021	2021	2021	2022	2022	2022	2023	2023
MW-5R	Sulfate												
	Barium	na	na								na	na	
MW-11	None												
MW-13/MW-13R (Background)	Chloride		ns		ns	ns							
	Barium		ns		ns	ns							
	Thallium		ns		ns	ns							
MW-19	Boron												
	Calcium												
	pH, lab		na										
	Sulfate												
	Total Dissolved Solids (TDS)												
	Cobalt	na	na								na	na	
	Lead	na	na								na	na	
	Lithium	na	na								na	na	
MW-21	Calcium		na										
	pH, lab												
	Fluoride												
	Sulfate		na										
	Total Dissolved Solids (TDS)		na										
	Lead	na	na								na	na	
	Lithium	na	na								na	na	
MW-23	Calcium				ns	ns		ns		na			
	pH, lab		na		ns	ns		ns					
	Sulfate				ns	ns		ns		na			
	Total Dissolved Solids (TDS)				ns	ns		ns		na			
MW-25	Sulfate					ns		ns		ns			
	Total Dissolved Solids (TDS)					ns		ns		ns			
MW-27 (Background)	Lithium		ns										
MW-29/MW-29R (Background)	Barium		ns		ns	ns							
	Cobalt		ns		ns	ns							
MW-57	Calcium				ns	ns		ns		ns			
	pH, lab		na		ns	ns		ns		ns			
	Sulfate				ns	ns		ns		ns			
	Total Dissolved Solids (TDS)				ns	ns		ns		ns			
MW-59S	None												
MW-60S	None												
MW-223S (Background)	Barium		ns										
MW-231S/MW-231SR (Background)	Calcium		ns										
	Sulfate		ns										
	Total Dissolved Solids (TDS)		ns										
	Thallium		ns										

Comments:
 Groundwater Protection Standard (GWPS) established under 40 CFR §257.95(h).
 ns - No sample collected during this sampling event.
 na - Constituent not analyzed.

Attachment 2

MCL/HAL Comparison Table

2023 Monitoring Analytical Results Summary
MidAmerican Energy Company
Neal North CCR Active Monofill
Sergeant Bluff, Iowa

Sample Location:				MW-5R	MW-5R	MW-11R	MW-11R	MW-11R	MW-11R	MW-13R	
Sample ID:				MW05R-GW-0323	MW05R-GW-0923	MW11R-GW-0323	DP04-GW-0323	MW11R-GW-0923	DP04-GW-0923	MW13R-GW-0323	
Sample Date:	MCL ^a	HAL ^b	SDWR ^c	04/03/2023	09/13/2023	04/03/2023	04/03/2023 (Duplicate)	09/13/2023	09/13/2023 (Duplicate)	03/27/2023	
Parameters	Units										
Appendix III											
Boron	mg/L	--	6	--	0.297	0.427	0.145	0.146	0.227	0.198	0.138
Calcium	mg/L	--	--	--	192	92.9	215	209	194	197	130
Chloride	mg/L	--	--	250	13.7	10.4	5.86	5.93	5.32	5.23	18.9
Fluoride	mg/L	4.0	--	2.0	<0.500	<1.00	<0.500	<0.500	<1.00	<1.00	<0.500
pH, lab	s.u.	--	--	6.5 - 8.5	7.3 J	7.3 J	7.6 J	7.6 J	7.8 J	7.5 J	7.3 J
Sulfate	mg/L	--	--	250	318	160	152	156	220	219	68.4
Total dissolved solids (TDS)	mg/L	--	--	500	920	626	796	832	834	868	502
Appendix IV											
Antimony	mg/L	0.006	0.006	--	--	<0.00200	--	--	--	--	<0.00200
Arsenic	mg/L	0.01	--	--	--	0.0283	--	--	--	--	0.0510
Barium	mg/L	2.0	--	--	--	0.100	--	--	--	--	0.200
Beryllium	mg/L	0.004	--	--	--	<0.00100	--	--	--	--	<0.00100
Cadmium	mg/L	0.005	0.005	--	--	<0.000200	--	--	--	--	0.000211
Chromium	mg/L	0.1	--	--	--	<0.00500	--	--	--	--	<0.00500
Cobalt	mg/L	--	--	--	--	<0.000500	--	--	--	--	0.00105
Lead	mg/L	0.015 ^d	--	--	--	<0.000500	--	--	--	--	0.000593
Lithium	mg/L	--	--	--	--	0.0578	--	--	--	--	0.0873
Mercury	mg/L	0.002	0.002	--	--	<0.000200	--	--	--	--	<0.000200
Molybdenum	mg/L	--	0.04	--	--	0.00393	--	--	--	--	0.00492
Radium-226 & 228	pCi/L	5	--	--	--	1.04	--	--	--	--	1.18
Selenium	mg/L	0.05	0.05	--	--	<0.00500	--	--	--	--	<0.00500
Thallium	mg/L	0.002	--	--	--	<0.00100	--	--	--	--	0.00146

