2019 Annual Groundwater Monitoring and Corrective Action Report Addendum No. 1

Ottumwa Generating Station – Ash Pond Ottumwa, Iowa

Prepared for:

Alliant Energy



SCS ENGINEERS

25222072.00 | May 4, 2022

2830 Dairy Drive Madison, WI 53718-6751 608-224-2830

Table of Contents

Section	Page
1.0 Introduct	ion1
	Tables
Table 1 Table 2 Table 3 Table 4 Table 4	Groundwater Monitoring Well Network Groundwater Elevation Summary Horizontal Gradients and Flow Velocities Groundwater Analytical Results Summary - 2019 2019 Groundwater Field Data Summary
	Figures
Figure 1 Figure 2 Figure 3 Figure 4	Site Location Map Site Plan and Monitoring well Location Shallow Potentiometric Surface, April 8, 2019 Shallow Potentiometric Surface, October 23-24, 2019
Appendices	
Appendix A Appendix B Appendix C Appendix D	Regional Hydrogeologic Information Boring Logs and Well Construction Documentation Historical Monitoring Results Statistical Evaluation
I:\25222072.00\	Deliverables\2019 Fed Annual Report Addendum - OGS AP\220504_Annual CCR GW Report OGS

AP_2019 Add 1_Final.docx

1.0 INTRODUCTION

This 2019 Annual Groundwater Monitoring and Corrective Action Report Addendum (Addendum) was prepared to support compliance with the groundwater monitoring requirements of the Coal Combustion Residuals (CCR) Rule [40 CFR 257.50-107]. The original 2019 Annual Groundwater Monitoring and Corrective Report (Annual Report) was completed on January 31, 2020 to fulfill the requirements of 40 CFR 257.90(e).

The 2019 Annual Report and this Addendum cover the period of groundwater monitoring from January 1, 2019, through December 31, 2019.

This Addendum includes the following tables, figures, and appendix materials to support the information in the original 2019 Annual Report:

- Table 1 Groundwater Monitoring Well Network
- Table 2 Groundwater Elevation Summary
- Table 3 Horizontal Gradients and Flow Velocities
- Table 4 Groundwater Analytical Results Summary 2019
- Table 5 2019 Groundwater Field Data Summary
- Figure 1 Site Location Map
- Figure 2 Site Plan and Monitoring Well Location
- Figure 3 Shallow Potentiometric Surface, April 8, 2019
- Figure 4 Shallow Potentiometric Surface, October 23-24, 2019
- Appendix A Regional Hydrogeologic Information
- Appendix B Boring Logs and Well Construction Documentation
- Appendix C Historical Monitoring Results
- Appendix D Statistical Evaluation

Tables

- 1 Groundwater Monitoring Well Network
- 2 Groundwater Elevation Summary
- 3 Horizontal Gradients and Flow Velocities
- 4 Groundwater Analytical Results Summary 2019
- 5 2019 Groundwater Field Data Summary

Table 1. Groundwater Monitoring Well Network Ottumwa Generating Station - Ash Pond / SCS Engineers Project #25222072.00

Monitoring Well	Location in Monitoring Network	Role in Monitoring Network				
MW-301	Upgradient	Background				
MW-302	Downgradient	Compliance				
MW-303	Downgradient	Compliance				
MW-304	Downgradient	Compliance				
MW-305	Downgradient	Compliance				
MW-306	Downgradient	Compliance				
MW-310	Downgradient	Delineation				
MW-311	Downgradient	Delineation				

Created by:	MDB	Date: 12/17/2021
Last revision by:	JAO	Date: 3/22/2022
Checked by:	KLG	Date: 3/28/2022

Table 2. Groundwater Elevations - CCR Rule Monitoring Well Networks
IPL - Ottumwa Generating Station / SCS Engineers Project #25220072.00

	Ground	l Water or Su	urface Wate	r Elevation in	feet above	mean sea	level (amsl)				
Well Number	MW-301	MW-302	MW-303	MW-304	MW-305	MW-306	MW-307	MW-308	MW-309	MW-310	MW-311	
Top of Well Casing Elevation /	/0/ /2	/72.00	//1.07	/00.04	/02.01	(02.47	/ = 7 = /	/55.20	/F / O /	/F0 /2	/F / 10	
Surface Water Reference Elevation	686.63	673.90	661.07	682.84	683.91	683.47	657.56	655.39	654.94	658.63	654.18	
(feet amsl)	10.00	F 00	F 00	Γ.00	F 00	F 00	F 00	F 00	F 00	F 00	Г 00	
Screen Length (ft)	10.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
Total Depth (ft from top of casing)	17.0	25.8	17.5	52.3	51.5	36.6	28.0	25.0	27.5	25.9	17.9	
Top of Well Screen Elevation (ft)	679.63	653.10	648.57	635.54	637.41	651.87	634.56	635.39	632.44	637.76	641.24	
Measurement Date		<u> </u>										
April 26, 2016	682.80	655.63	652.42	655.37	661.67	670.86	NI	NI	NI	NI	NI	
June 23, 2016	682.58	655.65	652.89	656.53	662.36	670.64	NI	NI	NI	NI	NI	
August 9, 2016	682.27	655.52	651.76	653.79	660.78	670.35	NI	NI	NI	NI	NI	
October 26-27, 2016	682.04	655.67	652.17	655.03	661.37	670.21	NI	NI	NI	NI	NI	
January 18-19, 2017	681.67	655.46	651.74	654.50	660.87	669.89	648.81	647.42	646.66	NI	NI	
April 19-20, 2017	682.15	656.35	654.57	657.48	663.27	670.69	653.62	651.09	650.16	NI	NI	
June 20-21, 2017	681.91	655.65	652.42	654.75	661.26	669.94	649.85	648.26	647.60	NI	NI	
August 21-23, 2017	681.28	655.13	650.58	652.39	659.00	668.77	645.78	643.12	641.82	NI	NI	
November 8, 2017	681.54	655.40	651.34	653.03	659.76	669.04	647.37	644.99	644.20	NI	NI	
April 18, 2018	681.53	655.71	652.47	655.55	660.99	668.92	649.66	647.91	647.65	NI	NI	
May 30, 2018	NM	NM	NM	NM	NM	NM	652.45	651.05	650.98	NI	NI	
June 28, 2018	NM	NM	NM	NM	NM	NM	652.87	651.43	651.47	NI	NI	
July 18, 2018	NM	NM	NM	NM	NM	NM	652.27	650.67	650.69	NI	NI	
August 14-15, 2018	680.91	656.05	652.57	656.35	661.56	668.66	NM	NM	NM	NI	NI	
August 29, 2018	681.09	655.89	655.07	657.82	NM	NM	NM	NM	NM	NI	NI	
October 16, 2018	682.50	656.91	656.17	658.20	663.37	670.24	654.13	NM	651.61	NI	NI	
January 8, 2019	682.22	656.03	654.65	656.28	662.13	669.84	NM	NM	NM	NI	NI	
April 8, 2019	682.69	657.23	655.55	659.33	664.01	670.96	654.90	653.70	653.55	NI	NI	
August 28, 2019	NM	NM	NM	NM	NM	NM	NM	NM	NM	640.98	642.10	
October 23-24, 2019	683.07	660.14	653.86	657.71	663.21	671.28	651.89	651.31	651.28	649.31	647.80	
December 11, 2019	NM	NM	NM	NM	NM	NM	649.59	647.39	647.24	NM	NM	
Bottom of Well Elevation (ft)	669.63	648.10	643.57	630.54	632.41	646.87	629.56	630.39	627.44	632.76	636.24	

Notes:Created by:NDKDate:1/15/2018NM = not measuredLast rev. by:JAODate:3/22/2022NI = not installedChecked by:KLGDate:3/28/2022

ND = Not surveyed

I:\25222072.00\Deliverables\2019 Fed Annual Report Addendum - OGS AP\Tables\[Table 2_GW Elevation Summary.xls]levels

Table 3. Horizontal Gradients and Flow Velocity Ottumwa Generating Station - Main Ash Pond / SCS Engineers Project #25222072.00 January - December 2019

	Shallow											
Sampling Dates	h1 (ft)	h2 (ft)	ΔI (ft)	Δh/Δl (ft/ft)	V (ff/d)							
April 9, 2019	670.00	654.90	455	0.03	0.23							
April 9, 2019	670.00	655.55	903	0.02	0.11							
October 23-24, 2019	671.28	650.00	621	0.03	0.24							
October 23-24, 2019	670.00	650.00	1056	0.02	0.13							
October 23-24, 2019	670.00	653.86	740	0.02	0.15							

	Well	K Values (cm/sec)	K Values (ft/d)
Upgradient Well	MW-301	4.6E-03	13
	MW-302	3.2E-03	9.1
	MW-303	1.2E-04	0.35
Shallow Wells	MW-304	3.5E-04	0.98
	MW-305	2.5E-03	7.1
	MW-306	2.8E-03	8.1
	Geometric Mean	1.0E-03	2.8

Assumed Unconsolidated Porosity, n

Note: Geometric mean calculations do not include upgradient well MW-301

Note: Multiple gradients were measured for each date to account for variation across the site

Groundwater flow velocity equation: $V = [K^*(\Delta h/\Delta I)] / n$

ft = feet h1, h2 = point interpreted groundwater elevation

ft/d = feet per day

K = hydraulic conductivity $\Delta I = distance between location 1 and 2$

n = effective porosity $\Delta h/\Delta l$ = hydraulic gradient

V = groundwater flow velocity

 Created by: NDK
 Date: 3/30/2022

 Last revision by: JAO
 Date: 4/11/2022

 Checked by: NDK
 Date: 4/18/2022

Table 4. Groundwater Analytical Results Summary - CCR Program - Assessment Monitoring Ottumwa Generating Station Ash Pond / SCS Engineers

				Backgro	ound Well						Complian	ce Wells					
				MW	/-301	MW	-302	MW	-303	MW	-304	MW	/-305	MW	/-306	MW-310	MW-311
Parameter Name	UPL Method	UPL	GPS	4/8/2019	10/24/2019	4/8/2019	10/24/2019	4/8/2019	10/24/2019	4/8/2019	10/23/2019	4/8/2019	10/23/2019	4/8/2019	10/23/2019	10/24/2019	10/24/2019
Appendix III							•		•		•		•				•
Boron, ug/L	Р	820	1	375	680	1,340	1,200	286	440	1,110	970	1,040	880	1,070	980	720	<110
Calcium, mg/L	Р	78.7		43.5	78	199	180	172	170	131	120	114	100	95.4	77	230	170
Chloride, mg/L	Р	86.8		50.2	110	240	220	22.1	35	325	280	248	280	97.6	47	150	13
Fluoride, mg/L	Р	0.484		< 0.500	<0.23	<0.500	<0.23	<0.500	<0.23	1.28	0.74	0.748	<0.23	<0.500	<0.23	0.31 J	<0.23
Field pH, Std. Units	Р	6.87		6.61	6.33	6.61	6.55	7.00	6.83	7.17	7.05	7.06	6.91	6.66	6.74	7.15	6.95
Sulfate, mg/L	Р	199		80.8	130	840	810	261	180	182	190	108	76	272	280	610	47
Total Dissolved Solids, mg/L	Р	628		340	510	1,640	1,600	886	810	1,140	1100	1,010	1000	930	870	260	530
Appendix IV		UPL	GPS														
Antimony, ug/L	P*	0.22	6	<1.00	<0.53	<1.00	<0.53	<1.00	<0.53	<1.00	<0.53	<1.00	< 0.53	<1.00	<0.53	<0.53	<0.53
Arsenic, ug/L	P*	0.53	10	<2.00	<0.75	<2.00	<0.75	<2.00	<0.75	<2.00	0.83 J	<2.00	<0.75	<2.00	0.78 J	0.78 J	<0.75
Barium, ug/L	Р	68.8	2,000	25.5	56	19.2	21	54.1	77	80.5	80	119	110	58.4	51	76	200
Beryllium, ug/L	DQ	DQ	4	<1.00	<0.27	<1.00	<0.27	<1.00	<0.27	<1.00	<0.27	<1.00	<0.27	<1.00	<0.27	<0.27	<0.27
Cadmium, ug/L	NP*	0.12	5	<0.500	0.040 J	<0.500	0.20	<0.500	0.21	<0.500	< 0.039	<0.500	0.087 J	1.08	0.89	0.22	0.04 J
Chromium, ug/L	Р	1.07	100	<5.00	<0.98	<5.00	<0.98	<5.00	<0.98	<5.00	2 J	<5.00	<0.98	<5.00	1.0 J	<0.98	<0.98
Cobalt, ug/L	NP	4.1	6	<0.500	0.60	1.2	2.7	<0.500	1.2	<0.500	0.5	1 <i>7</i>	17	6.92	6.2	0.57	0.78
Fluoride, mg/L	Р	0.48	4	<0.500	<0.23	<0.500	<0.23	<0.500	<0.23	1.28	0.74	0.748	<0.23	< 0.500	< 0.23	0.31 J	< 0.23
Lead, ug/L	NP*	0.10	15	<0.500	<0.27	<0.500	0.29 J	<0.500	<0.27	<0.500	0.27 J	< 0.500	<0.27	< 0.500	0.34 J	<0.27	<0.27
Lithium, ug/L	Р	34.2	40	15.5	24	10.4	10	<10.0	<2.7	<10.0	2.8 J	<10.0	<2.7	<10.0	<2.7	35	4.7 J
Mercury, ug/L	DQ	DQ	2	<0.200	<0.10	<0.200	<0.10	<0.200	<0.10	<0.200	<0.10	<0.200	<0.10	<0.200	<0.10	<0.10	<0.10 F1
Molybdenum, ug/L	Р	1.74	100	<2.00	1.1 J	<2.00	<1.1	7.46	5.2	<2.00	2.3	7.17	7.2	4.32	4.9	26	<1.1
Selenium, ug/L	Р	8.55	50	<5.00	6.2	<5.00	<1.0	<5.00	<1.0	<5.00	<1.0	<5.00	<1.0	<5.00	<1.0	5	<1.0
Thallium, ug/L	NP*	0.14	2	<1.00	<0.27	<1.00	<0.27	<1.00	<0.27	<1.00	<0.27	<1.00	0.38 J	<1.00	<0.27	<0.27	<0.27
Radium 226/228 Combined, pCI/L	Р	2.15	5	0.0956	0.956	0.116	0.79	0.391	0.336	2.42	3.03	0.685	0.46	0.155	0.624	0.411	0.411

4.4	Blue highlighted cell indicates the compliance well result exceeds the UPL (background) and the LOQ.
30.8	Yellow highlighted cell indicates the compliance well result exceeds the GPS.

Abbreviations:

UPL = Upper Prediction Limit

-- = Not Analyzed

P = Parametric UPL with 1-of-2 retesting

NP = Nonparametric UPL (highest background value)

mg/L = milligrams per liter ug/L = micrograms per liter

GPS = Groundwater Protection Standard

DQ = Double Quantification Rule (not detected in background)

LOQ = Limit of Quantification

J = Estimated concentration at or above the LOD and below the LOQ.

F1 = MS and/or MSD Recovery is outside acceptance limits.

Notes:

- 1. An individual result above the UPL or GPS does not constitute a statistically significant increase (SSI) above background or statistically significant level above the GPS. See the accompanying text for identification of statistically significant results.
- 2. GPS is the United States Environmental Protection Agency (US EPA) Maximum Contamination Level (MCL), if established; otherwise, the values are from 40 CFR 257.95(h)(2)
- 3. Interwell UPLs calculated based on results from background well MW-301.
- * = UPL is below the LOQ for background sampling. For compliance wells, only results confirmed above the LOQ are evaluated as potential SSIs above background.

