

Groundwater Monitoring System Summary Report

DTE Electric Company River Rouge Power Plant Bottom Ash Basin Coal Combustion Residual Unit

> 1 Belanger Park Drive River Rouge, Michigan

October 2017



Groundwater Monitoring System Summary Report

DTE Electric Company River Rouge Power Plant Bottom Ash Basin Coal Combustion Residual Unit

> 1 Belanger Park Drive River Rouge, Michigan

> > October 2017

Prepared For DTE Electric Company

Graham Crockford, C.P.G. Senior Project Geologist

David B. McKenzie, P.E. Senior Project Engineer

TRC Engineers Michigan, Inc. | DTE Electric Company Final X:\WPAAM\PJT2\265996\GWMS CERTS\05 RRPP\R2659960005-RRPP.DOCX

Table of Contents

1.	Intro	duction		Ĺ
	1.1	Backgr	ound and Objective1	L
	1.2	Site Lo	cation1	Ĺ
	1.3	Descrij	ption of RRPP CCR Unit1	L
2.	Hydr	ogeolog	gy	3
	2.1	Region	al Hydrogeologic Setting	3
	2.2	RRPP I	Hydrogeology	3
		2.2.1	Uppermost Aquifer4	ł
		2.2.2	Groundwater Flow	;
3.	Grou	ndwate	r Monitoring System	5
	3.1	Groun	dwater Monitoring System Installation ϵ	5
		3.1.1	Soil Boring Advancement	5
		3.1.2	Monitoring Well Installation	7
		3.1.3	Monitoring Well Development and Surveying	7
		3.1.4	Detection Monitoring	7
4.	Grou	ndwate	r Monitoring System Certification9)
List o	f Table	es		
Table	1		Monitoring Well Information Summary	
List o	f Figur	es		
Figur	e 1		Site Location Map	
Figur	e 2		Site Plan	
Figur	e 3		Cross Section Locator Map	

i

- Figure 4 Generalized Geologic Cross-Sections A-A' and B-B'
- Figure 5 Groundwater Potentiometric Surface Map July 6, 2017

List of Appendices

Appendix A Soil Boring and Monitoring Well Installation Logs

1.1 Background and Objective

The United States Environmental Protection Agency (U.S. EPA) established a comprehensive set of requirements for management and disposal of coal combustion residuals (CCR) in landfills and surface impoundments in the Final Rule: Disposal of CCR from Electric Utilities (CCR Rule) on April 17, 2015. The DTE Electric Company (DTE Electric) River Rouge Power Plant (RRPP) CCR bottom ash basin (BAB) unit is subject to the CCR Rule.

The objective of this report is to document and certify that the CCR Groundwater Monitoring System for the RRPP CCR BAB unit has been designed and constructed to meet the requirements of Title 40 Code of Federal Regulations (CFR) §257.91 (a)(1) and (2) of the CCR Rule. TRC Engineers Michigan, Inc. (TRC) was retained by DTE Electric to provide this report documenting the construction of the CCR groundwater monitoring system for the RRPP BAB.

1.2 Site Location

The RRPP BAB is located at 1 Belanger Park Drive, within the City of River Rouge in Wayne County, Michigan (**Figures 1 and 2**). The RRPP, including the BAB CCR unit, was originally constructed in the early 1950s, just east of the DTE Electric RRPP. The power plant is located at the confluence of the Rouge River and the Detroit River.

1.3 Description of RRPP CCR Unit

The property has been used continuously as a coal fired power plant since Detroit Edison Company (now DTE Electric) began power plant operations at RRPP in 1957. The plant is constructed on reclaimed land that was formerly emergent shoreline. The BAB has been in operation with the RRPP since it began operation and has collected CCR bottom ash that is cleaned out as needed and disposed of at Sibley Quarry Landfill.

The RRPP BAB is a sedimentation basin that is an incised CCR surface impoundment (**Figure 2**). The impoundment is sheet-piled around the perimeters to approximately 30 feet below ground surface (feet-bgs) into the native soil. The BAB is located northeast of the RRPP, runs roughly from southeast to northwest parallel and adjacent to the Rouge River, and is approximately 550 feet long by 50 to 110 feet wide and widens toward the northwest (**Figure 2**). The design bottom elevation of the BAB is 569 feet relative to the North American Vertical Datum of 1988 (NAVD 88). The BAB is used for receiving sluiced bottom ash and other process flow effluent pumped from the power plant to the eastern end of the BAB. There is a sheet pile weir near the

middle of the BAB that maintains the water elevation in the eastern portion to approximately 577.5 feet through gravity flow. The water in the western portion of the BAB is maintained at an elevation of no higher than 577 feet before being recirculated back to the RRPP from the northeastern end of the BAB and/or is discharged into the Rouge River in accordance with a National Pollution Discharge Elimination System (NPDES) permit.