**2023 Monitoring Analytical Results Summary
MidAmerican Energy Company
Neal North CCR Active Monofill
Sergeant Bluff, Iowa**

Sample Location:	MW-13R	MW-19	MW-19	MW-21	MW-21	MW-21	MW-23R	MW-23R	MW-25	
Sample ID:	MW13R-GW-0923	MW19-GW-0323	MW19-GW-0923	MW21-GW-0323	MW21-GW-0923	MW21-GW-1223	MW23R-GW-0323	MW23R-GW-0923	MW25-GW-0323	
Sample Date:	09/12/2023	04/03/2023	09/13/2023	04/03/2023	09/13/2023	12/05/2023	04/03/2023	09/13/2023	04/03/2023	
Parameters	Units									
Appendix III										
Boron	mg/L	0.122 J+	0.584	0.606	0.329	0.519	0.337	0.168	0.251	0.384
Calcium	mg/L	135	415	334	523	474	--	205	143	239
Chloride	mg/L	12.3	18.0	19.1	7.94	8.18	--	15.2	16.0	<5.00
Fluoride	mg/L	<1.00	<0.500	<1.00	0.791	<1.00	--	0.558	<1.00	<0.500
pH, lab	s.u.	7.2 J	6.7 J	6.7 J	6.8 J	6.7 J	--	7.4 J	7.3 J	7.2 J
Sulfate	mg/L	58.6	1020	736	1610	1550	--	244	205	450
Total dissolved solids (TDS)	mg/L	542	2220	2360	3050	3110	--	934	706	1280
Appendix IV										
Antimony	mg/L	<0.00200	--	<0.00200	--	<0.00200	--	--	--	--
Arsenic	mg/L	0.0483 J+	--	0.00298	--	<0.00200	--	--	--	--
Barium	mg/L	0.210 J+	--	0.0166	--	0.0139	--	--	--	--
Beryllium	mg/L	<0.00100	--	<0.00100	--	<0.00100	--	--	--	--
Cadmium	mg/L	<0.000200	--	<0.000200	--	0.000346	--	--	--	--
Chromium	mg/L	<0.00500	--	<0.00500	--	<0.00500	--	--	--	--
Cobalt	mg/L	0.000806 J+	--	0.00670	--	0.000983	--	--	--	--
Lead	mg/L	<0.000500	--	<0.000500	--	<0.000500	--	--	--	--
Lithium	mg/L	0.0880 J+	--	0.234	--	0.301	--	--	--	--
Mercury	mg/L	<0.000200	--	<0.000200	--	<0.000200	--	--	--	--
Molybdenum	mg/L	0.00411 J+	--	<0.00200	--	<0.00200	--	--	--	--
Radium-226 & 228	pCi/L	0.996	--	0.984	--	1.17	--	--	--	--
Selenium	mg/L	<0.00500	--	<0.00500	--	<0.00500	--	--	--	--
Thallium	mg/L	<0.00100	--	<0.00100	--	<0.00100	--	--	--	--

**2023 Monitoring Analytical Results Summary
MidAmerican Energy Company
Neal North CCR Active Monofill
Sergeant Bluff, Iowa**