Created by:	NDK	Date:	5/1/2018
Last revision by:	JAO	Date:	3/24/2022
Checked by:	NDK	Date:	3/26/2022
Proj Mgr QA/QC:		Date:	

I:\25222072.00\Deliverables\2019 Fed Annual Report Addendum - OGS AP\Tables\[Table 4 Groundwater Monitoring Summary.xlsx]Table

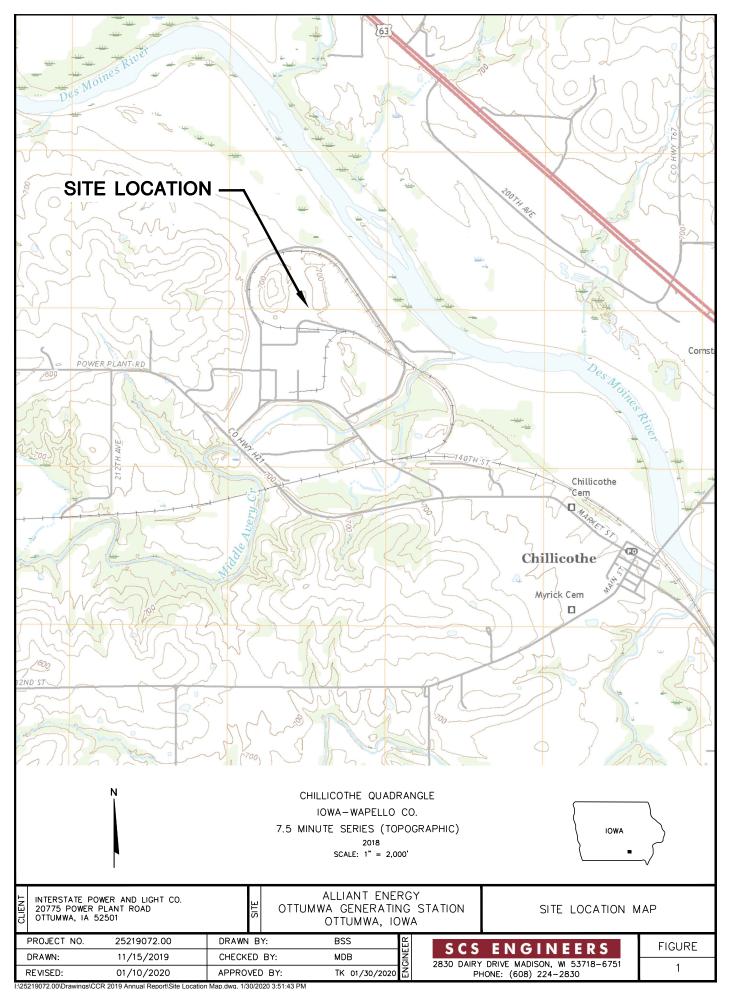
Table 5. 2019 Groundwater Field Data Summary Ottumwa Generating Station - Ash Pond SCS Engineers Project #25222072.00

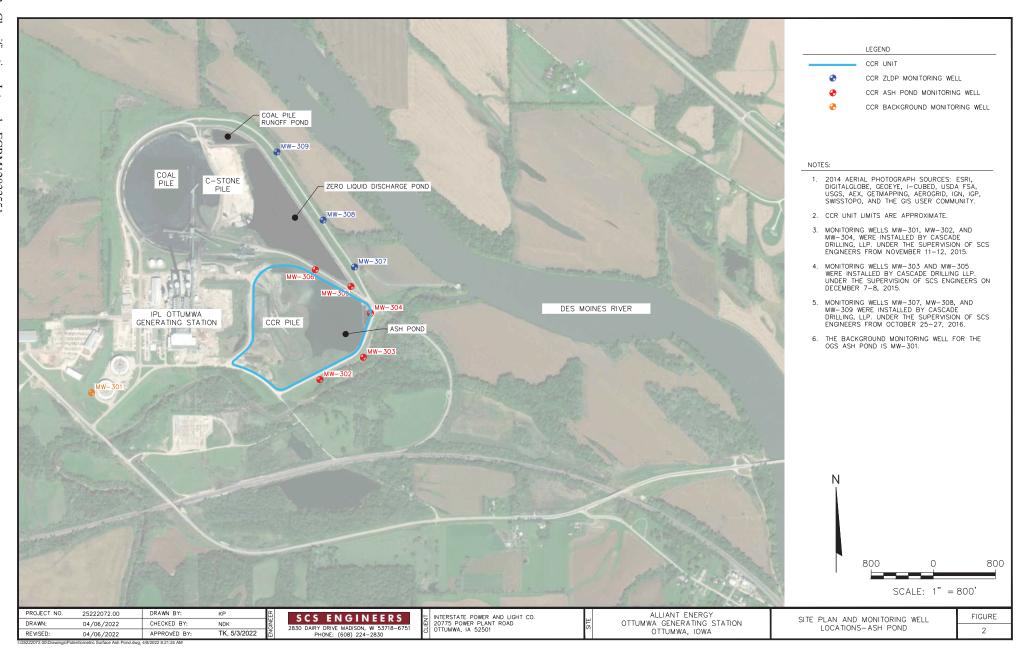
Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-301	1/8/2019	682.22	7.88	5.68	5.68	310	118.3	0.77
	4/8/2019	682.69	7.27	6.61	8.32	501	37.6	1.87
	10/24/2019	683.07	13.71	6.33	4.94	902	9.9	1.60
MW-302	1/8/2019	656.03	12.21	6.58	6.40	1473	70.2	4.39
	4/8/2019	657.23	12.27	6.61	0.86	2159	68.3	26.90
	10/24/2019	660.14	12.91	6.55	0.35	2184	-0.5	11.90
MW-303	1/8/2019	654.65	9.11	6.83	3.19	750	73.7	14.20
	4/8/2019	655.55	8.51	7.00	2.29	1181	51.7	3.49
	10/24/2019	653.86	15.34	6.83	0.28	1287	-5.1	4.24
MW-304	1/8/2019	656.28	12.81	7.16	0.72	1368	-62.1	4.38
	4/8/2019	659.33	13.75	7.17	0.41	1876	-58.3	57.90
	10/23/2019	657.71	13.64	7.05	0.44	1871	-57.5	18.90
MW-305	1/8/2019	662.13	12.43	6.99	0.81	1235	36.4	4.76
	4/8/2019	664.01	13.80	7.06	0.59	1728	32.6	21.70
	10/23/2019	663.21	13.20	6.91	0.42	1794	-6.7	6.21
MW-306	1/8/2019	669.84	13.31	6.65	0.47	965	59.5	0.89
	4/8/2019	670.96	13.63	6.66	0.92	1350	49.1	28.50
	10/23/2019	671.28	13.12	6.74	0.29	1266	-0.5	12.30
MW-310	10/24/2019	649.31	13.74	7.15	0.41	1906	-9.3	2.29
MW-311	10/24/2019	647.80	13.88	6.95	0.29	926	-24.7	3.88

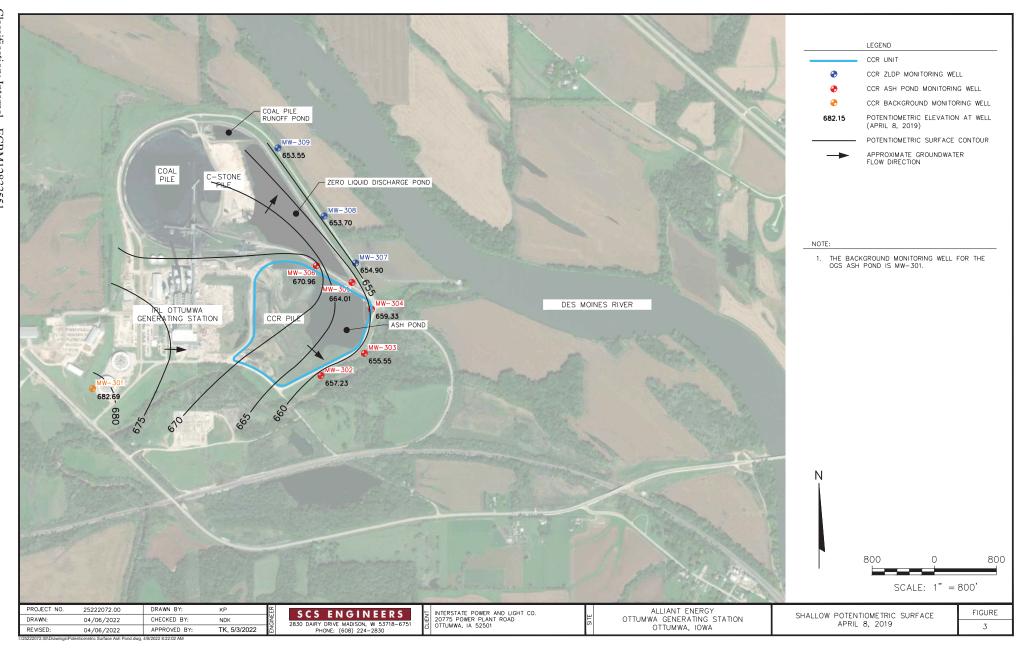
Created by: JAO Date: 3/23/2022
Last revision by: JAO Date: 3/23/2022
Checked by: KLG Date: 3/28/2022

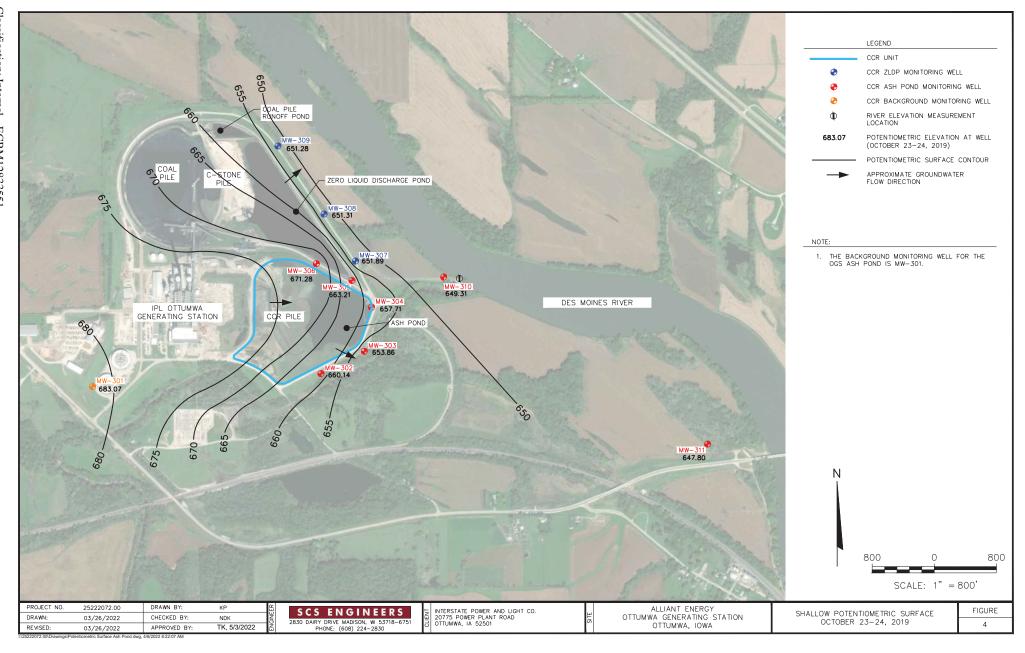
Figures

- 1 Site Location Map
- Site Plan and Monitoring Well Location
- Shallow Potentiometric Surface, April 8, 2019 3
- Shallow Potentiometric Surface, October 23-24, 2019 4









Appendix A Regional Hydrogeologic Information

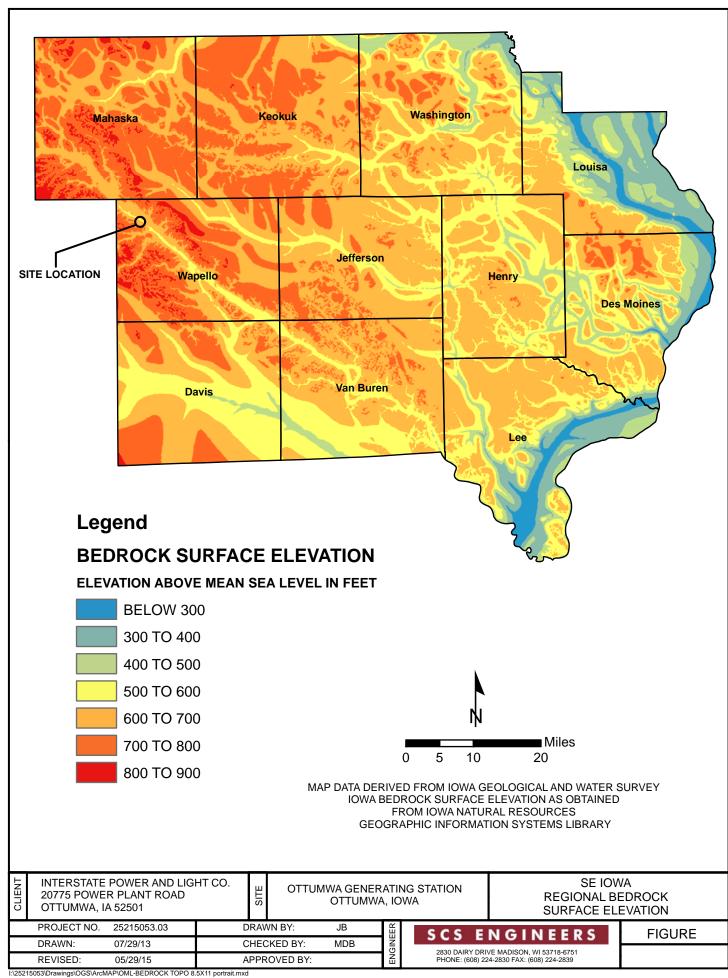
Table OGS-2. Regional Hydrogeologic Stratigraphy Ottumwa Midland Landfill / SCS Engineers Project #25215053.01

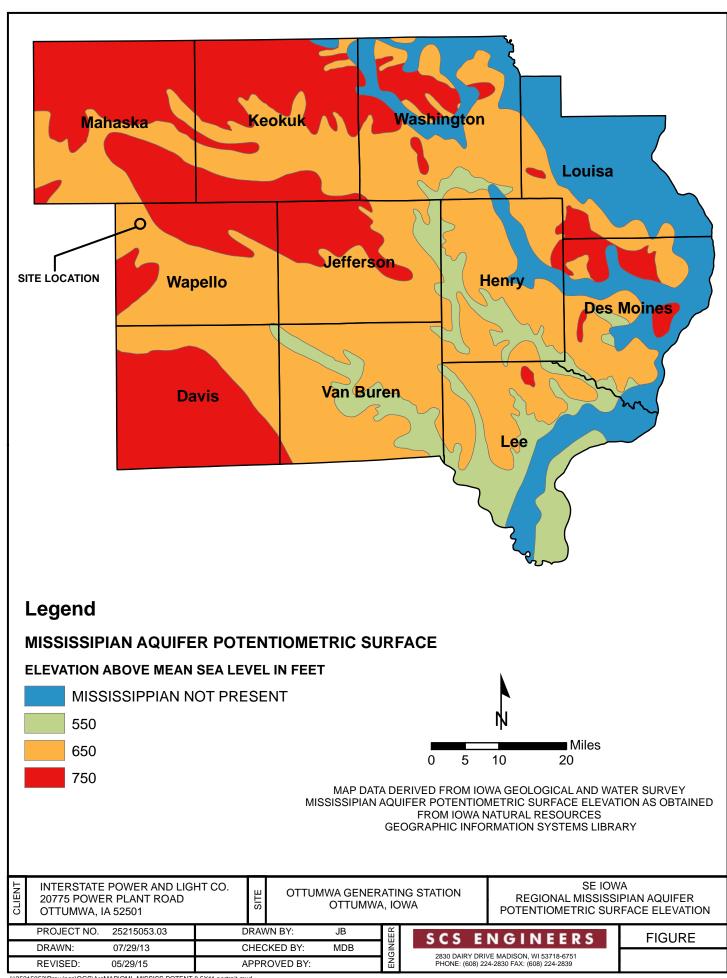
Age of Rocks	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Type of Rock
Quaternary (0-1 million years old)	Surficial Aquifers • Alluvial • Buried-Channel • Drift	0 to 320	Undifferentiated	 Sand, gravel, silt, and clay Sand, gravel, silt, and clay Till (sandy, pebbly clay), sand, and silt
Pennsylvanian (180 to 310 million years old)	Aquiclude	0 to 370	Undifferentiated	Shale, sandstone, limestone, and coal
	Mississippian Aquifer • Upper		St. Louis Spergen	Limestone and sandstone Limestone
Mississippian (310 to 345 million years old	• Lower	0 to 600	Warsaw Keokuk Burlington Hampton Starrs Cave	 Shale and dolomite Dolomite, limestone, and shale Dolomite and limestone Limestone and dolomite Limestone
Devonian	Aquiclude	0 to 425	Prospect Hill McCraney Yellow Spring Lime Creek	Siltstone Limestone Shale, dolomite, and siltstone Dolomite and shale
(345 to 400 million years old)	Devonian Aquifer	110 to 420	Cedar Valley Wapsipinicon	Limestone and dolomite Dolomite, limestone, shale, and gypsum
Silurian (400 to 425 million years old)	- Devolitali Aquitei	0 to 105	Undifferentiated	Dolomite
Ordovician (425 to 500 million years old)	Aquiclude	150 to 600	Maquoketa Galena Decorah Platteville	 Dolomite and shale Dolomite and chert Limestone and shale Limestone, shale, and sandstone
years ora;	Cambrian-Ordovician	750 to	St. Peter Prairie du Chien	Sandstone Dolomite and sandstone
	aquifer	1,110	Jordan St. Lawrence	Sandstone Dolomite
Cambrian (500 to 600 million years old)	Not considered an aquifer in southeast	450 to 750+	Franconia Galesville Eau Claire Mt. Simon	 Shale, siltstone, and sandstone Sandstone Sandstone, shale, and dolomite Sandstone
Precambrian (600 million to 2 billion + years old)	lowa			Sandstone, igneous rocks, and metamorphic rocks

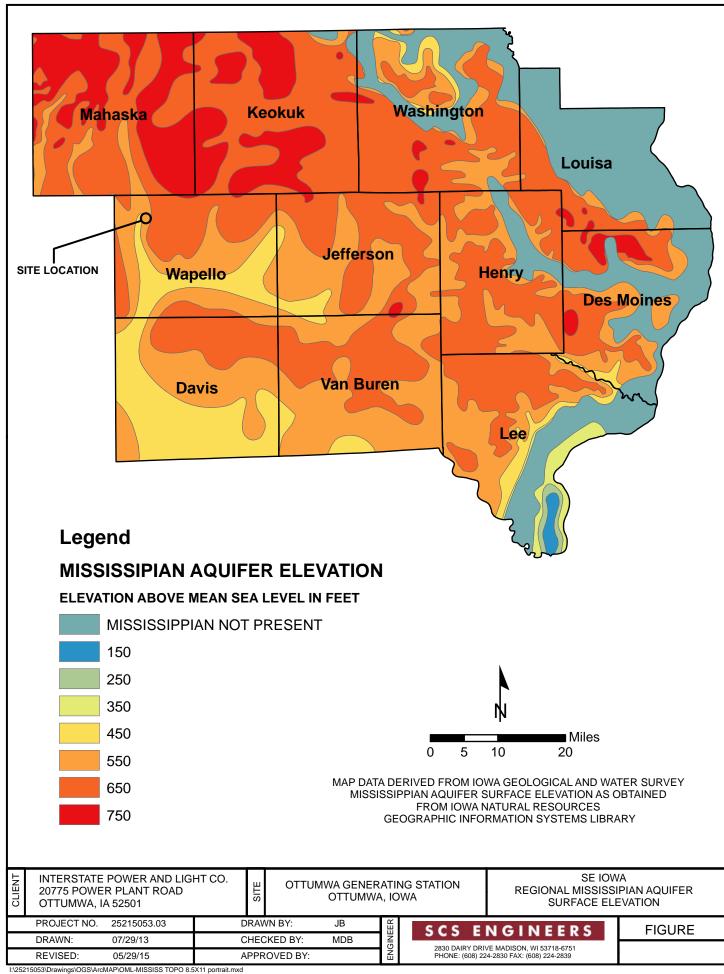
^{*}This nomenclature and classification of rock units in this report are those of the lowa Geological Survey and do not necessarily coincide with those accepted by the U.S. Geological Survey.