Section 2 Hydrogeology

2.1 Regional Hydrogeologic Setting

The Wayne County area geology is characterized by deposits of glacio-lacustrine clay and silt on top of thick strata of dolomite and limestone bedrock. The uppermost bedrock units in Wayne County consist of Paleozoic sedimentary rock strata of marine origin¹. According to the bedrock geology map of Wayne County, the site is located in an area where the Dundee Formation (mostly limestone, with some dolostone) and the Detroit River Group (limestone, dolostone, and some sandstone) underlie the unconsolidated glacial deposits. The stratigraphic succession (from youngest to oldest) in the subject area is: Dundee Formation (Limestone), Detroit River Group, Sylvania Sandstone, Bois Blanc, followed by the Bass Island and Salina Group. The majority of wells within the county are in glacial deposits (67%) while some are installed in bedrock (27%)². The general regional bedrock groundwater flow pattern in the area is generally considered to be from west to east toward the Detroit River.

2.2 RRPP Hydrogeology

The subsurface geology presented within this report is based on information from historical borings advanced during initial design and later expansion of the RRPP, in addition to the soil boring data collected from around the BABs during the groundwater monitoring system installation detailed in Section 3. Soil borings from the groundwater monitoring system are included in Appendix A and generalized geologic cross sections are provided in **Figures 3 and 4**.

This information documents that the RRPP CCR unit is underlain initially by approximately 10 feet of surficial fill of various composition (gravel, sand, silt and clay, brick and/or concrete fragments). The fill is in some places partially saturated, but is not continuously saturated across the RRPP, does not represent a significant, usable source of water and is therefore not an aquifer. An organic layer is often encountered beneath the surficial fill that is then underlain by a silt/clay-rich unit that ranges from 3 to about 8 feet thick in the area of the BAB (**Figures 3 and 4**). Beneath the silt/clay-rich unit, there is a saturated sand and gravel unit that often coarsens from sand to gravel with depth. This coarse-grained sand and gravel unit is present from as shallow as 15 feet-bgs to as deep as 25.5 feet bgs (**Figures 3 and 4**). This same coarse-grained unit is observed in most of the historical boring logs across the RRPP and appears to be a relatively

3

¹ Mozola, A. J., 1969, Geology for land and ground-water development in Wayne County, Michigan: Michigan Geological Survey Division Report R 3, 25 p.

² Beth A. Apple and Howard W. Reeves, 2007, Summary of Hydrogeologic Conditions by County for the State of Michigan. U.S. Geological Survey Open-File Report 2007-1236, 78 p.

continuous unit across the RRPP. Based on this information, this coarse-grained sand and gravel unit represents the uppermost aquifer present at the BAB CCR unit.

The coarse-grained sand and gravel unit is underlain by a more than 60-foot-thick contiguous silty clay-rich soil (till and/or lacustrine deposits) across the site, that extends to the top of the Dundee limestone bedrock (Figures 3 and 4). One deeper well (MW-4D) was set into the uppermost portion of the Dundee limestone (well below the uppermost aquifer) and is artesian. There is one irrigation well screened within the uppermost portion of the bedrock aquifer approximately one-mile southwest of the RRPP. There are no known water supply wells screened within the unconsolidated sediment within one-mile of the RRPP. Surface water bodies present in the area of the RRPP include the Rouge River, located immediately adjacent and northeast of the BAB CCR unit, and the Detroit River, located within 300 feet to the southeast of the BAB CCR unit (Figure 2).

2.2.1 Uppermost Aquifer

Definition

The 40 CFR §257.53 definitions of an aquifer and uppermost aquifer are as follows:

- Aquifer means a geologic formation, group of formations, or portion of a formation capable of yielding useable quantities of groundwater to wells or springs.
- Uppermost aquifer means the geologic formation nearest the natural ground surface that is an aquifer, as well as the lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. Upper limit is measured at a point nearest to the natural ground surface to which the aquifer rises during the wet season.

Site Uppermost Aquifer

As described above, the uppermost aquifer as defined in 40 CFR §257.53 is the sand and gravel unit that ranges from as shallow as 15 feet-bgs to as deep as 25.5 feet bgs. This unit is approximately 8 to 10 feet thick in the area of the BAB (Figures 3 and 4 and Appendix A). The uppermost aquifer sits beneath approximately 10 to 12 feet of fill/organic soil and a 3 to 8 foot thick confining silt/clay-rich unit. The uppermost aquifer is underlain by a more than 60 foot thick vertically contiguous silty clay-rich deposit that serves as a natural lower confining hydraulic barrier that isolates the Dundee limestone that represents the next aquifer (see Figures 3 and 4 and Appendix A). There is no apparent hydraulic connection between the uppermost aquifer and the Dundee limestone.

A hydraulic conductivity of 2.3×10^{-8} centimeters per second (cm/s) was measured from a soil sample collected from the underlying confining silty clay-rich low permeability

soil during the installation of monitoring well MW-4D. Given that there is over 60 feet of silty-clay that isolates the uppermost aquifer from the underlying limestone aquifer, with a strong upward hydraulic gradient (artesian conditions observed at MW-4D exceeded static water elevations in the uppermost aquifer by at least 10 feet), there is no potential for the lower bedrock aquifer to be affected by the RRPP BAB CCR unit.