Sample Location:	MW-25	MW-27	MW-27	MW-29R	MW-29R	MW-57R	MW-57R	MW-59S	MW-59S	
Sample ID:	MW25R-GW-0923	MW27-GW-0323	MW27-GW-0923	MW29R-GW-0323	MW29R-GW-0923	MW57R-GW-0323	MW57R-GW-0923	MW59S-GW-0323	MW59S-GW-0923	
Sample Date:	09/13/2023	03/29/2023	09/12/2023	03/29/2023	09/12/2023	04/03/2023	09/13/2023	04/03/2023	09/13/2023	
Parameters	Units									
Appendix III										
Boron	mg/L	0.522	0.246	0.222 J+	0.158	0.184 J+	0.327	0.341	0.229	0.239
Calcium	mg/L	214	158	169	200	222	253	220	209	135
Chloride	mg/L	<5.00	11.9	13.9	11.9	10.8	24.0	24.0	<5.00	<5.00
Fluoride	mg/L	<1.00	<0.500	<1.00	<0.500	<1.00	<0.500	<1.00	<0.500	<1.00
pH, lab	s.u.	7.4 J	7.1 J	7.1 J	7.1 J	7.0 J	7.3 J	7.3 J	7.3 J	7.3 J
Sulfate	mg/L	422	96.4	97.1	121	205	320	294	142	106
Total dissolved solids (TDS)	mg/L	940	634	716	724	906	1180	800	850	626
Appendix IV										
Antimony	mg/L	--	<0.00200	<0.00200	<0.00200	<0.00200	--	--	--	--
Arsenic	mg/L	--	0.0513	0.0616 J+	0.0258	0.0233 J+	--	--	--	--
Barium	mg/L	--	0.130	0.164 J+	0.261	0.248 J+	--	--	--	--
Beryllium	mg/L	--	<0.00100	<0.00100	<0.00100	<0.00100	--	--	--	--
Cadmium	mg/L	--	<0.000200	0.000207 J+	<0.000100	<0.000200	--	--	--	--
Chromium	mg/L	--	<0.00500	<0.00500	<0.00500	<0.00500	--	--	--	--
Cobalt	mg/L	--	0.000561	0.000978 J+	0.00265	0.00270 J+	--	--	--	--
Lead	mg/L	--	<0.000500	0.000513 J+	<0.000500	<0.000500	--	--	--	--
Lithium	mg/L	--	0.129	0.113 J+	0.109	0.118 J+	--	--	--	--
Mercury	mg/L	--	<0.000200	<0.000200	<0.000200	<0.000200	--	--	--	--
Molybdenum	mg/L	--	<0.00200	0.00284 J+	0.00232	0.00205 J+	--	--	--	--
Radium-226 & 228	pCi/L	--	<0.0863	1.46	0.842	1.15	--	--	--	--
Selenium	mg/L	--	<0.00500	<0.00500	<0.00500	<0.00500	--	--	--	--
Thallium	mg/L	--	<0.00100	<0.00100	<0.00100	<0.00100	--	--	--	--

**2023 Monitoring Analytical Results Summary
MidAmerican Energy Company
Neal North CCR Active Monofill
Sergeant Bluff, Iowa**

Sample Location:	MW-60S	MW-60S	MW-223S	MW-223S	MW-223S	MW-223S	MW-231SR	MW-231SR	
Sample ID:	MW60S-GW-0323	MW60S-GW-0923	MW223S-GW-0323	DP01-GW-0323	MW223S-GW-0923	DP01-GW-0923	MW231SR-GW-0323	MW231SR-GW-0923	
Sample Date:	04/03/2023	09/13/2023	03/29/2023	03/29/2023 (Duplicate)	09/12/2023	09/12/2023 (Duplicate)	03/28/2023	09/13/2023	
Parameters	Units								
Appendix III									
Boron	mg/L	0.151	0.210	0.140	0.137	0.149 J+	0.154 J+	0.500	0.253
Calcium	mg/L	144	126	186	188	126	122	204	172
Chloride	mg/L	6.83	1.85	<1.00 J	6.06 J	4.37	5.00	9.32	<1.00
Fluoride	mg/L	<0.500	<0.200	0.269	<0.500	<0.200	<1.00	0.163	<0.200
pH, lab	s.u.	7.5 J	7.4 J	7.4 J	7.4 J	7.5 J	7.4 J	7.2 J	7.1 J
Sulfate	mg/L	135	29.6	113	110	64.3	61.1	176	158
Total dissolved solids (TDS)	mg/L	646	592	600	606	474	456	788	716
Appendix IV									
Antimony	mg/L	--	--	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
Arsenic	mg/L	--	--	0.0172	0.0167	0.0133 J+	0.0132 J+	0.0121	0.00967
Barium	mg/L	--	--	0.377	0.382	0.256 J+	0.244 J+	0.136	0.120
Beryllium	mg/L	--	--	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	--	--	<0.000100	<0.000100	<0.000200	<0.000200	<0.000100	<0.000200
Chromium	mg/L	--	--	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	--	--	0.00107	0.00103	0.000667 J+	0.000638 J+	0.00330	0.00257
Lead	mg/L	--	--	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Lithium	mg/L	--	--	0.0684	0.0674	0.0517 J+	0.0504 J+	0.110	0.0851
Mercury	mg/L	--	--	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
Molybdenum	mg/L	--	--	0.00296	0.00288	0.00305 J+	0.00291 J+	0.00347	0.00219
Radium-226 & 228	pCi/L	--	--	<0.468	0.877	1.15	0.795	<0.362	1.48
Selenium	mg/L	--	--	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	--	--	<0.00100	<0.00100	<0.00100	<0.00100	0.00147	<0.00100

Notes:

^a Maximum contaminant level (MCL) established under 40 CFR 257.95(h)(1).