Source: "Water Resources of Southeast Iowa," <u>Iowa Geologic Survey Water Atlas No. 4</u>.

 $I:\25215053\Reports\Report\ 1\ -\ OML\Table_Regional_Hydrogeologic_Stratigraphy.doc$







Appendix B Boring Logs and Well Construction Documentation

SCS ENGINEERS Environmental Consultants and Contractors										8	OIL	BOR	ING I	LOG	INFC)RM	ATION
			Ro	ute To: Wate	rshed/W	astewater	Waste N	Manage	ement								
				Remo	ediation/l	Redevelopment	Other										
														Pag	ge 1	of	1
Facilit							License/I	Permit/	Monito	ring Nu	ımber		Boring	Numb		11.20	1
IPL	- Ottu	ımwa	Gener	rating Station forew chief (first	4 laat) aa	SCS#: 25215135.40	Date Dri	11: C4	t-a-d		ID.	te Drilli	Can	1		V-30	I ing Method
				crew chief (first	t, iast) ar	ia Firm	Date Dri	lling St	arted		Da	te Driiii	ng Con	приецеа			1/4 hollow
	ld Sch cade							11/10	/2015	i		1	1/10/	2015		1000	m auger
Uniqu			*6	DNR Well ID	No.	Common Well Name	Final Sta				Surfac	e Eleva			Во		Diameter
						MW-301		Fee	et				.3 Fee			8	.5 in
Local		rigin				ng Location 🖂	1 -		0	,	"	Local (Grid Lo				
State		- C		,077 N, 1,89			La		o								□ E
NW Facilit		of S	W 1	/4 of Section County		T 73 N, R 15 W	Long		Civil T	oven/Ci	ty/ or V	Village	Feet	\Box s		I	Feet W
raciii	y ID			Wape					Ottun		rn/City/ or Village						
San	nple	<u> </u>	T	- Trupe								Soil Properti					
					Soil/R	ock Description											
200	tt. & d (ii	nnts	Fee			ologic Origin For						uc					s
oer ype	th A	ပ်	l In			h Major Unit		CS	hic	am	Ð	lard	ture	· ·	city		/ nen
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		Date	ii Wajor Ome		S	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	200	RQD/ Comments
	N N	<u> </u>	-	TOPSOIL.				n			4	N F	20	1	P II	Ь	0 %
			Ē.				T	OPSO	F 77								
			E'	SANDY SILT W	VITH GRA	AVEL, gray (7.5YR 6/1), g	ravel is										
			<u>-</u> 2	mic.													
			E														
			- 3														
			E_1					ML									
			- 1					IVIL									
			_5														
S1	10	woh 1 3 9	E										W				
		33	- 6														
WEATHERED SANDSTONE, very weak, light g (10YR 7/1), scondary color very dark gray 910YR					ONE, very weak, light gray or very dark gray 910YR 3/	/ matrix 1),											
S2 1 13 24 50 -8 massive.						e les						W					
			E (
-			<u> </u>														
											1	1	1				

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Endo of Boring at 15 feet bgs.

•	•					
Signature	711	for	Kyle Kramer	Firm	SCS Engineers 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:
//			•			

SANDSTONE

W

W

			<u>R</u>	oute To:	Watershed/	Wastewater	Waste	_	ement								
					Remediatio	n/Redevelopment	Other										
														Pag	ge 1	of	2
	y/Proje						License/	Permit/	Monito	ring N	umber		Boring		er		
				rating S		SCS#: 25215135.40										<i>N</i> -30	
		(5)		of crew ch	nief (first, last)	and Firm	Date Dri	Iling St	tarted		Da	te Drilli	ng Con	npleted		1	ing Method
	ld Sch cade							11/10	0/201:	5		1	1/10/	2015			1/4 hollow em auger
Uniqu	e Well	No.	8	DNR	Well ID No.	Common Well Name	Final Sta				Surfac	e Eleva		2015	Bo		Diameter
						MW-302		Fe	et	_			.6 Fee			8	3.5 in
	Grid O	rigin				oring Location 🖂	La	ıt	0	1	"	Local C	Grid Lo				
State NE		of S		1/4 of Sec	, 1,902,62: ction 26,	5 E S/C/N T 73 N, R 15 W			o	,	"		F4				□ E
Facilit		101 13			County	1 /3 N, K 13 W	Long	<u> </u>	Civil T	own/C	ity/ or	Village	reet	ъ			Feet W
					Wapello				Ottu			8-					
San	nple				***************************************								Soil	Prope	erties		
	& (in)	s	1 75		Soil	Rock Description											
. 0	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		And (Geologic Origin For				_		T ioi	1)		>		ıts
ober Typ	Length Att. Recovered (C ×	th Ir		E	ach Major Unit		CS	ohic	l gram	PID/FID	darc	sture	uid it	Plasticity Index	0)/
Number and Type	Len	Blo	Dep					N S	Graphic Log	Well Diagram	PID	Standard Penetration	Moisture Content	Liquid Limit	Plastic Index	P 200	RQD/ Comments
			F	TOPSO	DIL.		Т	OPSO		M	1						
			<u>-</u> 1	IEAN	CLAV WITH S	AND, dark gray (10YR 4/1).		-	7 14								
			-	LEAN	CLAT WITH 57	AND, dark gray (101 K 4/1).					-			 			
			-2														
			E_3														
		-	F														
			E-4														
			_5														
			E														V
			-6														
			Ē _														
			F ⁷					CL									*
			E_8					CL									
			E														
			- 9						2.223								
			E ₁₀														*
			E 10														
S1	19	1 4 5 7	-11										M				
		3 /	F 12														
			-12														
			E-13														
S2	19	24	E							目:			M				
		7 11	-14	LEAN	CLAY WITH SA	AND, very dark gray (5Y 3/1).			1 🗏							
			- -15					CL		I							
			E														
11			- 16														
		y that	the info	rmation o	on this form is	true and correct to the bes	st of my kn	owledg	ge.								
Signati	ire	21	/	0	12.	Firm SCS	Engine									Tel: (6	08) 224-2830
10	1/2	The		fer	Kyle	Kany 2830	Dairy Dri	ve Ma	dison. V	WI 537	18						Fax:

SOIL BORING LOG INFORMATION SUPPLEMENT

Borin	g Numl	oer	MV	V-302							Pag	THE RESERVE AND ADDRESS OF THE PERSON NAMED IN	of	2
San	nple									Soil	Prope	erties		
	s (ii)	S	et	Soil/Rock Description										
o.	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	And Geologic Origin For			_	_	Standard Penetration	43		>		ıts
ber	th /	ပို	h In	Each Major Unit	CS	hic	ram	l E	darc	ture	bi t	icity		mer
S Number and Type	eng	low	ept		S	Graphic Log	Well Diagram	PID/FID	tand	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S3 1	24			POORLY GRADED SAND, olive yellow (2.5Y 6/6).	D	0 1		<u>_</u>	NA	M		P II		<u> </u>
		23 99	E	TOOKET GRADED STATE, ONTO JOHOW (2.5.1 6/6).	SP									
II.I			E 17											
П			- 10	LEAN CLAY, dark grayish brown (10YR 4/2).	CI	11.77	IE							
6.4	2.4	44	E 18		CL					337				
S4	24	44	E 19	POORLY GRADED GRAVEL, fine.	GP	000				W				saturation @ 18 ft bgs.
Ш			E	LEAN CLAY I I II (10VD (10)		2								
П			-20	LEAN CLAY, brownish yellow (10YR 6/8). POORLY GRADED GRAVEL WITH CLAY, gray (10YR	CL	0 480								
			E	5/1), fine.		0								
S5	15	2 3 3 6	-21							W				
		30	E		GD G									
			F 22		GP-G0	Po								
П			-23			0								
S6	24	3 4	E 23			5				w				
50	27	3 4 8 9	_24	POORLY GRADED SAND, gray (10YR 5/1), medium		O/H	1	-		"				
U			E	grained.										
П			-25											
- 11		4.0	Ε.,											
S7	24	4 3 6 8	-26		SP					W				
Ш		0 0	E-27											
			E 2'											
			-28	Course of the last house (10VD 5/2)										
S8	24	78 119	F	Same as above, but brown (10YR 5/3). POORLY GRADED SAND, gray (10YR 5/1), fine grained,			-			W				
		119	-29	(weathered bedrock?).										
			Ē											
П			-30	Medium grained.										
CO	22	5 14	- 31							337				
S9	23	5 14 33 50/.4	₹ '`		SP					W				
Ш			_32											
п			E											
- 11			-33											
S10	12	2 50/	L							W				
Ш			=34	POORLY GRADED SAND, olive yellow (2.5Y 7/1), fine grained, (weathered bedrock?).			1							
-			_ 35	grained, (weathered bedrock?).										
- 11			- 33		SP									
S11	3	50/.3	E-36							w				
511			E							''				
Ц			-37	End of Boring at 37 feet bgs.		 	1							
				End of Borning at 57 tool ogs.										
,														
										10				

			<u>Re</u>	oute To:	Watershed/V		Waste Other	_	ement								
					Remediation	/Redevelopment	Other	Ш									
Facilit	y/Proje	ct Nar	ne				License/	Permit/	Monito	ring N	umber		Boring	Pag		of	1
	-			rating S	tation	SCS#: 25215135.40				6			Boring	1 vaino		W-30	13
				of crew ch	ief (first, last) a	and Firm	Date Dri	illing St	tarted		Da	te Drilli	ng Con	npleted			ling Method
	ld Sch							12/8	/2015				12/8/2	2015			1/4 hollow em auger
	e Well		6	DNR V	Well ID No.	Common Well Name	Final Sta				Surfac	e Eleva		2013	Вс		Diameter
- -	0:10			<u> </u>		MW-303		Fe	et				.0 Fee			8	3.5 in
Local	Grid Or Plane	rıgın			1,903,215		La	ıt	o 	<u> </u>	"	Local C	irid Lo	cation N	r		□Е
NE		of S		1/4 of Sec		T 73 N, R 15 W	Lon	g	0	'	"		Feet			1	Feet W
Facilit	y ID				County						ity/ or	Village					
C	1-				Wapello				Ottur	nwa	Т		G '1	D			T
San	nple				G 11/1	. 15							Soil	Prope	erties		
	tt. & d (in	ınts	Feet			Rock Description eologic Origin For						두					S S
ber Jype	th A	Cor	l In			ch Major Unit		CS	hic	am	Œ	lard ratio	ture	7	city		/ nent
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet			on major ome		n s c	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 10			 	FILL, bo	oring location wa	as cleared to 9' bgs by hydrov	vac, then	-				07 14	20				10
S1 S2	1 NR	50	-1 -2 -3 -4 -5 -6 -7 -8 -10 -11 -12 -13	(10YR 5	HERED SANDS' 5/4). Boring at 14.5 ft l	ΓΟΝΕ, medium grained, bro		FILL	DNE				W				
I hereb	y certif	y that	the info	rmation o	n this form is t	rue and correct to the best	t of my kn	nowledg	ge.								
Signati	ire					Firm SCS	Engine								***************************************	Tel: (6	08) 224-2830
13	h	16		fer	Kyle K		Dairy Dri		dison, V	VI 537	18						Fax:

			<u>Re</u>	oute To:	Watershed/W Remediation/			Waste I Other	_	ement								
					Kemediation	redevelop	писи 🗀	Outer	ш							4	0	2
Facilit	y/Proje	ct Nan	ne					License/I	Permit/	Monito	ring Nu	mber	Т	Boring	Pag Numbe		of	3
IPL	- Ottu	ımwa	Gene	rating S			5215135.40										V-30	
		-		f crew ch	ief (first, last) a	nd Firm		Date Dri	lling St	arted		Da	te Drilli	ng Con	npleted		1	ing Method
	ld Sch cade								11/11	1/2015	5		1	1/11/	2015			1/4 hollow m auger
Uniqu	e Well	No.	6	DNR V	Well ID No.		Well Name	Final Sta	tic Wat	ter Leve		Surfac	e Elevat	ion		Во	rehole	Diameter
T 1	0:10						W-304		Fee	et				.1 Fee			8	.5 in
Local	Grid Or Plane	rıgın			☐) or Bor 1,903,287		on ⊠ ′C/N	La	t	o	'	"	Local C	irid Loc	cation N			□Е
SE		of N		1/4 of Sec			N, R 15 W	Long	g	o	1			Feet]	Feet W
Facilit				10	County					Civil T		ty/ or \	Village					
		1			Wapello					Ottur	nwa			~ !!				
San	nple				: 1751		5 0							Soil	Prope	rties		
	t. & I (in)	nts	eet			ock Descri							_					70
er ype	h At rered	Con	In F			ologic Orig	_		S	ic	m m	<u>e</u>	ard atio	ure nt	_	sity		ents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		Eac	h Major U	nit		SC	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	200	RQD/ Comments
<u> </u>	N R	m	E	TOPSO	IL.				n	1.171		Ь	SA	20	7 7	P II	Ь	<u> </u>
			E 1					Т	OPSO									
			= '	FAT CL	LAY, black (10YF	R 2/1).												
			-2															
			E_3															
			E															
			-4															
			E -5															
			Ę															
			- 6															
			E_7						СН									
			E '															
			-8															
			E_9															
			E															
П			-10															
		15	Ē.,															
S1	23	4 5 4 5	F11											M				
Ш			-12															
П			E 12	FAT CL	AY, yellowish br	own (10YR	5/4).											
S2	19.5	44	E 13											М				
52	19.5	5 5	-14						CH					141				
ш			E 15															
			-15 -	FAT CL	AY, yellowish br	own (10YR	3/4).		СН									
			-16															
		y that	the info	rmation o	on this form is tr	ue and con		t of my kn	owledg	ge.								
Signati	ire /	7/		0	W to W			Engine									Tel: (6	08) 224-2830
15	m	TI	-	rev	Kyle Kr	ane	2830	Dairy Dri	ve Ma	dison, V	NI 5371	18						Fax:

Boring Number	MV	V-304								ge 2	of	3
Sample								Soil	Prope	erties		
Number and Type Length Att. & Recovered (in)	eet	Soil/Rock Description					l u					ω.
ype ype th At verec	In F	And Geologic Origin For Each Major Unit	S	jic	am	Ű	ard ratio	ure	5	city		/ ments
Number and Type Length Att. & Recovered (ir	Depth In Feet	Lacii Wajoi Oiiii	USC	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S3 12 33 45	 	FAT CLAY, yellowish brown (10YR 3/4). (continued)	+-	I	ſΪ	I	01 14	M		<u> </u>		
	-17											
п	E 10			.E								
S4 22 43 7 12	E 18							M				
7 12	-19											
	E ₂₀											
	E			i de la companya de La companya de la co								
S5 23 27 89	<u>-</u> 21			erii m				M				
Ц												
П												
S6 23 3 4 8 6	F							М				
	24											
п	-25											
S7 23 511	E		СН					M				
S7 23 5 11 15 11		6						IVI				
2	E-27											
	28	* * * * * * * * * * * * * * * * * * * *										
S8 15 44 56	E - 29							M				
Ц	Ē	, ,										
П	= 30											
S9 18 46 99	_31	×V						M				
Ц ["	32											
п	=	e e										
S10 24 46	-33							M				5
76	34							IVI				
	_35	FAT CLAY, DADY, OLBUT DROUBL (2 5V 2/2)										
	-	FAT CLAY, DARK OLIVE BROWN (2.5Y 3/3).										
S11 16 $\begin{bmatrix} 2 & 2 \\ 4 & 6 \end{bmatrix}$	- 36	* ************************************						M				
Ч	=37											
П	-38											
S12 24 43 55	-		СН					M				
Ц [] 3	- 39											
п	-40											
S13 18 23 33	E_41							M				
3 3	=							141				
	-42											
1 1	1 1		I	1 1			1 1					