2.2.2 Groundwater Flow

Groundwater Flow Direction

TRC installed the groundwater monitoring wells included in the CCR monitoring well system which were initially completed by June 2016 with two monitoring wells added in June 2017. TRC was also retained to collect water samples and to measure groundwater level data from these wells. Groundwater flow in the vicinity of the BAB CCR unit is generally to the northeast, towards the Rouge River based on static water level data measured during the collection of the eight independent samples from the groundwater monitoring system in accordance with the CCR Rule that began in August 2016.

A representative potentiometric groundwater surface (from July 6, 2017) is displayed on **Figure 5**. As shown on **Figure 5**, CCR monitoring wells MW-16-04S, MW-17-06, and MW-17-07 are up gradient to the southwest relative to the BAB CCR unit, whereas the CCR monitoring wells MW-16-01, MW-16-02, and MW-16-03 are down gradient to the northeast of the BAB CCR unit. These potentiometric groundwater elevations indicate that groundwater flow in the area of the BAB CCR unit is generally to the northeast, towards the Rouge River, with a mean hydraulic gradient of approximately 0.00067 foot/foot based upon June through September 2017 static water level readings.

Uppermost Aquifer Hydraulic Conductivity

Hydraulic conductivities measured within the CCR monitoring wells using single well hydraulic conductivity tests (e.g., slug tests) range approximately 9.5 to 120 feet/day with a geometric mean of approximately 25.5 feet/day.

Horizontal Time of Travel

Assuming an average porosity of 0.4 for the silt/clay-rich soil within the uppermost aquifer, the low hydraulic conductivity of 9.5 feet/day, a high hydraulic conductivity of 120 feet/day, and a hydraulic gradient of 0.00067 for the uppermost aquifer proximal to the RRPP BAB, the horizontal groundwater flow rate ranges from approximately 0.016 feet/day (5.8 feet/year) to 0.2 feet/day (73 feet/year) toward the northeast.

Section 3 Groundwater Monitoring System

3.1 Groundwater Monitoring System Installation

During 2016 and 2017, TRC, on behalf of DTE Electric oversaw the installation and development of the groundwater monitoring system in accordance with the 40 CFR §257.91. Seven CCR monitoring wells (MW-16-01 through MW-16-03, MW-16-04S, MW-16-04D, MW-17-06, and MW-17-07) were installed by a Michigan-licensed well driller at the RRPP (at locations up gradient and down gradient of the BAB) to establish the groundwater monitoring system as described below:

3.1.1 Soil Boring Advancement

Initially, in 2016, five soil borings were advanced to evaluate the subsurface geology and to allow monitoring well installation to the northeast and southeast of the RRPP BAB. This work was performed using sonic drilling techniques with 4-inch and 6-inch tooling. Soil samples were collected continuously in ten-foot sections from the ground surface to the termination of the soil boring. A TRC geologist was present to log each boring and to describe the soil samples in accordance with the Unified Soil Classification System (USCS).

Four of the soil borings were advanced to depths of approximately 25 to 30 feet-bgs to install monitoring wells MW-16-01 through MW-16-03 (down gradient) and MW-16-04S (up gradient) within the uppermost aquifer sand and gravel unit present between 15 and 25 feet-bgs. In addition, a soil boring was advanced into the top of the Dundee Formation through the unconsolidated deposits, encountering the underlying limestone bedrock at a depth of 86 feet-bgs. Monitoring well MW-16-04D was installed in this boring and screened at the top of the confined, artesian limestone aquifer.

In June 2017, two additional soil borings were advanced into the uppermost aquifer to establish additional monitoring wells MW-17-06 and MW-17-07 further up gradient on the southwest side of the RRPP main building (**Figure 2**) for use as background wells. The June 2017 borings were advanced utilizing hollow stem augers to temporarily isolate the shallow fill followed by direct push drilling methods to advance to the sand and gravel aquifer and install the monitoring wells. Soil samples were collected continuously in five-foot sections from the ground surface to the termination of the soil boring, and were logged in accordance with the USCS by a TRC geologist.

3.1.2 Monitoring Well Installation

CCR monitoring wells MW-16-01 through MW-16-03 and MW-16-04S were established within the uppermost aquifer sand and gravel unit at approximately 15 to 25 feet-bgs. Three of these locations were on the northeastern side of the BAB (presumed down hydraulic gradient adjacent to the Rouge River) and one was to the southwest of the BAB (presumed up hydraulic gradient) (**Figure 2**). In addition, monitoring well MW-16-04D was screened within the uppermost portion of the limestone bedrock aquifer well below the uppermost aquifer. MW-16-04D is not utilized as a CCR monitoring well as it is not installed within the uppermost aquifer and is hydraulically isolated from the uppermost aquifer by more than 60 feet of very low hydraulic conductivity silty clay-rich soil.