^b Drink Water Health Advisories - Life-time established in the 2018 Edition of the Drinking Water Standards and Health Advisories (EPA 822-F-18-001).

^c Secondary Drinking Water Regulation.

^d Action level for lead (treatment technique).

1.00 Value exceeds the MCL, or HAL where MCL not established.

J - Estimated concentration.

< - Not detected at the associated reporting limit.

J- - Estimated concentration, result may be biased low

J+ - Estimated concentration, result may be biased high.

Attachment 3

**IDNR Template to AGWMCAR Cross
Reference Table**

IDNR Template to AGWMCAR Cross Reference Table

Neal North Energy Center - Active CCR Monofill
Permit No. 97-SDP-12-95P

Annual Water Quality Report Template for Non-Municipal Landfills	Annual Groundwater Monitoring and Corrective Action Report	Notes
Table 1 Monitoring Program Summary	Table 2.1 Groundwater Monitoring Well Network	Lists all wells in monitoring network.
	Table 2.6 Summary of Groundwater Monitoring Events	Lists total number of samples from monitoring programs since December 2015.
	Table 4.5 Inter-Well Comparisons for Monitoring Data vs. Upgradient Background UTLs	Compares current reporting period's groundwater data to the pooled background data (control limit).
	Section 1.1 Purpose of this Report	States the current monitoring program.
	Section 2.1 Groundwater Monitoring Network	Describes the aquifer characteristics.
	Section 6.3 Recommendations	Provides recommended changes, if any, to the monitoring network.
Table 2 Monitoring Program Implementation Schedule	Table 2.6 Summary of Groundwater Monitoring Events	Provides summary of all sampling events since December 2015.
Table 3 Monitoring Well Maintenance and Performance Revaluation Schedule	Section 2.2 Monitoring Well Inspection	States the frequency of total depth measurements (annually).
Table 4 Monitoring Well Maintenance and Performance Summary	Table 2.2 Well Construction Details	Provides well coordinates and elevations for TOC, original total depth, ground surface, top of screen, and bottom of screen.
	Table 2.3 Monitoring Well Screen Occlusion Evaluation	Provides TOC elevation, original total depth below TOC, screen length, annual total depth measurements, and percent of screen occluded.
	Table 3.1 Groundwater Elevation Data	Provides all groundwater elevation data, past elevations through elevations during the current reporting period.
Table 5 Background Summary	Table 4.3 Inter-Well Comparison Values	Summary of inter-well evaluation from pooled background well data. Provides the baseline 95/95 UTL (background level).
Table 6 Summary of Well/Detected Constituent Pairs With No Immediately Preceding Control Limit Exceedances	Table 4.5 Inter-Well Comparisons for Monitoring Data vs. Upgradient Background UTLs	Compares current reporting period's groundwater data to the pooled background data (control limit).
Table 7 Summary of Ongoing and Newly Identified Control Limit Exceedances	--	Table 7 is provided to IDNR.
Table 8 Analytical Data Summary	Table 4.1 Baseline Period Groundwater Monitoring Data	Provides all groundwater analytical data from the baseline period at the CCR Monofill.
	Table 4.2 Monitoring Analytical Results Summary	Provides all groundwater analytical data for the current reporting period at the CCR Monofill.
Table 9 Historic Control Limit & GWPS Exceedances	--	Table 9 is provided to IDNR.
Table 10 Groundwater Quality Assessment Plan Trend Analysis	Section 4 Groundwater Monitoring	Section 4 discusses trends in groundwater data, during baseline monitoring and current reporting period.
Table 11 Leachate Management Summary	Annual Leachate Report	The Annual Leachate Report documents the leachate management activities for the current reporting period. Provides analytical data, leachate head, and leachate volume measurements.
Table 12 Gas Monitoring Summary	NA	Not applicable since the CCR Monofill holds CCR and does not generate gas.