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A

Boring Number	MV	V-304							Pag	ge 3	of	3
Sample								Soil	Prope	erties		
% (ii)	*	Soil/Rock Description										
od (i	Fee	And Geologic Origin For					on			_		its
ber [ype	h In	Each Major Unit	CS	hic	ram	FID	lard	ture	р	icity		/ men
Number and Type Length Att. & Recovered (in) Blow Counts	Depth In Feet		S	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	200	RQD/ Comments
Zall H	-43	FAT CLAY, DARK OLIVE BROWN (2.5Y 3/3).	D		N II	Д	N A	20	11	P I	Д	
S14 24 34	E 43	(continued)	CH					W				
9 14	_44	SANDY SILT, very dark gray. POORLY GRADED SAND, medium grained, gray (5Y 6/1),	ML	Щ.				VV				
4	E	(weathered bedrock).										
п	-45											
S16 15 30 50/.	- 4–46							***				
S16 15 30 50/.	E							W				
Ц	-47											
п	E											
5 33 50/.	<u></u> 48		SP					***				
S17 5 33 50/.	E-49							W				
Ч	E											
п	E-50											
S18 50/.4	E 51				- 1			337				
S18 50/.4	E							W				
4	- 52	End of Boring at 52 feet bgs.										
		1 1										
1 1	ı l		1				1					

			Ro	oute To:	Watershed/V	Wastewater	Waste I		ement								
					Remediation	n/Redevelopment	Other										
														Pag	ge 1	of	3
Facilit	y/Proje	ct Nam	e				License/I	Permit/	/Monito	ring N	umber		Boring	Numbe			
				rating S		SCS#: 25215135.40									M	N-30	15
Boring	g Drille	d By: 1	Vame o	f crew ch	ief (first, last)	and Firm	Date Dri	lling S	tarted		Da	te Drilli	ng Con	npleted		Drill	ing Method
		ımalfe															1/4 hollow
		Drillir	ıg	DMD	V II ID M	IG WIN	E' 1.G		//2015		G C		12/8/2	2015	I.D.		em auger
Uniqu	e Well	No.		DNR V	Well ID No.	Common Well Name MW-305	Final Sta			el	Surfac	e Elevat			Bo		Diameter .5 in
Local	Grid O	rigin		timated:	O or Bo	oring Location	1.	Fe	et			Local C	.5 Fee				.5 111
State		igiii			1,903,023		La	.t	0			Locar	iiid Loc				□Е
SE		of N		/4 of Sec		T 73 N, R 15 W	Long	or	0		"		Feet			1	Feet W
Facilit		01 11			County	1 /5 11,10 11	Long	>	Civil T	own/C	ity/ or \	Village	1 000				
					Wapello				Ottur	nwa							
San	nple												Soil	Prope	erties		
	& (in)				Soil/	Rock Description											
4)	tt. d	unts	Fee			eologic Origin For						loo					ts
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet			ich Major Unit		CS	hic	Well	PID/FID	Standard Penetration	Moisture Content	р	Plasticity Index		RQD/ Comments
Tum L Du	eng	low	ept					n s o	Graphic Log	Well	, E	tanc	Moisture Content	Liquid Limit	Plastic Index	P 200	CO mo
	N N			TOPSO	IL		Т	OPSO	10 1 10 1	MK		N L	20	I	ПП	Ь	<u> </u>
			-1	GRAVE					601								
			E ,					GP	3000								
	=		-2	FAT CL	.AY												
			E														
			_3														
			Ε,														
			- 4														
			_ _5														
			-6														
			=														
			- 7														
			_ _8														
								CIT									
			_9					СН									
П			-10	FAT CL	AY, very dark g	grayish brown (10YR 3/2).											
C1	10	3 6											117				
S1	18	9 11	= '										W				
Ш			12														
П			=														
		2.7	_13	same as	above except, b	rown (10YR 4/3).											
S2	22	3 7 14 22	- 14										W				
Ш			- 14														
п			15														
			_														
			- 16						V. 111.000								
I hereb	y certif	y that t	he info	rmation o	n this form is t	rue and correct to the bes	st of my kn	owled	ge.								
Signati			11			Firm SCS	S Engine	ers								Tel: (6	08) 224-2830
111	1/	KI	2	for	- K 10 10		Dairy Dri		dison V	М 537	18					· ·	Fav

Boring Number	MV	V-305							Pag		of .	3
Sample								Soil	Prope	erties		
Number and Type Length Att. & Recovered (in) Blow Counts	set	Soil/Rock Description										
Number and Type Length Att. & Recovered (in Blow Counts	Depth In Feet	And Geologic Origin For	S	l _o	Ε	Д	Standard Penetration	re t		ity		RQD/ Comments
mbe 1 Ty ngth cove	pth]	Each Major Unit	U	Graphic Log	Well Diagram	PID/FID	nda	Moisture Content	Liquid Limit	Plasticity Index	P 200	D/ mm
Number and Type Length Att Recovered Recovered State S	De		U S	Grap Log	We Dia	PII	Sta Per	S S	Lig	Plastic Index	P 2	RQ Co
S3 22 5 15 14 1:	5 =	FAT CLAY (continued)										
ᄖ	-17											
П	E 18		СН									
S4 20 35	F											
13 15	5 - 19											
	E_20											
	= 20	FAT CLAY WITH SILT, dark gray (10YR 4/1).										7
S5 24 4 5 7 11	-21							M				
п	E 22											
	23	same as above except, very dark brown (10YR 2/2).										
S6 20 7 11 15 20	E 24							M				
Ц	= 24											
п	-25	same as above except, very dark gray (10YR 3/1).										
0.5	E -26											
S7 24 4 8 11 12	2 = 20		CH					M				
Ч	27											
П	E -28											
S8 24 8 12								M				
16 2	29											
<u> </u>	= 30											
II I	E											
S9 13 44 7 12	-31							M				
	= 32											
П	F	LEAN CLAY, very dark brown (10YR 2/2).	-									
	=33	LEAN CLAT, very dark from (101K 2/2).										
S10 24 5 6 9	E ₃₄							W				
Ц	E											
п	= 35											
S11 24 4 4	E ₃₆							W				
S11 24 4 4 5 7			CL					**				
ч	-37											
П	-38											
S12 22 2 3 5	=	same as above except, very dark grayish brown (10YR 3/2).						w				
	= 39											
	-40											
	E											
S13 6 3 9 11	E-41	POORLY GRADED SANDY GRAVEL, fine, brown (10YR		300				W				water @ 41.0 ft bgs.
Ц	-42	4/3).	GPS									11.0 It 0gs.
п	F			00								
			1				51		5	100		-

Form 4400-122A

Boring	g Numl	ber	MV	V-305								Pag	ge 3	of	3
San	nple										Soil	Prope	erties		
	& (ii)	nts	eet	Soil/Rock Description											
er ype	h Att	Cour	In F	And Geologic Origin For	S	.c		E	0	arior	are nt	_	ity		ents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Each Major Unit	SC	Graphic Log	Well	Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
<u> </u>	N N	<u>m</u>		POORLY GRADED SAND, medium grained, yellowish	SP	0 1		뮈	Д	NA	20	l l	РП	Д	<u> </u>
S14	22	23 50	= 13	brown (10YR 5/4), (weathered bedrock). (continued)							s				
			E-44												
П			<u>-</u> 45				IE								
		5 10	= 46												
S15	6	5 10 50	 46		SP		1 =				S				
Ц			-47				l								
П			E -48				IE								N-
S16	6	50	E								s				
Ц			- 49					1							
			- 50	End of Boring at 50 ft bgs.			-	\dashv							
								-		-					
															,
							1								
															6
													,		
															11
															<u>a</u>
l	1				İ		1								

SCS ENGINEERS

SOIL BORING LOG INFORMATION

Environmental	Consultants	and	Contractors	
---------------	-------------	-----	-------------	--

			Ro	oute To:			stewater edevelopment		aste M	_	ement								
																Pag	ge 1	of	2
	y/Proje								nse/Pe	ermit/	Monito	ring N	umbe	r	Boring		er		A
IPL Boring	- Ottu	mwa 1 Bv	Gener	rating S	station lief (first, las		SCS#: 25215135.40		Drilli	ing St	arted		Tr	Date Drill	ing Con	nnleted		V-30	ing Method
Too	ld Sch	malf	eld	1 01011 011	Ter (Tirot, Ido	it) unic	• • • • • • • • • • • • • • • • • • • •												1/4 hollow
	cade l		ng	DND	Well ID No.	16	Common Well Name	- Eine			2/2015 er Leve		I Come	ice Eleva	11/12/	2015	Do		m auger Diameter
Uniqu	e weii	NO.		DNK	well ID No.		MW-306	e Fina	1 Statio	Fee		21	Suria		.1 Fee	et	Во		.5 in
Local		rigin					g Location 🖂		Lat		0	,		, Local C					
State SE		of N		,666 N, 1/4 of Sec	, 1,902,6 etion 26,		: s/c/n r 73 n, r 15 w	,	Lan	***************************************	o	,	,		Foot			1	☐ E Feet ☐ W
Facilit		01 14			County		1 75 N, K 15 V	, , ,	Long	T	Civil T	own/C	ity/ o	r Village	rect				Teet W
					Wapello						Ottur	nwa			~				Г
San	nple				_										Soil	Prope	erties		
	tt. & d (in)	ınts	Feet				ck Description logic Origin For							L L					SQ.
ber Гуре	th A	Blow Counts	h In				Major Unit			CS	hic	120	E	dard	ture	id t	icity)/ ment
Number and Type	Length Att. & Recovered (in)	Blow	Depth In Feet				3			N S	Graphic Log	Well	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
-			E	TOPSO	IL.				TC	PSO	1111		1						
			-1 -2	FAT CL	AY, dark ol	ive bro	own (2.5Y 3/3).		-		2 73		2						
			$\begin{bmatrix} -2 \end{bmatrix}$																
			=																
			-3																
			<u>-</u> 4																
			E																
			- 3																
			_6																
			E ₇							СН									
			Ē																
			- 8																
			<u>_</u> 9																
			E 10																
			- 10																
S1	18	3 6 9 11	-11												M				
Ш		711	-12																
П			E																
62	22	5 6	- 13	FAT CL	LAY, gray (10	YR 5/	1).								M				
S2	22	79	-14												M				
ш			- -15							CH									
			- 13																
			- 16								(4.44.70)								
	-	y that	the info	rmation o	n this form	is true	e and correct to the l				ge.								
Signat		K	le le	C.	- Kyle	Ko	Firm SO	CS Eng 30 Dairy			dison. V	WI 53	718					Tel: (6	608) 224-2830 Fax:
-	1	- /	7	,,,,	70-						,		-						

Form 4400-122A

Boring Num	ber	MW	V-306								ge 2	of :	2
Sample									Soil	Propo	erties		
t. &	nts	eet	Soil/Rock Description										
ype ype h At	Cou	In F	And Geologic Origin For Each Major Unit	SO	iic	am	Ð	ard	ure	-	city		nents
Number and Type Length Att. & Recovered (in)	Blow Counts	Depth In Feet		USC	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S3 22	5 10	9 <u>0</u>	FAT CLAY, gray (10YR 5/1). (continued) FAT CLAY, gray (10YR 5/1).		I			07 11	M	1 1	H	<u> </u>	<u> </u>
Ц	10 14	_17	FAT CLAT, gray (10 TR 3/1).	СН	13 M 22 34								
П		E 18	FAT CLAY, dark olive brown (2.5Y 3/3).								-		
S4 13	5 8 14 17								M				
Ц	14 17	-19 -											
п		20											
S5 15	5 6	E -21			otra de				w				
33 13	5 6 13 16			СН					VV				
		<u>-22</u>											
	2.5	-23											
S6 15	3 5 7 9	- -24			2.00.0				W				
4		_ 25											
		=											
S7 22	2 5 7 11	<u>-</u> 26	POORLY GRADED SAND, very dark grayish brown (10YR 3/2), medium to coarse grained, (weathered bedrock?).						W				
Ц		27	5/2), median to coarse grained, (weathered bedrock.).										
П		E 28											
S8 NR	7 3 4 3	E 29							W				
Ц		<u> </u>											
П		30		SP	p 5								
S9 18	1 1 2 2	-31 -31							W				
Ц	22	-32											
П		-											
S10 13	WOR	33							W				
		34				B			**				
			End of Boring at 34.5 feet bgs.										
								A.					

Environmental	Consultants	and	Contractors

			Ro	ute To:		Wastewater n/Redevelop		Waste Other	_	gement								
															Pag	ge 1	of	2
Facilit								License/	Permit	/Monito	ring N	umb	er	Boring		er		
IPL	-Ottu	mwa d Byr	Gener	ating S	Station hief (first, last)	SCS#: 2:	5216148.00	Date Dr	iliaa C	toutad			Date Drill	ina Com	anlatad	M	V-30	ing Method
	e Mu		ivallie 0	i ciew c	inei (ilist, iast)	and ritin		Date Dr	illing S	tarted			Date Driii	ing Con	npieted		ווווען	ing Method
Cas	cade :	Drilli	ng						10/2	5/2016	5			10/25/	2016		H	SA
Uniqu	e Well	No.		DNR	Well ID No.		Well Name	Final Sta			el	Sur	face Eleva			Bo		Diameter
Local	Grid O	rigin		timatad	: 🗌) or B		W-307		Fe	et				5.1 Fee			8	.5 in
State		ngin	401	,707 N	1, 1,903,070	DE S	on ⊠ C/N	La	at	o 			" Locar	JIIQ LO	cation	r		□Е
NE		of S		, /4 of Se			N, R 15 W	Lon	g	o	'		"	Feet				Feet W
Facilit	y ID				County							ity/	or Village					
C	1	1	T		Wapello				1	Ottur	nwa	Т		G '1	D			T
San	nple													Soil	Prope	erties		
	t. & 1 (in	nts	Feet			Rock Descri	•											10
ype	h At /erec	Con	In I			Geologic Orig ach Major U	_		S	ig.	am	E	ard ard	ure	_	city		nents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		E	acii iviajor o	IIIt		SC	Graphic Log	Well Diagram	TIN/FII	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
<u> </u>	N N	Щ	-	POOR	LY GRADED SA	AND WITH C	RAVEL, tan, f	ine to	D	0 1		1 0	NA	20	77	P	Ъ	~ 0
SI	24	2232	-1 -2 -3 -4 -5 -6 -7 -8 -10	hydrov	sand and gravel, ac hole cleared to	o 8.5 ft bgs).			SP					W				water level 6.5 ft bgs.
		4 1 4 4 y that	-11 -12 -13 -14 -15 the infor	mation	on this form is	true and corr				ge.				W				
Signat	TT'S	1	/	M	1		Firm SCS	Engine	ers								Tel: (6	508) 224-2830
	4/1	1	/	1	111		2830	Dairy Dri	ive Ma	idison, V	<i>W</i> I 537	11						Fax:

Form 4400-122A

San	y Num		T	W-307			I	T			Soil	Prop		of	Ī
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well	Diagram PID/FID	Standard	Penetration	Moisture Content		Ų.	P 200	RQD; Comments
33	24	1 2 2 4	16	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense. (continued) SILT, dark yellowish brown (10YR 3/4), fine to medium	CL						W				
64	17	3333	- 17 - 18 - 19	sand.	ML						W				Bedrock @19.5 ft
L			= 20	SANDSTONE, dark brown (10YR 3/3),											bgs.
55	5	50/0.:	_								W				More competent @20.5' -24.5' bgs.
			-23 -24	more weathered.											
			-25 -26 -27	more weathered.											
6	1	100	E -28	Same as above except, gray (10YR 6/1).											
				End of boring at 28 ft bgs.											
												=			
									=						
1															

SCS ENGINEERS SOIL BORING LOG INFORMATION Environmental Consultants and Contractors Route To: Watershed/Wastewater Waste Management Remediation/Redevelopment Other \square 1 of 2 Page Facility/Project Name License/Permit/Monitoring Number Boring Number IPL-Ottumwa Generating Station MW-308 SCS#: 25216148.00 Boring Drilled By: Name of crew chief (first, last) and Firm Date Drilling Started Date Drilling Completed Drilling Method Mike Mueller Cascade Drilling 10/25/2016 10/25/2016 **HSA** Unique Well No. DNR Well ID No. Common Well Name Final Static Water Level Borehole Diameter Surface Elevation MW-308 652.9 Feet Feet 8.5 in Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒ Local Grid Location State Plane 402,312 N, 1,902,665 E Lat S/C/N \square N \square E 0 Feet \square S NE 1/4 of Section 1/4 of SE 26, T 73 N, R 15 W Feet \square W Long Facility ID Civil Town/City/ or Village County Wapello Ottumwa Sample Soil Properties Length Att. & Recovered (in) Soil/Rock Description Depth In Feet Blow Counts Penetration And Geologic Origin For Number and Type Standard Plasticity Diagram Moisture PID/FID Graphic Content Each Major Unit Liquid Limit P 200 Well Log POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 9.5 ft bgs). -2 SP water @ 6.5 ft bgs. LEAN CLAY, brown (10YR 4/3), dense. 10 194 -11 24 W CL 22 12

ML

Madison, WI 53711

I hereby certify that the information on this form is true and correct to the best of my knowledge.