Monitoring wells MW-17-06 and MW-17-07 were installed further up gradient of the BAB CCR unit to the southwest of the RRPP main building into the sand and gravel uppermost aquifer in June 2017 (**Figure 2**) to provide more representative background wells. With the additional two up gradient wells, the consistent groundwater flow direction, and the relatively small foot-print of the BAB, the horizontal spacing of the wells is adequate to detect constituents from the CCR unit.

Monitoring wells were constructed within each borehole using 2-inch-diameter, Schedule 40 PVC casing and 5-foot long screens with 0.010-inch factory cut slots. Monitoring well construction diagrams from the installed monitoring wells accompany the soil boring logs in Appendix A. Following well installation, the grout and bentonite seal materials were allowed to stabilize for more than 24-hours before monitoring well development began.

3.1.3 Monitoring Well Development and Surveying

Following installation, each CCR monitoring well was developed by air lifting methods or by utilizing a submersible pump. In addition, a Michigan-licensed surveyor horizontally located each monitoring well utilizing the Michigan State Plan South Zone-2113, North American Datum 1983 (NAD 83), International feet. Vertical elevations of the ground surface at each soil boring and monitoring well location, and the top of casing for each monitoring well were also surveyed in feet relative to the NAVD 1988. Monitoring well coordinates, elevations, screened intervals, and other monitoring well details are included in Table 1.

3.1.4 Detection Monitoring

The RRPP BAB CCR unit groundwater monitoring system uppermost aquifer monitoring wells, as shown on **Figure 2**, will serve as the detection monitoring locations pursuant to Title 40 CFR §257.93 and §257.94 of the CCR Rule. Given that groundwater flow is consistently northwest toward the Rouge River, monitoring wells MW-17-06 and

7

MW-17-07 are upgradient monitoring wells and MW-16-01 through MW-16-03 will be down gradient wells for the BAB CCR unit. Based on the consistent flow regime, in addition to the relatively shallow position of the uppermost aquifer relative to the BAB CCR unit, inter-well statistical approaches appear to be appropriate and, as such, will be evaluated for use during detection monitoring. A statistical evaluation plan is currently being developed to evaluate compliance in accordance with the CCR Rule.

Section 4 Groundwater Monitoring System Certification

Groundwater Monitoring System Certification per 40 CFR §257.91(f) River Rouge Power Plant Bottom Ash Basin River Rouge, Michigan

The U.S. EPA's Disposal of Coal Combustion Residuals from Electric Utilities Final Rule Title 40 CFR Part 257 §257.91 requires that the owner or operator of an existing CCR unit install a groundwater monitoring system. The owner or operator must obtain a certification from a qualified professional engineer stating that the groundwater monitoring system has been designed and constructed to meet the requirements of Title 40 CFR §257.91.

CERTIFICATION

I hereby certify that the groundwater monitoring system presented within this document for the RRPP BAB CCR unit has been designed and constructed to meet the requirements of Title 40 CFR §257.91 of the Federal CCR Rule. This document is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of Title 40 CFR §257.91.

<u>Name</u>	Expiration Date	- 10 P 25 0 2 m-
David B. McKenzie, P.E.	October 31, 2017	DAVID B. McKENZIE
Company	Date	No. 42332
TRC Engineers Michigan, Inc.	October 13, 2017 (Malanana Miles
	· (Stamp

9

Table 1 Monitoring Well Information Summary DTE Electric Company – River Rouge Power Plant River Rouge, Michigan

Well Location	Date Installed	Northing	Easting	Ground Surface Elevation (ft AMSL)	TOC Elevation (ft AMSL)	Geologic Unit of Screen Interval	Well Construction	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft AMSL)	Borehole Terminus Depth (ft BGS)	Borehole Terminus Elevation (ft AMSL)
River Rouge Pov	ver Plant									-	
MW-16-01	6/13/2016	284822.46	13463082.55	580.46	583.02	Sand, Silty Clay, Gravel	2" PVC	18.5 to 23.5	562.0 to 557.0	26.5	554.0
MW-16-02	6/13/2016	284900.37	13462923.81	579.86	582.79	Silty Sand, Sand, Clay, Gravel	2" PVC	18.5 to 23.5	561.4 to 556.4	25.5	554.4
MW-16-03	6/10/2016	285003.95	13462772.52	579.90	582.75	Sand, Sand with Gravel	2" PVC	18.5 to 23.5	561.4 to 556.4	30.0	549.9
MW-16-04S	3/17/2016	284814.39	13462847.74	580.65	582.41	Sand, Gravel	2" PVC	19.5 to 24.5	561.2 to 556.2	25.0	555.7
MW-16-04D	2/25/2016	284811.70	13462855.24	580.28	581.83	Silty Clay, Limestone bedrock	2" PVC	85.0 to 90.0	495.3 to 490.3	97.0	483.3
MW-17-06	6/7/2017	284345.83	13462436.31	579.89	583.01	Sand, Gravel with Sand	2" PVC	20.0 to 25.0	559.9 to 554.9	25.0	554.9
MW-17-07	6/14/2017	283337.37	13461939.92	579.99	583.05	Silt with Sand, Clay	2" PVC	16.0 to 21.0	564.0 to 559.0	25.0	555.0

Notes:

Coordinates are Michigan State Plane South Zone-2113, International Feet

Elevation in feet above NAVD88.