SILT, brown (10YR 4/3), some clay.

Signature	DM	Firm	SCS Engineer 2830 Dairy Drive
	00"//		

Tel: (608) 224-2830

W

Fax:

13

15

12

22

13

S2

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A

Borin	g Num	ber	N	1W	7-308									Pa	ge	2	of	2
San	nple												Soil	Prop	ertie	es		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Donth In East	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic	Log	Well	Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity	Index	P 200	RQD/ Corrments
			E		SILT, brown (10YR 4/3), some clay. (continued)	ML												
S3	18	12	E-1	6	SILTY SAND, brown (10YR 4/3).			Щ					w					
		1 3	E	-	POORLY GRADED SAND, brown (10YR 4/3), fine	SM	H	Ц					"					
			E	7	grained.	SP												
54	13	4 12 13 3	E	8	WELL GRADED SAND AND GRAVEL, dark grayish brown (10YR 3/2), fine to coarse grained, (weathered bedrock).	SW							W					
			E		SANDSTONE, dark grayish brown (10YR 4/2), weathered bedrock.													
S5 [6	12 26	F 2	0.0	Same as above except, brown (10YR 4/3).								W					
			<u>-2</u>	.1														
			_2	2			6 to											
			E															
			-2	3					E	1 1								
	E a																	
	66 4 50/0.4	-2	4	Same as above except, dark grayish brown (10YR 4/2).					_									
66 L		1 _ 2	.5	Ford of Locky at 25 O Lan		_						W						
				End of boring at 25 ft bgs.														
				1		3												
						=												
				- 1														
																-		

Environmental Consultants and Contractors

			Ro	oute To:		Vastewater /Redevelopment	Waste I	_	ement									
														Pag		of	2	
	y/Proje			-4: C	14_4!		License/	License/Permit/Monitoring Number Boring Number								.0		
				ating S	hief (first, last) a	SCS#: 25216148.00	Date Drilling Started Date Drilling Completed						IVI	MW-309 Drilling Method				
	Mike Mueller								unica			ate Dilli	ing Con	ipicica			ing iviculou	
Cas	cade 1	Drilli	ng				7/2016				0/27/	2016			HSA			
Uniqu	e Well	No.		DNR	Well ID No.	Common Well Name	Final Sta			el	Surfa		1				rehole Diameter	
Local	Grid O	rigin	☐ (es	stimated	: 🗆) or Bo	MW-309 ring Location ⊠		Fe				Local C	.5 Fee			8	.5 in	
State		J	403	,189 N	ſ, 1,902,070	E S/C/N	La	t	°	<u> </u>	•		200	□ N			□Е	
NE		of S	E 1	/4 of Se		T 73 N, R 15 W	Long	g	<u> </u>	<u>'</u>			Feet	\Box s]	Feet W	
Facilit	y ID				County Wapello				Civil T Ottur		ity/ or	Village						
San	nple		I		wapeno				Ottur	nwa	Т		Soil	Prope	rties			
					Soil/E	Rock Description							3011	Тторс	rues			
	tt. & d (in	unts	Feet			eologic Origin For						l E					93	
ber 「ype	th A vere	Ş	h In			ch Major Unit		CS	hic	am.	Ð	lard	ture	ъ.,	city	_	/ nent	
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet			on many or one		n s (Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments	
			<u> </u>	Hydro	vac borehole to 10	ft bgs.			0 1	N B		07 14	20		I			
S1		33367	-10 -11 -12	LEAN sand.	CLAY, very dark	grayish brown (10YR 3/2),	trace						W					
S2		22222	-13 -14 -15					CL					W					
		y that t	he info	rmation (on this form is tr	rue and correct to the bes	t of my kn	owledg	ge.									
Signati	re	71)	12	200		Engine Dairy Driv		dison. V	WI 537	11					Tel: (6	08) 224-2830 Fax:	

Form 4400-122A

Borin	g Numb	er	MV	V-309										ge 2	of .	2
San	nple											Soil	Prope	erties		
	Length Att. & Recovered (in)	its	eet	Soil/Rock Description												
er pe	Att	Cour	In F	And Geologic Origin For	S	0			E	О	rd atior	ure nt		ity		ents
Number and Type	ngth	Blow Counts	Depth In Feet	Fach Major Unit	SC	Graphic	Log	Well	Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
a Z	Le Re	BI	Ď	SILTY SAND, very dark grayish brown (10YR 3/2), fine to	D	5	Lc	W	D	PI	St	≥ 3	12 13	Pl	Ъ	<u> </u>
			E	medium grained.												
S3		1 1 1 1	-16									W				
			E ₁₇		SM											
			E													
			-18													
S4		3 5 4 6	E -19									W				
			E 19	POORLY GRADED SAND, yellowish brown (10YR 5/4), coarse grained.												
п			-20		SP											
		2.2	Ē.		31											
S5		2 3 7 50	<u>-21</u>									W				
Ш			E_22	WEATHERED SANDSTONE.												
			E													
			23													
			E ₂₄													
			F -													
S6 [25					E				W				
50			E-26									,,,				
			F 20					E								
	-		_27													
				End of boring at 27.5 ft bgs.												
				7 y 7 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m												
				- 3												
2											2					
											-		,			
					-											
				4 2												
															9	
										A.						
			1		I	1		l	-		1	1	1	1	I	i

SCS ENGINEERS Environmental Consultants and Contractors									S	SOIL	BOR	ING	LOG	INFO)RM	ATION	
Environment	ar con		oute To:	Watershed/	Wastewater □ n/Redevelopment □	Waste Other		ement									
													Pag	ge 1	of	2	
	Facility/Project Name IPL-Ottumwa Generating Station SCS#: 25216148.00								License/Permit/Monitoring Number Boring Number								
					SCS#: 25216148.00	Date Dr	:11: C	tout a d		D	ite Drilli	C	11		309X		
	Boring Drilled By: Name of crew chief (first, last) and Firm Mike Mueller						ming S	iaried		Da	ne Driii	ng Con	npietea		ווחכן	ling Method	
Cascade	Cascade Drilling						10/20	5/2016	5		1	0/26/	2016		HS	SA	
Unique Well	No.		DNR W	Vell ID No.	Common Well Name	Final Sta			el	Surfac	e Elevat			Во		Diameter	
Local Grid O	rigin	□ (e:	stimated:	Or B	oring Location 🖂		Fe	et			Local C	Feet	antion		8	3.5 in	
State Plane	nigiii	☐ (c.	stimated.	N,	E S/C/N	La	at	°	<u> </u>		Local	JI IU LO		r		□Е	
	of S	E 1	/4 of Sect		T 73 N, R 15 W	Lon	g	o 	1			Feet	\Box s			Feet W	
Facility ID				County						ty/ or	Village						
Sample	Т	T		Wapello			T	Ottur	nwa 	1	T	C - :1	D	4:		Т	
				C-:1	Daala Daanintian							5011	Prope	erties		+	
tt. &	unts	Feet			Rock Description Geologic Origin For						l u					, s	
ber Fype th A	S	h In			ach Major Unit		S)	hic	ram	Œ	lard	ture	. g	icity		/ meni	
Number and Type Length Att. & Recovered (in)	Blow Counts	Depth In Feet			J		USC	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments	
		=	coarse sa	and and gravel,	AND WITH GRAVEL, tan, (construction fill sand to fil	fine to											
		-1	hydrovac	hole cleared to	9 ft bgs).												
		E ₂															
		<u>-2</u>															
		_3															
	2	E	_														
		- 4					SP										
		_5					SP										
		E															
		<u>-</u> 6															
7		7														Water at 6.5 ft bgs	
		Ė '														11 050	
		-8															
		_ 9															
		E 9	LEAN C	LAY, dark bro	wn (10YR 3/3), medium de	nse.											
п		-10															
	1.0	Ē.,					CL										
S1 12	1334	<u></u> 11										W					
Ц		E - 12															
П		E	SILT, da	rk brown (10Y	R 3/3), some clay.		-										
S2 18	3 3	_13	,	,								337					
32 18	3 3 3 3	- -14					ML					W					
Ц		E															
		- 15															
I hereby certi	fy that t	the info	rmation on	this form is	true and correct to the be	st of my kr	nowleds	ze.									

Signa	iture	01	21	Firm	SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
'//		~ //				

SOIL BORING LOG INFORMATION SUPPLEMENT

Environmental Consultants and Contractors

Form 4400-122A

Borin	g Num	ber	B-3	09X								Pag	ge 2	of	2
San	nple										Soil	Prope	rties		
	& in)	50	et	Soil/Rock Description											
. •	Att.	ount	1 Fe	And Geologic Origin For						ion	1)		y		nts
nber Typ	gth over	C	th Is	Each Major Unit	CS	phic		гап	FIL	dar	stur	uid it	ticit	0) mue
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		SO	Graphic	Well	wen Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			E	SILT, dark brown (10YR 3/3), some clay. (continued)	ML										
S3	20	3 3 3 2	-16 -	POORLY GRADED SAND, very dark grayish brown (10YR 3/2), fine grained.	SP						W				
П			-17 - - - - - 18	SILT, dark brown (10YR 3/3).	ML										
S4 F	15	1 17	_ 16	POORLY GRADED SAND, brown (10YR 4/3).	SP						W		1		Bedrock
34	13	50/0.2	<u>–</u> 19	WEATHERED SANDSTONE, grayish brown (10YR 5/2).							VV				at18.5 ft bgs
a. H		50/0.3	E								***				
S5 L	6	30/0.3	-20								W				
			E												
			-21 -												
			E -22	*											
			-23												
			E												
		ě	-24												
			_ 												
			= -												
			26												
	_			End of boring at 26.5 ft bgs.		-	1								
						-					-			-	
										_				-	

IOWA DEPARTMENT OF NATURAL RESOURCES

MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

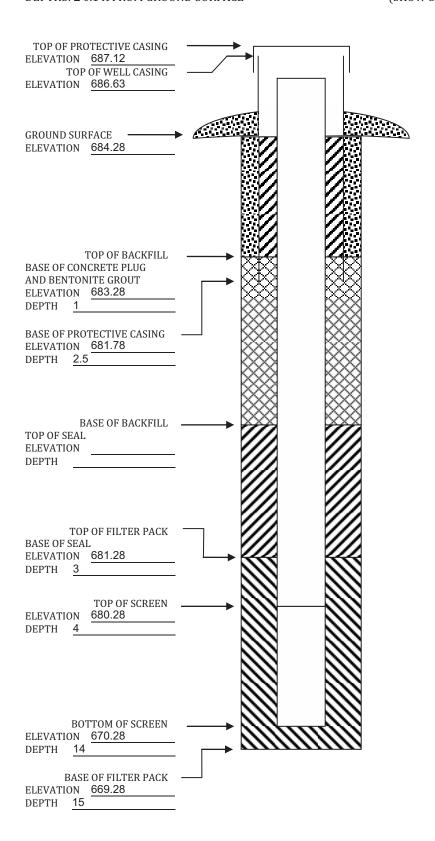
Disposal Site Name: IPL - Ottumwa Generating Station	Permit No.:
Well or Piezometer No: MW-301	_
Dates Started: 11/10/15	Date Completed: 11/10/15
A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):	Name & Address of Construction Company:
Specify corner of site: SE of Parcel 003052640340000	Cascade Drilling, LP
Distance & direction along boundary: 106' W	301 Alderson St
Distance & direction from boundary to wall:306' N	Schofield, WI 54476
Elevations (± 0.01 ft MSL):	Name of Driller: Todd Schmalfeld
Ground Surface: 684.28	Drilling Method: HSA
Top of protective casing: 687.12	Drilling Fluid: NA
Top of well casing: 686.63	Bore Hole Diameter: 8 inch
Benchmark elevation:	Soil Sampling Method: Spoon
Benchmark description:	Depth of Boring: 15 ft
C. MONITORING WELL INSTALLATION	
Casing material: PVC sch 40	Placement method: Gravity
Length of casing: 4 ft	Volume: 8 cu. ft.
Outside casing diameter: 2.38"	Backfill (if different from seal):
Inside casing diameter: 2"	Material:
Casing joint type: threaded	Placement method:
Casing/screen joint type:threaded	Volume:
Screen material: PVC	Surface seal design:
Screen opening size: 0.010"	Material of protective casing: Steel 6 inch
Screen length: 10 ft	Material of grout between protective casing and well casing: sand
Depth of well: 14 ft	Protective cap:
Filter Pack:	Material: Steel, vented
Material: Red Flint	Vented: ☐ Yes ☐ No Locking: ■ Yes ☐ No
Grain size: #40	Well Cap:
Volume: 4 cu. ft.	Material: PVC
Seal (minimum 3 ft length above filter pack):	Vented: ☐ Yes ■ No
Material: 3/8 inch bentonite chips	
D. GROUNDWATER MEASURMENT (± 0.01 ft below top of in	nner well casing)
Water level: 3.09 ft	Stabilization Time: <5 minutes
Well development method: Surged with block and pumped to	o reduce turbidity. 435 gallons pumped.
Average depth of frostline: 3.5'	

Attachments: Driller's log. Pipe schedules and grouting schedules. $8 \frac{1}{2} x 11$ inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

06/2011 cmz 05/06/2022 - Classification: Internal - ECRM12833551



IOWA DEPARTMENT OF NATURAL RESOURCES

MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

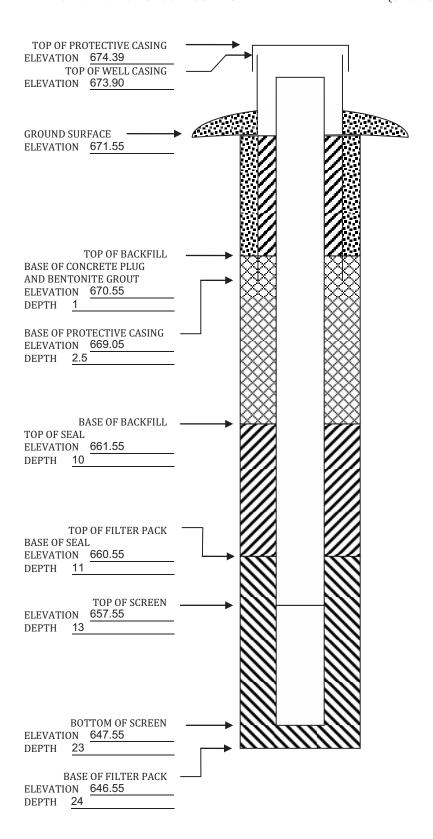
Disposal Site Name: IPL - Ottumwa Generating Station	Permit No.:
Well or Piezometer No: MW-302	<u></u>
Dates Started: 11/10/15	Date Completed: 11/11/15
A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):	Name & Address of Construction Company:
Specify corner of site:NW of Parcel 003052630215000	Cascade Drilling, LP
Distance & direction along boundary:844' NE	301 Alderson St
Distance & direction from boundary to wall.4.5' S	Schofield, WI 54476
Elevations (± 0.01 ft MSL):	Name of Driller: Todd Schmalfeld
Ground Surface: 671.55	Drilling Method: HSA
Top of protective casing: 674.39	Drilling Fluid: NA
Top of well casing: 673.90	Bore Hole Diameter: 8 inch
Benchmark elevation:	Soil Sampling Method: Spoon
Benchmark description:	Depth of Boring: 24 ft
C. MONITORING WELL INSTALLATION	
Casing material: PVC sch 40	Placement method: Gravity
Length of casing: 13 ft	Volume: 2.6 cu. ft
Outside casing diameter: 2.38"	Backfill (if different from seal):
Inside casing diameter: 2"	Material: 3/8" bentonite chips
Casing joint type: threaded	Placement method: Gravity
Casing/screen joint type:threaded	Volume: 1 cu. ft.
Screen material: PVC	Surface seal design:
Screen opening size: 0.010	Material of protective casing: Steel
Screen length: 10 ft	Material of grout between protective casing and well casing: sand
Depth of well: 23 ft	Protective cap:
Filter Pack:	Material: Steel, vented
Material: Red Flint	Vented: ☐ Yes ☐ No Locking: ■ Yes ☐ No
Grain size: #40	Well Cap:
Volume: 3.5 cu. ft	Material: PVC
Seal (minimum 3 ft length above filter pack):	Vented: ☐ Yes ■ No
Material: 3/8" bentonite chips	
D. GROUNDWATER MEASURMENT (± 0.01 ft below top of	inner well casing)
Water level: 18.19	Stabilization Time: < 5 min
Well development method: Surged with block and pumped	to remove turbidity. 183 gallons purged
Average depth of frostline: $3.5'$	

Attachments: Driller's log. Pipe schedules and grouting schedules. $8 \frac{1}{2} x 11$ inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

06/2011 cmz 05/06/2022 - Classification: Internal - ECRM12833551



STATE OF THE STATE

IOWA DEPARTMENT OF NATURAL RESOURCES

MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

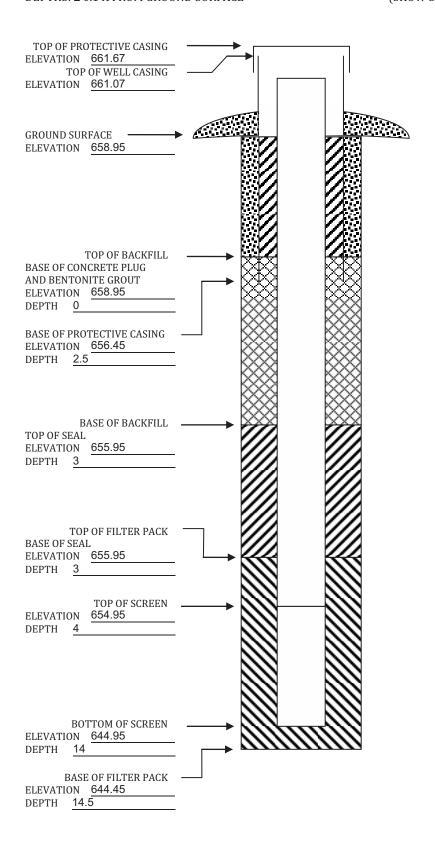
Disposal Site Name: IPL - Ottumwa Generating Station	Permit No.:
Well or Piezometer No: MW-303	
Dates Started: 12/8/15	Date Completed: 12/8/15
A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):	Name & Address of Construction Company:
Specify corner of site: SE of parcel 003052630207000	Cascade Drilling, LP
Distance & direction along boundary:181' NW	301 Alderson St
Distance & direction from boundary to wall: 0	Schofield, WI 54476
Elevations (± 0.01 ft MSL):	Name of Driller: Todd Schmalfeld
Ground Surface: 658.95	Drilling Method: HSA
Top of protective casing: 661.67	Drilling Fluid: NA
Top of well casing: 661.07	Bore Hole Diameter: 8 inch
Benchmark elevation:	Soil Sampling Method: Spoon
Benchmark description:	Depth of Boring: 14.5 ft
C. MONITORING WELL INSTALLATION	
Casing material: PVC sch 80	Placement method: Gravity
Length of casing: 3 ft	Volume: 10 cu. ft.
Outside casing diameter: 2.38"	Backfill (if different from seal):
Inside casing diameter: 2"	Material:
Casing joint type: threaded	Placement method:
Casing/screen joint type:threaded	Volume:
Screen material: PVC	Surface seal design:
Screen opening size: 0.010	Material of protective casing: Steel 6 inch
Screen length: 10 ft	Material of grout between protective casing and well casing: sand
Depth of well: 14 ft	Protective cap:
Filter Pack:	Material: Steel, vented
Material: Red Flint	Vented: ☐ Yes ☐ No Locking: ■ Yes ☐ No
Grain size: #40	Well Cap:
Volume: 7.5 cu. ft.	Material: PVC
Seal (minimum 3 ft length above filter pack):	Vented: ☐ Yes ■ No
Material: 3/8" bentonite chips	·
D. GROUNDWATER MEASURMENT (± 0.01 ft below top of in	ner well casing)
Water level: 7.71'	Stabilization Time: ~ 1 day (bails dry)
Well development method: Bailed dry 3 times to reduce turbi	dity
Average depth of frostline: 3.5'	

Attachments: Driller's log. Pipe schedules and grouting schedules. $8 \frac{1}{2} x 11$ inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

06/2011 cmz 05/06/2022 - Classification: Internal - ECRM12833551



IOWA DEPARTMENT OF NATURAL RESOURCES

MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

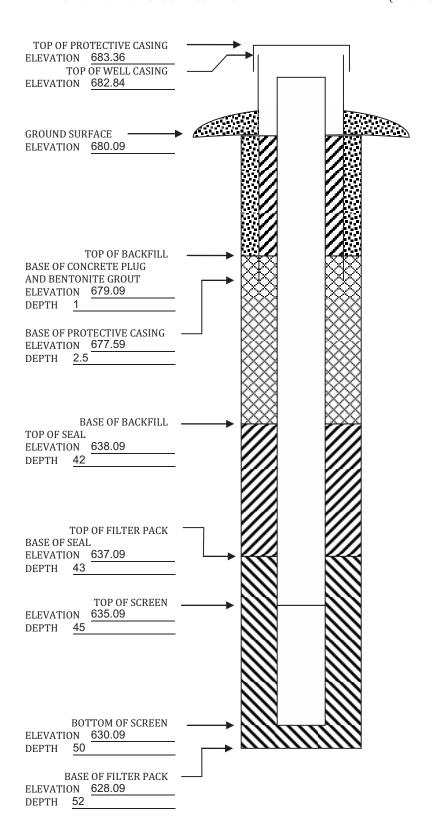
Disposal Site Name: IPL - Ottumwa Generating Station	Permit No.:
Well or Piezometer No: MW-304	<u></u>
Dates Started: 11/11/15	Date Completed: 11/12/15
A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):	Name & Address of Construction Company:
Specify corner of site:SE of Parcel 003052620200000	Cascade Drilling, LP
Distance & direction along boundary:502' W	301 Alderson St
Distance & direction from boundary to wall: 44' N	Schofield, WI 54476
Elevations (± 0.01 ft MSL):	Name of Driller: Todd Schmalfeld
Ground Surface: 680.09	Drilling Method: HSA
Top of protective casing: 683.36	Drilling Fluid: NA
Top of well casing: 682.84	Bore Hole Diameter: 8 inch
Benchmark elevation:	Soil Sampling Method: Spoon
Benchmark description:	Depth of Boring: 52 ft
C. MONITORING WELL INSTALLATION	
Casing material: PVC sch 40	Placement method: gravity
Length of casing: 40 ft	Volume: .3 cu. ft.
Outside casing diameter: 2.38"	Backfill (if different from seal):
Inside casing diameter: 2"	Material: AquaGuard Grout
Casing joint type: threaded	Placement method: tremie
Casing/screen joint type:threaded	Volume: 75 gallons
Screen material: PVC	Surface seal design:
Screen opening size:0.010"	Material of protective casing: Steel
Screen length: 5 ft	Material of grout between
	protective casing and well casing: sand
Depth of well: 50 ft Filter Pack:	Protective cap: Material: Steel, vented
Material: Red Flint	Vented: Yes No Locking: Yes No
Grain size: #40	Well Cap:
Volume: 2 cu. ft.	Material: PVC
Seal (minimum 3 ft length above filter pack):	Vented: Yes No
Material: 3/8" bentonite chips	venteu. Fies Fino
D. GROUNDWATER MEASURMENT (± 0.01 ft below top of	inner well casing)
Water level: 24.5 ft	Stabilization Time: ~1 day (bails dry)
Well development method: bailed dry 3 times to reduce tur	
Average depth of frostline: 3.5'	
——————————————————————————————————————	

Attachments: Driller's log. Pipe schedules and grouting schedules. $8 \frac{1}{2} x 11$ inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

06/2011 cmz 05/06/2022 - Classification: Internal - ECRM12833551



PAR

IOWA DEPARTMENT OF NATURAL RESOURCES

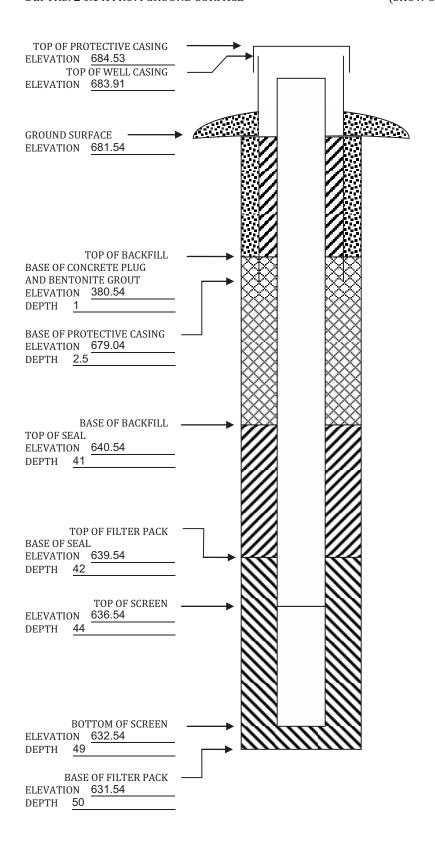
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Generating Station	Permit No.:
Well or Piezometer No: MW-305	
Dates Started: 12/7/15	Date Completed: 12/8/15
A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):	Name & Address of Construction Company:
Specify corner of site: SW of Parcel 003052620200000	Cascade Drilling, LP
Distance & direction along boundary: 539' E	301 Alderson St
Distance & direction from boundary to wall: 404' N	Schofield, WI 54476
Elevations (± 0.01 ft MSL):	Name of Driller: Todd Schmalfeld
Ground Surface: 681.54	Drilling Method: HSA
Top of protective casing: 684.53	Drilling Fluid: NA
Top of well casing: 683.91	Bore Hole Diameter: 8 inch
Benchmark elevation:	Soil Sampling Method: Spoon
Benchmark description:	Depth of Boring: 50 ft
C. MONITORING WELL INSTALLATION	
Casing material: PVC sch 80	Placement method: gravity
Length of casing: 44 ft	Volume: .3 cu. ft.
Outside casing diameter: 2.38"	Backfill (if different from seal):
Inside casing diameter: 2"	Material: AquaGuard grou
Casing joint type: threaded	Placement method: tremie
Casing/screen joint type:threaded	Volume: 80 gallons
Screen material: PVC	Surface seal design:
Screen opening size: 0.010	Material of protective casing: Steel
Screen length: 5 ft	Material of grout between protective casing and well casing: sand
Depth of well: 49 ft	Protective cap:
Filter Pack:	Material: Steel, vented
Material: Red Flint	Vented: ☐ Yes ☐ No Locking: ■ Yes ☐ No
Grain size: #40	Well Cap:
Volume: 2 cu. ft.	Material: PVC
Seal (minimum 3 ft length above filter pack):	Vented: ☐ Yes ■ No
Material: 3/8" bentonite chips	
D. GROUNDWATER MEASURMENT (± 0.01 ft below top of in	
Water level: 22.02	Stabilization Time: < 5 min
Well development method: Surged with block and pumped to	reduce turbidity
Average depth of frostline: $3.5'$	

Attachments: Driller's log. Pipe schedules and grouting schedules. $8 \frac{1}{2} x 11$ inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov



IOWA DEPARTMENT OF NATURAL RESOURCES

MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

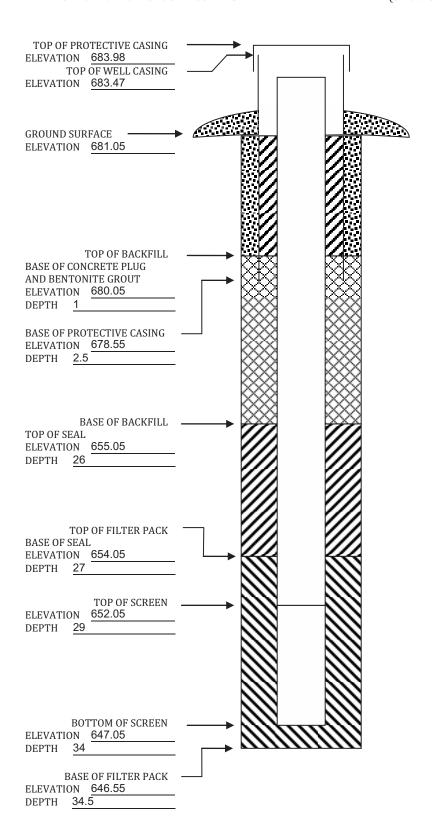
Disposal Site Name: IPL - Ottumwa Generating Station	Permit No.:
Well or Piezometer No: MW-306	_
Dates Started: 11/12/15	Date Completed:
A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):	Name & Address of Construction Company:
Specify corner of site: NW of Parcel 003052620200000	Cascade Drilling, LP
Distance & direction along boundary: 137.5' E	301 Alderson St
Distance & direction from boundary to wall: 321' S	Schofield, WI 54476
Elevations (± 0.01 ft MSL):	Name of Driller: Todd Schmalfeld
Ground Surface: 681.05	Drilling Method: HSA
Top of protective casing: 683.98	Drilling Fluid: NA
Top of well casing: 683.47	Bore Hole Diameter: 8 inch
Benchmark elevation:	Soil Sampling Method: Spoon
Benchmark description:	Depth of Boring: 34.5 ft
C. MONITORING WELL INSTALLATION	
Casing material: PVC sch 80	Placement method: Gravity
Length of casing: 29 ft	Volume: 10.5 cu. ft.
Outside casing diameter: 2.38"	Backfill (if different from seal):
Inside casing diameter: 2"	Material:
Casing joint type: threaded	Placement method:
Casing/screen joint type:threaded	Volume:
Screen material: PVC	Surface seal design:
Screen opening size: 0.010"	Material of protective casing: Steel
Screen length: 5 ft	Material of grout between protective casing and well casing: sand
Depth of well: 34 ft	Protective cap:
Filter Pack:	Material: Steel, vented
Material: Red Flint	Vented: ☐ Yes ☐ No Locking: ■ Yes ☐ No
Grain size: #40	Well Cap:
Volume: 2 cu. ft.	Material: PVC
Seal (minimum 3 ft length above filter pack):	Vented: ☐ Yes ■ No
Material: 3/8" bentonite chips	
D. GROUNDWATER MEASURMENT (± 0.01 ft below top of i	nner well casing)
Water level: 12.96'	Stabilization Time: < 5 min
Well development method: Surged with block and pumped.	193 gallons purged.
Average depth of frostline: 3.5'	

Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

DNR Form 542-1277



DNR Form 542-1277

PAR

IOWA DEPARTMENT OF NATURAL RESOURCES

MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

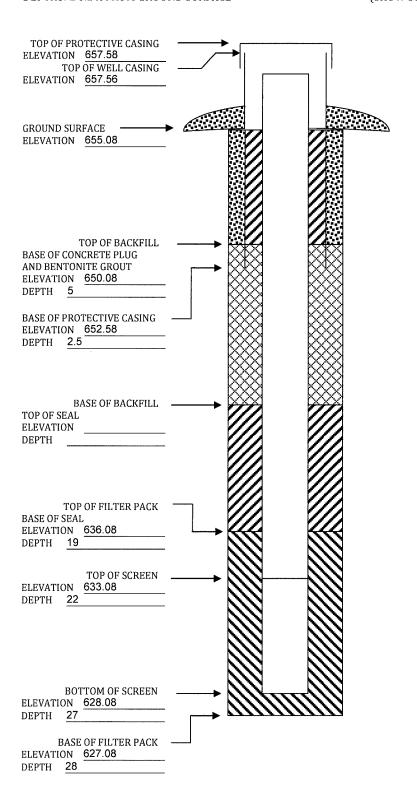
Disposal Site Name: IPL - Ottumwa Generating Station	Permit No.:
Well or Piezometer No: MW-307	
Dates Started: 10/25/16	Date Completed: 10/25/16
A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):	Name & Address of Construction Company:
Specify corner of site:NE of Parcel 003052620200000	Cascade Drilling, LP
Distance & direction along boundary:683' W	301 Alderson St
Distance & direction from boundary to wall:296' S	Schofield, WI 54476
Elevations (± 0.01 ft MSL):	Name of Driller: Mike Mueller
Ground Surface: 655.08	Drilling Method: HSA
Top of protective casing: 657.58	Drilling Fluid: NA
Top of well casing: 657.56	Bore Hole Diameter: 8 inch
Benchmark elevation:	Soil Sampling Method: Spoon
Benchmark description:	Depth of Boring: 28 ft
C. MONITORING WELL INSTALLATION	
Casing material: PVC sch 40	Placement method: Gravity
Length of casing: 22 ft	Volume: 250 lbs
Outside casing diameter: 2.38"	Backfill (if different from seal):
Inside casing diameter: 2"	Material:
Casing joint type: threaded	Placement method:
Casing/screen joint type:threaded	Volume:
Screen material: PVC	Surface seal design:
Screen opening size: 0.010"	Material of protective casing: Steel 6 inch
Screen length: 5 ft	Material of grout between protective casing and well casing: sand
Depth of well: 27 ft	Protective cap:
Filter Pack:	Material: Steel, vented
Material: Red Flint	Vented: ■ Yes □ No Locking: □ Yes □ No
Grain size: #40	Well Cap:
Volume: 200 lbs	Material: PVC
Seal (minimum 3 ft length above filter pack):	Vented: ☐ Yes ■ No
Material: 3/8 inch bentonite chips	
D. GROUNDWATER MEASURMENT (± 0.01 ft below top of in	ner well casing)
Water level: 8.12	Stabilization Time: 5 minutes
Well development method: surged with bailer and pumped	
Average depth of frostline: 3.5'	

Attachments: Driller's log. Pipe schedules and grouting schedules. $8\frac{1}{2}x11$ inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