TOC: Top of well casing.

ft AMSL: Feet above mean sea level.

ft BGS: Feet below ground surface.



E:\DTE\CCR_Sites\2017_265996\265996-SLMMB.mxd -- Saved By: BDEEGAN on 10/9/2017, 14:51:49 PM



LEGEND

-\$-



MONITORING POINT

BEDROCK MONITORING WELL

<u>NOTES</u>

- 1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
- 2. WELL LOCATIONS SURVEYED BY BMJ ENGINEERS AND SURVEYORS INC. IN JUNE 2016 & JUNE 2017.









NOTES

- 1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
- 2. WELL LOCATIONS SURVEYED BY BMJ ENGINEERS AND SURVEYORS INC. IN JUNE 2016 AND JUNE 2017.









LEGEND



MONITORING POINT

UPPERMOST AQUIFER MONITORING WELLS

BEDROCK MONITORING WELL

<u>`</u>

GROUNDWATER CONTOUR (.25' INTERVAL, DASHED WHERE INFERRED)

FLOW DIRECTION

(575.25)

ELEVATION FT (NGVD 88)

<u>NOTES</u>

- 1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
- 2. WELL LOCATIONS SURVEYED BY BMJ ENGINEERS AND SURVEYORS INC. IN JUNE 2016 & JUNE 2017.
- 3. NU = NOT UTILIZED



Appendix A Soil Boring and Monitoring Well Installation Logs



WELL NO. MW-16-01

acility	/Projec	t Name	e:				Date Drilling Started	t:	Date D	Drilling C	omple	ted:	Projec	t Number:
	DT	E Ele	ctric	Company R	iver Rou	ge Power Plant	6/13/16			6/13	/16		2318	328.0005.000
rilling	Firm:				Drilling Met	hod:	Surface Elev. (ft)	TOCE	Elevatio	n (ft)	Total	Depth (ft bgs)	Borehole Dia. (in)
	S	tock I	Drillin	g		Sonic	580.46	5	83.02	2		26.5		6/4
oring	Locatio	on: N	of botto	om ash basin, fa	arthest well t	o the E.	Personnel	1			Drilling	g Equip	ment:	
: 28	4822.4	6 E:	1346	3082.55			Logged By - C. Sc Driller - A. Goldsm	ieszka ith					TSi 1	50cc
ivil To	own/Cit	y/or Vil	llage:	County:		State:	Water Level Observ	ations:	Time				Death	(0
R	iver F	Roug	e	Way	ne	Michigan	After Drilling:	Date/ Date/	Time Time	6/14/1	6 10:4	5 ¥	Depti	n (ft bgs) n (ft bgs) <u>5.38</u>
SAMI	PLE													
ND TYPE	ECOVERY (%)	LOW COUNTS	EPTH IN FEET			LITHOLOGIC DESCRIPTION			scs	RAPHIC LOG	ELL DIAGRAM	D PM)	С	OMMENTS
A	R	8	ō	011 77 (0					ö	O	3	E C		
				SILTY SA sand, litt 4/1) to b	AND WIT	H GRAVEL mostly f coarse gravel, little YR 5/3), no odor, dry	ine to medium silt, dark gray (10Y /, loose.	′R	SM			<1	Continu 4-inch o ground soil bor	ous sampling with liameter casing from surface to terminus ing, over-drilled with
5	100		-	fine to co odor, dry	oarse sai , loose.	nd, trace to few silt, g	gray (10YR 5/1), no	5	GW			<1	6-inch (install n	liameter casing to nonitoring well.
			5-	Fine to co	LAY WIT	H GRAVEL mostly c ivel, low plasticity, bl ace slag fragments	elay, little silt, little ack (10YR 2/1), no	, -	CL- ML			<1		
	100			Change SILTY SA sand, litt 4/1) to b	to slight AND WIT le fine to rown (10	odor at 5.5 feet. H GRAVEL mostly f coarse gravel, little YR 5/3), no odor, dry	ine to medium silt, dark gray (10Y y, loose, trace brick	' 'R K _	SM			<1		
			10-	Change metallic CLAY m	ts preser to black sheen or nostly cla	nt. (10YR 2/1), strong o n soil grains at 8.5 fe y, trace silt, high pla	dor, saturated, et. sticity, dark gray		CL					
r 📗	100			Change	to no od	or at 10.0 feet.	moist, soit.							
Ĩ			15-	SANDY S trace cla odor, sat	SILT mo y, very lo turated, s	stly silt, some fine to w plasticity, dark gra stiff.	o medium sand, ay (10YR 4/1), no		ML					
6	100			SAND m gray (10	nostly fin YR 4/1),	e to medium sand, tr no odor, saturated, o	ace to few silt, dar dense.	k			······································			
			20-						SP					
				Ŀ										
6	100			SILTY C plasticity stiff.	LAY mo , dark gr	stly clay, little silt, lov ay (10YR 4/1), no oc	w to medium dor, moist, stiff to v	ery /	CL- ML GW	. C.				
			25 -	GRAVEL sand, tra loose.	ce silt, d	fine to coarse grave ark gray (10YR 5/1) v trace silt biob pla	I, few fine to coars , no odor, saturate sticity, brown (10)	e d, B	CL					
				\5/3), no End of b	odor, mo oring at 2	ist, very soft. 26.5 feet below grou	nd surface.							
			,											