06/2011 cmz



IOWA DEPARTMENT OF NATURAL RESOURCES

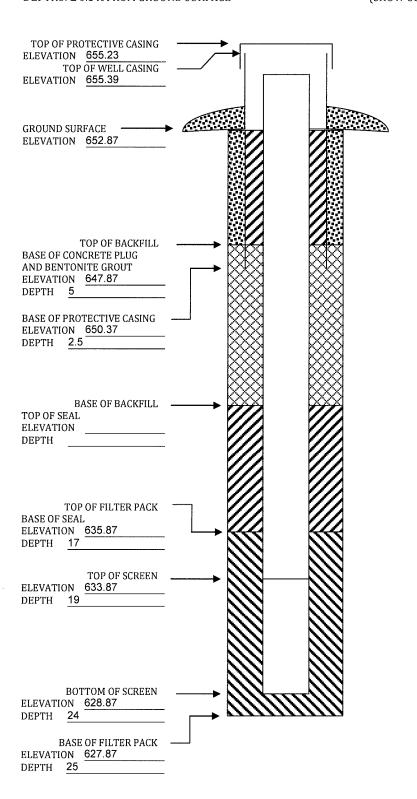
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Generating Station	Permit No.:
Well or Piezometer No: MW-308	
Dates Started: 10/26/16	Date Completed: 10/26/16
A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):	Name & Address of Construction Company:
Specify corner of site:SW of Parcel 0030502620203000	Cascade Drilling, LP
Distance & direction along boundary:158' E	301 Alderson St
Distance & direction from boundary to wall:417' N	Schofield, WI 54476
Elevations (± 0.01 ft MSL):	Name of Driller: Mike Mueller
Ground Surface: 652.87	Drilling Method: HSA
Top of protective casing: 655.23	Drilling Fluid: NA
Top of well casing: 655.39	Bore Hole Diameter: 8 inch
Benchmark elevation:	Soil Sampling Method: Spoon
Benchmark description:	Depth of Boring: 25 ft
C. MONITORING WELL INSTALLATION	
Casing material: PVC sch 40	Placement method: Gravity
Length of casing: 19 ft	Volume: 200 lbs
Outside casing diameter: 2.38"	Backfill (if different from seal):
Inside casing diameter: 2"	Material:
Casing joint type: threaded	Placement method:
Casing/screen joint type:threaded	Volume:
Screen material: PVC	Surface seal design:
Screen opening size: 0.010"	Material of protective casing: Steel 6 inch
Screen length: 5 ft	Material of grout between protective casing and well casing: sand
Depth of well: 24 ft	Protective cap:
Filter Pack:	Material: Steel, vented
Material: Red Flint	Vented: ■ Yes □ No Locking: □ Yes □ No
Grain size: #40	Well Cap:
Volume: 200 lbs	Material: PVC
Seal (minimum 3 ft length above filter pack):	Vented: ☐ Yes ■ No
Material: 3/8 inch bentonite chips	
D. GROUNDWATER MEASURMENT (± 0.01 ft below top of in	ner well casing)
Water level: 9.85	Stabilization Time: 5 minutes
Well development method: surged with bailer and pumped	
Average depth of frostline: 3.5'	

Attachments: Driller's log. Pipe schedules and grouting schedules. $8\frac{1}{2}x11$ inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov



06/2011 cmz

DNR Form 542-1277

PRID

IOWA DEPARTMENT OF NATURAL RESOURCES

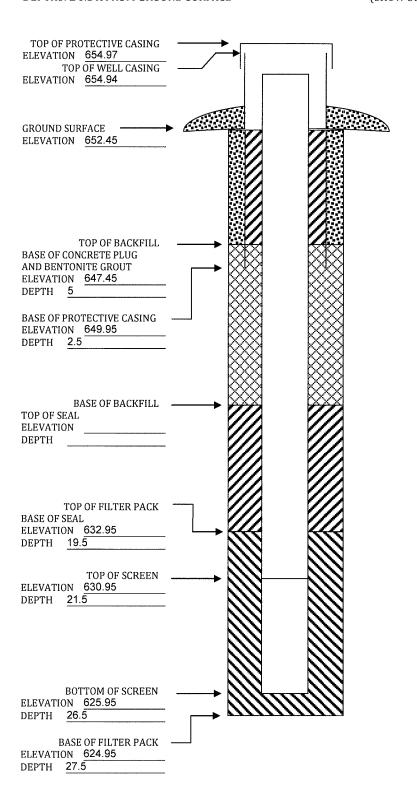
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ott	tumwa Generating Station	Permit No.:
Well or Piezometer No: MW	-309	
Dates Started: 10/27/16		Date Completed: 10/27/16
A. SURVEYED LOCATIONS A	ND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft):		Name & Address of Construction Company:
Specify corner of site:NE of P	arcel 003052620204000	Cascade Drilling, LP
Distance & direction along bo	undary:480' W	301 Alderson St
Distance & direction from bou	ındary to wall:438' S	Schofield, WI 54476
Elevations (± 0.01 ft MSL): _		Name of Driller: Mike Mueller
Ground Surface: 652.45		Drilling Method: HSA
Top of protective casing: 654.		Drilling Fluid: NA
Top of well casing:	654.94	Bore Hole Diameter: 8 inch
Benchmark elevation:		Soil Sampling Method: Spoon
Benchmark description:		Depth of Boring: 27.5 ft
C. MONITORING WELL INST.	ALLATION	
Casing material:	PVC sch 40	Placement method: Gravity
Length of casing:	21.5 ft	Volume: 600 lbs
Outside casing diameter:	2.38"	Backfill (if different from seal):
Inside casing diameter:	2"	Material:
Casing joint type:	threaded	Placement method:
Casing/screen joint type:three	aded	Volume:
Screen material:	PVC	Surface seal design:
Screen opening size: 0.010"		Material of protective casing: Steel 6 inch
Screen length:	5 ft	Material of grout between protective casing and well casing: sand
Depth of well:	26.5 ft	Protective cap:
Filter Pack:		Material: Steel, vented
Material:	Red Flint	Vented: ■ Yes □ No Locking: □ Yes □ No
Grain size:	#40	Well Cap:
Volume:	200 lbs	Material: PVC
Seal (minimum 3 ft length abo		Vented: ☐ Yes ■ No
Material: 3/8 inch bentonite	chips	
D. GROUNDWATER MEASUR	MENT (± 0.01 ft below top of in	ner well casing)
Water level: 9.87		Stabilization Time: 5 minutes
Well development method: S	urged with bailer and pumped	
	.5'	
Attachments: Driller's log. I monitoring wells and piezo		nedules. 8 ½x11 inch map showing locations of all

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

06/2011 cmz



	e of W artmen		atural R		/astewater [] /Redevelopment []	Waste Other		gement			SOIL onn 44		ING	LOG	Re	v.: 7-98	
Facili						1.icense/	Permit	/Monito	ring N	umber		Boring			Page	1 (of 2
IPL	- Otto	umwa	Gener	ating Station of crew chief (first, last) a	SCS#: 25219028,00	Date Dri	Min., S	Instad		Da	te Drill		MW		fraci	17	thod
West Comments	c Wei	-50.000.00		or contraction, many or		Date (51)	iumg o	iai icu		174	ic Dilli	ing Coi	приссе				ollow
Rol	erts	Envi	onme	ntal Drilling, Inc.				7/2019				8/27/2	2019		sto	m au	ger
WI U	nque \	Well N	O.	DNR Well ID No.	Common Well Name MW-310	Final Sta	uic Wa Feet		:I	CONTRACTOR OF THE	e Eleva 55.76		1214	Be	orchole o	Diame 5 in.	ter
Local	Grid C	rigin		estimated []) or Bor	ing Location	1	1 001	0			Local (0	.5 111.	
State			40	1,502 N, 1,904,206		l.a	ıt		<u> </u>			Feet			1	reet [3 E
Facilit		4 of		1/4 of Section ,	T N, R	County Co		Civil To	oum/C	itul or	Zillana						W
	2			Wapello		Salamy Sa	nut.	Ottun		ity/ Oi	rmage						
San	nple						П					Soil	Prop	erties			
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	And Ge Eac	ock Description ologic Origin For th Major Unit		uscs	Graphic Log	Well	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	ROD/	Comments
			-2 -3 -4 -5 -7	Hydrovac through elay	for utility clearances,												
\$1 \$2	11	WOR 1 1 10 2 2 3 2	8 6 9 1 10 1 1	LEAN CLAY, brown, Some reddish brown an		sik.	80					М					

Firm SCS Engineers 2830 Dairy Drive Madison, WI 53718 This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis, Stats, Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identificable information on this form is not intended to be be used for any other purpose. NOTE. See instructions for more information, including where the completed form

fel: 608-224-2850

Signature

should be sent.

SILT, brown, with clay

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Sam	•									Soil	Prope	rties		
and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/
	24	WOR	-16		SIL					M/W				
	18	13 23	- 17 - 18	POORLY GRADED SAND, fine to medium, 1/2" coarse sand seam at 17,75'.						w				
	14 W	OR WC	19 -20							w				
	10	WOR 2	21	Trace small rounded gravel	SP					w				
	24	6 6 20	23	End of boring at 24'						W				
			9.5											

	le of W parlmen		uural R		Wastewater			gement			SOIL form 44			LOG		ORMATION ev. 7-98
				Remediatio	n/Redevelopment 📋	Other									Page	l of 2
	ity/Proj			D		License/	Permit	/Monito	ring N	umber		Boring				
Borin	e Drill	ed By	Name	ating Station of crew chief (first, last)	SCS#: 25219028.00	Date Dr	illing S	tarted		11)1	te Drill		MW		Dell	ling Method
	ic We					J. Committee	6	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		1.70	171111	ing coi	inprotec	•		1/4 hollow
			onmei	ntal Drilling, Inc.			8/27	7/2019		-		8/27/	2019			em auger
WLU	Inique \	Well No	o.	DNR Well ID No.	Common Well Name	Final Sta			el	Surfac	e Eleva	tion		Be	rchole	Diameter
	77.77		post .	1.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	MW-311		Feet	MSL			51.24				8	.5 in.
	Grid C	nigin		stimated: (1) or B 0,350 N, 1,907,600		1.3	ıt	0	*		Local (
อเลเซ		4 of		1/4 of Section ;		Lon		0	*			Fee				Feet E E W
Facili		7 01		County		County Co		Civil T	own/C	ity/ or	Village		11.3	0		LJ W
	8			Wapello		(6)		Ottur			-					
Sar	mple							1				Soil	Prop	erties		
	E. &	1/2	등	Soil/	Rack Description											
Q	i i	Blow Counts	Depth In Feet	And C	Reologic Origin For						_ 6					ti si
Typ	gth 2) ×	다 1	E	ach Major Unit		CS	hic	Tari		darc	shure ent	.p _	icip X		iner.
Number and Type	Length Att.	Blov	Dep				SD	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
-			E				É	<u> </u>			37.4					
			E,													
				LEAN CLAY, brown sand, roots, 1" sand s	i, massive, trace fine to n	nedium			8 8							
SI	14	23 46	-2		, ,			1				M				
		40							8 1							
			-3					(-)	8 1							
00		3 3	E-4				Ch.									
S2	14	4.6										М		1		
-			-5		9											
S3	6	23	-6	SILT, brown, massive	ž.			$+$ π				М				
							266		1 4							
			-	LEAN CLAY, brown	i, massive.		(L	1 20								
S4	20	2.3	8					l				M/W				
.54	20	4.3		POORLY GRADED massive,	SAND, fine to medium,	brown						1VI/ W				
H			-9						1 1							
S5	12	23 45	-10	2" clay seam at 10,5%								W				
			Err	a ving main in 10,5%					H							
										r .						

Thereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm SCS Engineers

2830 Dairy Drive Madison, WI 53718

Tel: 608-224-2830
Fax

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299. Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

14

	g Numb	ier	MW	V-311 Use only as an attachment to Form 4400-1	22.			_	1	0-!1	D		Page	2 of 2
Number and Type	Length Att. & d	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Limit Limit	Plasticity solution	P 200	RQD/ Comments
			16	End of boring at 16'.	SV									

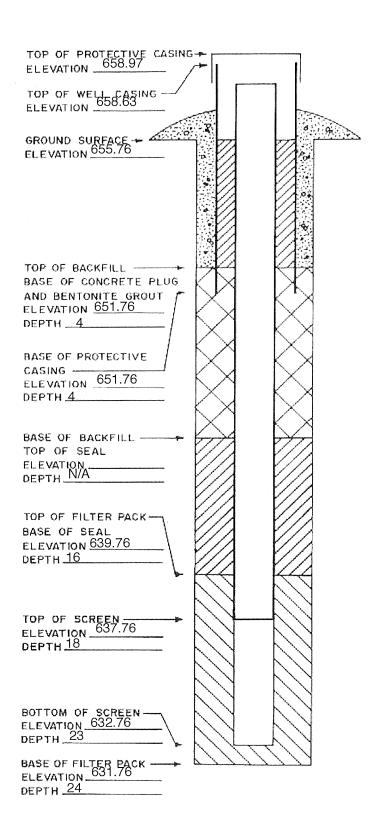
MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name IPL - Ottumwa Generating Station	Permit No.						
Well or Piezometer No. MW-310 Dates Starte	d 8/27/2019 Date Completed 8/27/2019						
A. SURVEYED LOCATION AND ELEVATION OF POINT (+0.5 f	t.)						
Specify corner of site Middle Avery Creek @ Des Moines River Distance	e and direction along boundary 340' NW						
Distance and direction from boundary to surface monitoring	g well _45' SW						
Elevation (+0.01 ft. MSL)	_						
Ground Surface 655.76	Top of protective casing 658.97						
Top of well casing 658.63	Benchmark elevation						
Benchmark description							
B. SOIL BORING INFORMATION							
Construction Company Name Roberts Environmental Drilling							
Address 1107 South Mulberry Street	City, State, Zip Code Millstadt, IL, 62260						
Name of driller Eric Wetzel							
Drilling method 4 1/4" HSA Drilling fluid	Bore Hole diameter 8.5"						
Soil sampling method Split Spoon	Depth of boring 24'						
C. MONITORING WELL INSTALLATION							
Casing material PVC - Sch. 40	Placement method Gravity						
Length of casing 20.87	Volume 4 cubic feet						
Outside casing diameter 2.4"	Backfill (if different from seal):						
Inside casing diameter 2.0"	Material						
Casing joint type Threaded	Placement method						
Casing/screen joint type Threaded	Volume						
Screen material PVC - Sch. 40	Surface seal design: Concrete						
Screen opening size 0.01'	Material of protective casing: Steel						
	Material of grout between						
Screen length 5'	protective casing and well casing: Bentonite/Filter Sand						
Depth of Well 23'	Protective cap:						
Filter Pack:	Material Steel						
Material Filter Sand	Vented?: ⊠Y N Locking?: ⊠Y N						
Grain Size #5	Well cap:						
Volume 1.25 cubic feet	Material Plastic						
Seal (minimum 3 ft. length above filter pack):	Vented?: 🔲 Y 💢 N						
Material 3/8" Bentonite Chips	-						
D. GROUNDWATER MEASUREMENT (±0.01 foot below top of	of inner well casing)						
Water level 16.67	Stabilization time 5 min						
Well development method surge and purge with pump to re	move turbidity						
Average depth of frost line 3.5'							
是是我们的最后,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们就会不会会的。""我们就是这一个人的,我们就会不会 "我们就是我们就是我们就是我们就是我们就是我们就是我们的,我们就是我们的,我们就是我们的,我们就是我们的,我们就是我们的,我们就是我们的,我们就是我们的,我们就	ERTIFICATION						
	tion reported above is true, accurate, and complete.						
Signature EMMT	Certification #						

Attachments: Driller's log. Pipe schedules and grouting schedules. 8 % inch x 11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Burcau, 502 E. 9th St, Des Moines, IA 50319. Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

ELEVATIONS: ± 0.01 FT. MSL DEPTHS: ± 0.1 FT. FROM GROUND SERFACE

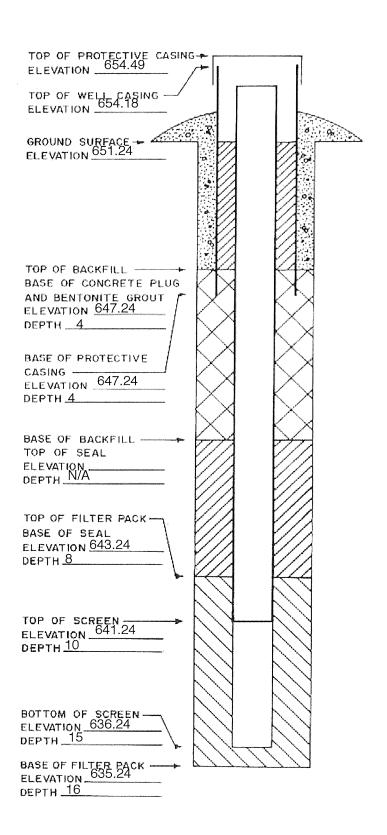


MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name IPL - Ottumwa Generating Station	Permit No							
Well or Piezometer No. MW-311 Dates Starte	d <u>8/27/2019</u> Date Completed <u>8/27/2019</u>							
A. SURVEYED LOCATION AND ELEVATION OF POINT (+0.5 f	:1							
	and direction along boundary 730' W							
Distance and direction from boundary to surface monitoring								
Elevation (+0.01 ft. MSL)								
Ground Surface 651.24	Top of protective casing 654.49							
Top of well casing 654.18	Benchmark elevation							
Benchmark description								
D. COULDODING INFORMATION								
B. SOIL BORING INFORMATION Construction Company Name Roberts Environmental Drilling	The							
Construction Company Name Roberts Environmental Drilling Address 1107 South Mulberry Street	City, State, Zip Code Millstadt, IL, 62260							
Name of driller Eric Wetzel	City, State, Zip Code Ministati, 12, 02200							
Drilling method 4 1/4" HSA Drilling fluid	Bore Hole diameter 8.5"							
Soil sampling method Split Spoon	Depth of boring 16'							
C. MONITORING WELL INSTALLATION	Placement method Gravity							
Casing material PVC - Sch. 40 Length of casing 12.94'	Volume 2 cubic feet							
Outside casing diameter 2.4"	Backfill (if different from seal):							
Inside casing diameter 2.0"	Material							
Casing joint type Threaded	Placement method							
Casing/screen joint type Threaded	Volume							
Screen material PVC - Sch. 40	Surface seal design: Concrete							
Screen opening size 0.01'	Material of protective casing: Steel							
	Material of grout between							
Screen length 5'	protective casing and well casing: Bentonite/Filter Sand							
Depth of Well 15'	Protective cap:							
Filter Pack:	Material Steel							
Material Filter Sand	Vented?: XYN Locking?: XYN							
Grain Size #5	Well cap:							
Volume 1.5 cubic feet	Material Plastic							
Seal (minimum 3 ft. length above filter pack):	Vented?: X X N							
Material 3/8" Bentonite Chips	-							
D. GROUNDWATER MEASUREMENT (±0.01 foot below top of	f inner well casing)							
Water level 12.04	Stabilization time 5 min							
Well development method surge and purge with pump to re	move turbidity							
Average depth of frost line 3.5'								
DRILLER'S CE	RTIFICATION							
	ion reported above is true, accurate, and complete.							
Signature (Signature)	Certification # 150 9 Date 11.3.19							