WELL NO. MW-16-02

Facilit	Projec	t Name	e.			Date Drilling Started		te Drilling	Comple	ted	Page 1 of 1
aciiit		FEIO	ctric (Company River P	ouge Power Plant	6/10/16		6/1	3/16	acu.	231828 0005 000
Drilling	Firm:		ouno	Drilling	Method:	Surface Elev. (ft)	TOC Elev	ation (ft)	Total	Depth (ft bgs) Borehole Dia. (in)
	S	tock I	Drillin	a	Sonic	579 86	582	79		25.5	6/4
Boring	Locatio	on: N	of botto	om ash basin, middle we	ell.	Personnel	002		Drillin	g Equip	ment:
N: 28	4900.3	87 E:	1346	2923.81		Logged By - C. Sci Driller - A. Goldsmi	eszka th				TSi 150cc
Civil T	own/Cit	y/or Vil	llage:	County:	State:	Water Level Observ	ations:	10			Depth (ft has)
R	River F	Rouge	e	Wayne	Michigan	After Drilling:	Date/Tin	ne <u>6/14</u>	/16 10:5	<u>50</u>	Depth (ft bgs) <u>4.87</u>
SAM	PLE										
NUMBER AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET		LITHOLOGIC DESCRIPTION			SRAPHIC LOG	VELL DIAGRAM	(Mdd)	COMMENTS
24	œ			GRAVEL WITH	I SAND mostly fine to c	coarse gravel, few					
1 CS	100			to little fine to c (10YR 4/2), no Change to few at 2.0 feet.	coarse sand, trace silt, odor, dry, loose. silt, trace clay, trace sl	dark grayish brown ag fragments prese	ent _G	w ooo		<1	Continuous sampling with 4-inch diameter casing from ground surface to terminus of soil boring, over-drilled with 6-inch diameter casing to install monitoring well.
			5-			ine sand few to	-				
			-	little silt, few to	little fine to coarse gra	vel, dark gray (10Y	R r	M		15.3	
			-	۱ 4/1), no odor, o ۱ Change to moi	dry, loose. ist, brick fragments pres fine to coarse sand, tra	sent at 5.5 to 6.0 fe ce to few silt, trace	eet./s	W			
2 :S	90		- 10-	fine to coarse of medium dense PEAT black (1 fragments pres	gravel, gray (10YR 5/1) a. 0YR 2/1), no odor, moi sent.	, no odor, saturate ist, soft, wood chip	d, /				
			1.1	SANDY SILT	mostly silt, little fine san	nd, trace to few					
3 ,т	75			clay, low plasti moist, stiff.	city, very dark gray (10	YR 3/1), no odor,	N	۱L			
			15-								
4 :S	100		-	SILTY SAND r 4/1), no odor, s	mostly fine sand, little s saturated, dense.	ilt, dark gray (10YF	₹ s	M			
			20-	SAND mostly 4/1), no odor, s Change to mos	fine to medium sand, d saturated, loose. stly fine to coarse sand	ark gray (10YR at 20.0 feet.	5	SP 111			
5	100			Change to woo	od fragment present, ap t 21.5 feet.	oproximately 1-inch					
			-	Change to few CLAY mostly (5/1), no odor, i	clay, trace silt, high pla moist, stiff.	sticity, gray (10YR	_/ c	w oo		-	
			25-	GRAVEL mos sand, color var CLAY mostly 5/3), no odor, r	tly fine to coarse grave ries with grain, no odor, clay, trace silt, high pla moist, very soft.	l, few fine to coarse , saturated, loose. sticity, brown (10Y	R				
				End of boring	at 25.5 feet below grou	nd surface.					
lignet			0		Finn. The		Correction	ior			704 074 70
annat	ure	¢	11	/	Firm: TF	C Environmental	Corporat	ion			/34-9/1-708