Attachments: Driller's log. Pipe schedules and grouting schedules. $8\,\%$ inch x 11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319. Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov



Appendix C **Historical Monitoring Results**

Name: IPL - Ottumwa Generating Station

Location ID:	MW-301			
Number of Sampling Dates: Parameter Name	3 Units	1/8/2019	4/8/2019	10/24/2019
		1/0/2019	380	680
Boron	ug/L			
Calcium	mg/L		43	78
Chloride	mg/L		50	110
Fluoride	mg/L		0.44	<0.23
Field pH	Std. Units	5.68	6.61	6.33
Sulfate	mg/L		81	130
Total Dissolved Solids	mg/L		340	510
Antimony	ug/L		<0.53	<0.53
Arsenic	ug/L		<0.75	<0.75
Barium	ug/L		25	56
Beryllium	ug/L		<0.27	<0.27
Cadmium	ug/L		<0.077	0.04
Chromium	ug/L		<0.98	<0.98
Cobalt	ug/L		0.44	0.6
Lead	ug/L		<0.27	<0.27
Lithium	ug/L		15	24
Mercury	ug/L	<0.09	<0.1	<0.1
Molybdenum	ug/L		<1.1	1.1
Selenium	ug/L		3.1	6.2
Thallium	ug/L		<0.27	<0.27
Total Radium	pCi/L		0.0956	0.956
Radium-226	pCi/L		0.0726	0.15
Radium-228	pCi/L		0.023	0.753
Field Specific Conductance	umhos/cm	310	501	902
Field Temperature	deg C	7.88	7.27	13.71
Groundwater Elevation	feet	682.22	682.69	683.07
Oxygen, Dissolved	mg/L	5.68	8.32	4.94
Turbidity	NTU	0.77	1.87	1.6
pH at 25 Degrees C	Std. Units		7.1	7.1
Field Oxidation Potential	millivolts	118.3	37.6	9.9

Page 1 3/31/2022 9:38:31 AM

Name: IPL - Ottumwa Generating Station

3			
Unite	1/9/2010	4/9/2010	10/24/2019
	1/0/2019		1200
			180
		-	220
		<0.23	<0.23
Std. Units	6.58	6.61	6.55
mg/L		840	810
mg/L		1600	1600
ug/L		<0.53	<0.53
ug/L		<0.75	<0.75
ug/L		19	21
ug/L		<0.27	<0.27
ug/L		0.21	0.2
ug/L		<0.98	<0.98
ug/L		1.2	2.7
ug/L		<0.27	0.29
ug/L		10	10
ug/L	<0.09	<0.1	<0.1
ug/L		<1.1	<1.1
ug/L		<1	<1
ug/L		<0.27	<0.27
pCi/L		0.116	0.752
pCi/L		0.116	0.134
pCi/L		-0.0591	0.619
umhos/cm	1473	2159	2184
deg C	12.21	12.27	12.91
feet	656.03	657.23	660.14
mg/L	6.4	0.86	0.35
NTU	4.39	26.9	11.9
Std. Units		6.9	7.2
millivolts	70.2	68.3	-0.5
	mg/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L u	ug/L mg/L mg/L mg/L std. Units 6.58 mg/L ug/L ug	ug/L 1300 mg/L 200 mg/L 240 mg/L 240 mg/L 240 mg/L 240 mg/L 20.23 Std. Units 6.58 6.61 mg/L 840 mg/L 1600 ug/L <0.53

Page 1 3/31/2022 9:40:35 AM

Name: IPL - Ottumwa Generating Station

Location ID:	MW-303			
Number of Sampling Dates: Parameter Name	3 Units	1/8/2019	4/8/2019	10/24/2019
Boron	ug/L		290	440
Calcium	mg/L		170	170
Chloride	mg/L		22	35
Fluoride	mg/L		<0.23	<0.23
Field pH	Std. Units	6.83	7	6.83
Sulfate	mg/L		260	180
Total Dissolved Solids	mg/L		890	810
Antimony	ug/L		<0.53	<0.53
Arsenic	ug/L		<0.75	<0.75
Barium	ug/L		54	77
Beryllium	ug/L		<0.27	<0.27
Cadmium	ug/L		0.092	0.21
Chromium	ug/L		<0.98	<0.98
Cobalt	ug/L		0.42	1.2
Lead	ug/L		<0.27	<0.27
Lithium	ug/L		<2.7	<2.7
Mercury	ug/L	<0.09	<0.1	<0.1
Molybdenum	ug/L		7.5	5.2
Selenium	ug/L		2.1	<1
Thallium	ug/L		<0.27	<0.27
Total Radium	pCi/L		0.391	0.321
Radium-226	pCi/L		0.172	0.0551
Radium-228	pCi/L		0.22	0.265
Field Specific Conductance	umhos/cm	750	1181	1287
Field Temperature	deg C	9.11	8.51	15.34
Groundwater Elevation	feet	654.65	655.55	653.86
Oxygen, Dissolved	mg/L	3.19	2.29	0.28
Turbidity	NTU	14.2	3.49	4.24
pH at 25 Degrees C	Std. Units		7.5	7.5
Field Oxidation Potential	millivolts	73.7	51.7	-5.1

Page 1 3/31/2022 9:41:00 AM

Name: IPL - Ottumwa Generating Station

Location ID:	MW-304			
Number of Sampling Dates: Parameter Name	3	4/0/0040	4/0/0040	40/00/0040
	Units	1/8/2019	4/8/2019	10/23/2019
Boron	ug/L		1100	970
Calcium	mg/L		130	120
Chloride	mg/L		320	280
Fluoride	mg/L		1.3	0.74
Field pH	Std. Units	7.16	7.17	7.05
Sulfate	mg/L		180	190
Total Dissolved Solids	mg/L		1100	1100
Antimony	ug/L		<0.53	<0.53
Arsenic	ug/L		<0.75	0.83
Barium	ug/L		80	80
Beryllium	ug/L		<0.27	<0.27
Cadmium	ug/L		<0.077	<0.039
Chromium	ug/L		1.6	2
Cobalt	ug/L		0.4	0.5
Lead	ug/L		<0.27	0.27
Lithium	ug/L		3.3	2.8
Mercury	ug/L	<0.09	<0.1	<0.1
Molybdenum	ug/L		1.5	2.3
Selenium	ug/L		<1	<1
Thallium	ug/L		<0.27	<0.27
Total Radium	pCi/L		2.42	2.58
Radium-226	pCi/L		1.23	1.08
Radium-228	pCi/L		1.19	1.5
Field Specific Conductance	umhos/cm	1368	1876	1871
Field Temperature	deg C	12.81	13.75	13.64
Groundwater Elevation	feet	656.28	659.33	657.71
Oxygen, Dissolved	mg/L	0.72	0.41	0.44
Turbidity	NTU	4.38	57.9	18.9
pH at 25 Degrees C	Std. Units		7.5	7.7
Field Oxidation Potential	millivolts	-62.1	-58.3	-57.5

Page 1 3/31/2022 9:41:30 AM

Name: IPL - Ottumwa Generating Station

Location ID:	MW-305			
Number of Sampling Dates: Parameter Name	3 Units	1/8/2019	4/8/2019	10/23/2019
Boron	ug/L	1/0/2019	1000	880
Calcium			110	100
Chloride	mg/L		250	280
-	mg/L			
Fluoride	mg/L		0.75	<0.23
Field pH	Std. Units	6.99	7.06	6.91
Sulfate	mg/L		110	76
Total Dissolved Solids	mg/L		1000	1000
Antimony	ug/L		<0.53	<0.53
Arsenic	ug/L		<0.75	<0.75
Barium	ug/L		120	110
Beryllium	ug/L		<0.27	<0.27
Cadmium	ug/L		<0.077	0.087
Chromium	ug/L		<0.98	<0.98
Cobalt	ug/L	16.4	17	17
Lead	ug/L		<0.27	<0.27
Lithium	ug/L		<2.7	<2.7
Mercury	ug/L	<0.09	<0.1	<0.1
Molybdenum	ug/L		7.2	7.2
Selenium	ug/L		<1	<1
Thallium	ug/L		0.33	0.38
Total Radium	pCi/L		0.685	0.383
Radium-226	pCi/L		0.339	0.186
Radium-228	pCi/L		0.347	0.197
Field Specific Conductance	umhos/cm	1235	1728	1794
Field Temperature	deg C	12.43	13.8	13.2
Groundwater Elevation	feet	662.13	664.01	663.21
Oxygen, Dissolved	mg/L	0.81	0.59	0.42
Turbidity	NTU	4.76	21.7	6.21
pH at 25 Degrees C	Std. Units		7	7.5
Field Oxidation Potential	millivolts	36.4	32.6	-6.7

Page 1 3/31/2022 9:42:23 AM

Name: IPL - Ottumwa Generating Station

Location ID:	MW-306				
Number of Sampling Dates: Parameter Name	3 Units	1/8/2019	4/8/2019	10/23/2019	
		1/0/2019			
Boron	ug/L		1100	980	
Calcium	mg/L		95	77	
Chloride	mg/L		98	47	
Fluoride	mg/L		0.27	<0.23	
Field pH	Std. Units	6.65	6.66	6.74	
Sulfate	mg/L		270	280	
Total Dissolved Solids	mg/L		930	870	
Antimony	ug/L		<0.53	<0.53	
Arsenic	ug/L		<0.75	0.78	
Barium	ug/L		58	51	
Beryllium	ug/L		<0.27	<0.27	
Cadmium	ug/L		1.1	0.89	
Chromium	ug/L		<0.98	1	
Cobalt	ug/L	6.2	6.9	6.2	
Lead	ug/L		<0.27	0.34	
Lithium	ug/L		<2.7	<2.7	
Mercury	ug/L	<0.09	<0.1	<0.1	
Molybdenum	ug/L		4.3	4.9	
Selenium	ug/L		<1	<1	
Thallium	ug/L		<0.27	<0.27	
Total Radium	pCi/L		0.155	0.624	
Radium-226	pCi/L		0.0529	-0.00408	
Radium-228	pCi/L		0.102	0.624	
Field Specific Conductance	umhos/cm	965	1350	1266	
Field Temperature	deg C	13.31	13.63	13.12	
Groundwater Elevation	feet	669.84	670.96	671.28	
Oxygen, Dissolved	mg/L	0.47	0.92	0.29	
Turbidity	NTU	0.89	28.5	12.3	
pH at 25 Degrees C	Std. Units		6.6	7.4	
Field Oxidation Potential	millivolts	59.5	49.1	-0.5	

Page 1 3/31/2022 9:42:10 AM

Name: IPL - Ottumwa Generating Station

Location ID:	MW-310						
Number of Sampling Dates: 1							
Parameter Name	Units	10/24/2019					
Boron	ug/L	720					
Calcium	mg/L	230					
Chloride	mg/L	150					
Fluoride	mg/L	0.31					
Field pH	Std. Units	7.15					
Sulfate	mg/L	610					
Total Dissolved Solids	mg/L	260					
Antimony	ug/L	<0.53					
Arsenic	ug/L	0.78					
Barium	ug/L	76					
Beryllium	ug/L	<0.27					
Cadmium	ug/L	0.22					
Chromium	ug/L	<0.98					
Cobalt	ug/L	0.57					
Lead	ug/L	<0.27					
Lithium	ug/L	35					
Mercury	ug/L	<0.1					
Molybdenum	ug/L	26					
Selenium	ug/L	5					
Thallium	ug/L	<0.27					
Total Radium	pCi/L	0.411					
Radium-226	pCi/L	-0.0393					
Radium-228	pCi/L	0.411					
Field Specific Conductance	umhos/cm	1906					
Field Temperature	deg C	13.74					
Groundwater Elevation	feet	649.31 ft					
Oxygen, Dissolved	mg/L	0.41					
Turbidity	NTU	2.29					
pH at 25 Degrees C	Std. Units	7.2					
Field Oxidation Potential	millivolts	-9.3					

Page 1 3/31/2022 9:42:44 AM

Name: IPL - Ottumwa Generating Station

Location ID:	MW-311	
Number of Sampling Dates:	1	
Parameter Name	Units	10/24/2019
Boron	ug/L	<110
Calcium	mg/L	170
Chloride	mg/L	13
Fluoride	mg/L	<0.23
Field pH	Std. Units	6.95
Sulfate	mg/L	47
Total Dissolved Solids	mg/L	530
Antimony	ug/L	<0.53
Arsenic	ug/L	<0.75
Barium	ug/L	200
Beryllium	ug/L	<0.27
Cadmium	ug/L	0.04
Chromium	ug/L	<0.98
Cobalt	ug/L	0.78
Lead	ug/L	<0.27
Lithium	ug/L	4.7
Mercury	ug/L	<0.1
Molybdenum	ug/L	<1.1
Selenium	ug/L	<1
Thallium	ug/L	<0.27
Total Radium	pCi/L	0.386
Radium-226	pCi/L	0.0831
Radium-228	pCi/L	0.303
Field Specific Conductance	umhos/cm	926
Field Temperature	deg C	13.88
Groundwater Elevation	feet	647.8
Oxygen, Dissolved	mg/L	0.29
Turbidity	NTU	3.88
pH at 25 Degrees C	Std. Units	7
Field Oxidation Potential	millivolts	-24.7

Page 1 3/31/2022 9:43:01 AM

Appendix D Statistical Evaluation

SCS ENGINEERS

APPENDIX D - STATISTICAL EVALUATION

2019 Annual Report Addendum Ottumwa Generating Station Ash Pond

Statistical evaluation completed in 2019 included the following:

• Calculation of lower confidence limit (LCL) for the mean for cobalt for wells with individual results exceeding the Groundwater Protection Standard (GPS).

These evaluations were completed in accordance with 40 CFR 257.93(f)(3) using an interwell prediction interval procedure, and in accordance with the statistical methods described in the Sampling and Analysis Plan for the monitoring system.

These evaluations are documented in the following attachments:

- LCL Calculations for April 2019 Event
- LCL Calculations for October 2019 Event

Upper Prediction Limits (UPLs) previously calculated from the background monitoring data from upgradient well MW-301 were applied to the monitoring events in 2018. The UPL calculations were provided in the 2018 Annual Report Addendum.

SCC/AJR



Table 2
Assessment Monitoring Results April 2019 - Cobalt IPL - Ottumwa Generating Station

				Assessmer	nt Monitoring					
Monitoring Well	Units	Groundwater Protection Standard (GPS)	4/18/2018	8/15/2018	10/16/2018	1/8/2019	4/8/2019	Mean	Lower Confidence Limit for Mean (a = 95%)	LCL Exceeds GPS?
MW-305	ug/L	6	14.5	15.6	17.2	16.4	17.0	16.1	15.3	YES
MW-306	ug/L	6	4.8	5.5	6.4	6.2	6.92	6.0	5.3	NO

I:\25219072.00\Data and Calculations\Tables\[LCL Calc Table_OGS.xlsx] CO Apr 2019

Table 2
Assessment Monitoring Results October 2019 - Cobalt IPL - Ottumwa Generating Station

			Assessment Monitoring Results								
Monitoring Well	Units	Groundwater Protection Standard (GPS)	4/18/2018	8/15/2018	10/16/2018	1/8/2019	4/8/2019	10/23/2019	Mean	Lower Confidence Limit for Mean (a = 95%)	LCL Exceeds GPS?
MW-305	ug/L	6	14.5	15.6	17.2	16.4	17.0	17	16.3	15.5	YES
MW-306	ug/L	6	4.8	5.5	6.4	6.2	6.92	6.2	6.0	5.5	NO

Revised by: MDB 1/15/2020 Checked by: SCC 1/15/2020

I:\25219072.00\Data and Calculations\Tables\[LCL Calc Table_OGS.xlsx]Co Oct 2019