WELL NO. MW-16-03

Facility	/Projec	ct Name	9:	1.26. 1	67.11	Sector Sector	Date Drilling Start	ed:	Date D	Drilling C	Comple	ted:	Project Number:
	DT	E Ele	ctric (Company F	River Rou	ige Power Plant	6/10/16	5		6/10	/16		231828.0005.0000
Drilling	Firm:				Drilling Me	thod:	Surface Elev. (ft)	TOCI	Elevatio	n (ft)	Total	Depth (f	t bgs) Borehole Dia. (in)
	S	tock	Drillin	g		Sonic	579.90		582.75	5	Dellin	30.0	6/4
soring	5003.9	on: N 95 E:	1346	m ash basin, 1 2772.52	arthest well	to the W.	Logged By - C. S Driller - A. Golds	Scieszka mith			Drillin	g Equipi	TSi 150cc
Civil T	own/Cit	ty/or Vi	lage:	County:		State:	Water Level Obse	ervations:	/Time				Depth (ft bas)
R	liver F	Roug	e	Wa	iyne	Michigan	After Drilling:	Date	e/Time	6/14/1	6 10:5	5 ¥	Depth (ft bgs) <u>5.14</u>
ND TYPE	RECOVERY (%)	SLOW COUNTS	JEPTH IN FEET			LITHOLOGIC DESCRIPTION			JSCS	SRAPHIC LOG	WELL DIAGRAM	UD PPM)	COMMENTS
× .	œ.		0	GRAVE	L mostly	coarse gravel, light	grav (10YR 7/1).	no _	GP	500	<u>></u>	4.5	
1 :S	95		- - 5-	odor, m SILTY C (10YR ⊄	oist, very CLAY mo 4/3), no o	loose. stly clay, some silt, l dor, dry, stiff.	ow plasticity, brow	vn	CL- ML			<1 <1 1.1	Continuous sampling with 4-inch diameter casing from ground surface to terminus o soil boring, over-drilled with 6-inch diameter casing to install monitoring well.
S	50		- - 10 - -	SAND of fine to coodor, m PEAT to soft. Change	mostly mo coarse gra oist, loos black (10 e to wood	edium to coarse san avel, black (10YR 2/ e. YR 2/1), moderate to and high organic co	d, trace silt, trace 1), moderate to si strong odor, moi ntent present at 1	rong / st, /	SP			27.5 129.6	
S	100		 	feet. CLAY r plasticit modera SANDY gray (10 Change SAND	mostly cla y, black (te odor, s SILT mo DYR 4/1), to no od mostly m	ay, trace silt, trace fir 10YR 2/1), to dark g soft to medium stiff. ostly silt, little fine sa slight odor, saturate for at 16.0 feet. edium to coarse san	ne sand, high ray (10YR 4/1), nd, non plastic, da nd, stiff. d, trace silt, dark	/	ML				
			20 — - -	gray (10 Change Change SAND V little fine no odor	to trace to no sil WITH GR to coars , saturate	to few silt at 17.5 feet t at 19.5 feet. AVEL mostly medium se gravel, trace silt, o ed, loose.	n to coarse sand ark gray (10YR 4	/ //1),	SP				
S	100		25	CLAY n plasticit	mostly cla y, gray (1	ay, trace silt, trace co I0YR 5/1), no odor, r	parse sand, high noist, very soft to	soft.	CL	00			
	_		30-	End of	boring at	30.0 feet below arou	und surface		-	11	1		
			1.000		buing at	ou.u leet below glot	and sundue.			1.1.1		1	



WELL NO. MW-16-04S

DT Drilling Firm: S loring Location J: 284814.3 ivil Town/Cit		ectric (Company R	iver Rou		Date Drining Staffed	.	DateL	a ming C	omple		noject number.
Drilling Firm: Storing Location J: 284814.3 Sivil Town/Cit	tock	SCITE			no Dower Diant	1/6/16			AIG	16		231828 0005 0000
Soring Location J: 284814.3 Vivil Town/Cit	tock			Drilling Mot	ye rower riant	4/0/10 Surface Fley (ff)	TOCE	levatio	4/0/	Total	Denth (f	t bas) Borehole Dia (in)
Soring Location	OD: 10	Drillin	~	Drining wet	Sonio	ESO GE	1001	00 11		Total	25.0	
V: 284814.3			y est of MIN/ 16 0	A	SULIC	DOU.00 Personnel	1 0	02.41		Drillin	20.0	0/4
ivil Town/Cit	39 E:	: 1346	2847.74	4.		Logged By - A. Kn Driller - A. Goldsm	nutson nith			Driinių	a Eduibi	TSi 150cc
	ty/or Vi	illage:	County:		State:	Water Level Obser	vations:	2.00				Charles Collins
River F	Roug	e	Way	yne	Michigan	While Drilling: After Drilling:	Date. Date.	/Time /Time	6/14/1	6 11:0	<u>4</u>	Depth (ft bgs) Depth (ft bgs) <u>4.10</u>
SAMPLE												
AND TYPE RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET			LITHOLOGIC DESCRIPTION			ISCS	GRAPHIC LOG	WELL DIAGRAM	DID (PPM)	COMMENTS
			SAND m	nostly fin	e to coarse sand few	fine to coarse		CIAL		Í		
			gravel, to GRAVEL to coarse saturate	race silt, - WITH S e sand, tr d.	dark gray (10YR 4/1) AND mostly coarse g race silt, dark gray (1	i, no odor, dry, loo gravel, some fine 0YR 4/1), no odor	ose	GP	0000		<1.0	Continuous sampling with 4-inch diameter casing from ground surface to terminus o soil boring, over-drilled with 6-inch diameter casing to install monitoring well.
l 90 .S		5	SAND m (10YR 5. SILT mo (10YR 4.	nostly fine /8), no oc ostly silt, /1), no oc	e to coarse sand, yel dor, saturated. few fine to coarse sa dor, saturated, brick f	lowish brown nd, dark gray ragments present	/ t.	SW ML			<1.0	
2 S 90		10-	PEAT h	igh organic o	no odor, moist. nic content, dark brov dor, moist, soft, wood	vn (10YR 2/2), I fragments prese	ent.	CL			<1.0	
3 ;T 100			SANDY dark gra	SILT mo y, no odo	stly silt, few to little s or, moist, medium stil	and, nonplastic, ff.		ML				
4 100		- 15	SILTY S. (10YR 4	AND mo /1), no oo	stly fine sand, few to dor, moist to saturate	little silt, dark gra d.	ıу	SP			<1.0	
		20	SAND n no odor,	nostly fin saturate	e to coarse sand, da d.	rk gray (10YR 4/1),	sw			-10	
5 100 S			Change	to shells	present at 23.0 feet.	, few fine to coars	3e _	GW	<u>ە</u> تر			
		25	sand, da CLAY m 5/3), no End of b	ark gray (nostly cla odor, mo ooring at	10YR 4/1), no odor, i y, trace silt, high plas ist, soft. 25.0 feet below grou	saturated, loose. sticity, brown (10Y nd surface.	/R	CL				
		-										
		-							-		_	
jignature:		-	1.0		Firm: TF	RC Environmental	Corpo	oration	1			734-971-708
lin	A	w	The		15	40 Eisenhower P	lace A	nn Ar	bor, N	Michi	gan	Fax 734-971-902

() TPC	•
	۲.

WELL NO. MW-16-04D

-	15			-						0		Page 1 of 2
Facility	//Projec	t Name); 		-		Date Drilling Started	d:	Date Drilling	Comple	ted:	Project Number:
Drilling	DT	E Ele	ctric (Company F	Viver Ro	uge Power Plant	2/23/16	TOC	2/2	5/16	Donth (231828.0005.000
Unling	rinn:	took	Drillin			Sonic			ERVALION (II)	Total		(in Ugs) Borenole Dia. (in
Boring	Locati	OD: 10	0 feet o	y ast of basin b	ridae 25 fe	SUNIC et south of basin	Personnel	1	001.03	Drilling	97.0 Equir	oment:
N: 28	4811.7	70 E:	13462	2855.24	nuge, 20 ie	ct south of busin.	Logged By - C. So Driller - A. Goldsm	ieszka hith		Brinnig	a Edail	TSi 150cc
Civil To	own/Cit	ty/or Vil	lage:	County:		State:	Water Level Obser	vations:	/Time			Depth (ft bas)
R	liver F	Rouge	е	Wa	iyne	Michigan	After Drilling:	Date	e/Time		_	Depth (ft bgs)
SAM	PLE											
NUMBER AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET			LITHOLOGI DESCRIPTIC	C DN		USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
1 CS	55		5	SAND r gravel, o	mostly fii dark gra	ne to coarse sand, tra y (10YR 4/1), no odor,	ce to few silt, trace , dry, loose.	e fine	sw			Continuous sampling with 4-inch diameter casing from ground surface to terminus a soil boring, over-drilled with 6-inch diameter casing to install monitoring well.
				SANDV	VITH SIL	T mostly fine to coars	se sand, few to litt	le silt,	sw-	111		
			10-	dark gra	ay (10YF	R 4/1), no odor, moist,	medium dense.	C	SM CL-			
			4		aravel. n	ostly clay, little to som nedium plasticity, dark	e silt, trace to few aray (10YR 4/1).	no od		1 2 2		
2 CS	90		- - 15 -	moist, s PEAT h \natural SANDY dark gra	oft to me nigh orga organic SILT m ay (10YF	edium stiff. anic content, very dark odor, moist, soft to me ostly silt, little to some R 4/1), no odor, moist,	t brown (10YR 2/2 edium stiff. fine sand, nonpla medium stiff.), astic,				
			4		moist.	ostly fine sand, little s medium dense.	ilt, dark gray (10Y	R 4/1)	, SM	清洁		
			20-	SAND odor, sa	mostly finaturated,	ne sand, trace silt, da loose.	rk gray (10YR 4/1)	, no	SP			
				Change		fragment present at	21.0 feet.	to		00		
3	100		- 25-	some sa	and, dar	k gray (10YR 4/1), no ay, trace silt, high plas	odor, saturated, log sticity, brown (10Y	ose. 7R 5/3	GW),			
50		}	1.1.1.1	10 0001	, moist,	very son.						
-			30 —	Change	e to trace	fine gravel, trace coa	arse sand at 30.0 f	eet.		1		
			-							11		
									CL	11		
4 CS	90		35-									
										11		
										11		
1			40-									
			-							1/1		
Cier - "	0	0	-					0				701 071 700
Signan	yre:	X	11	int			C Environmental	Corp	oration	2 22 2.2		/34-9/1-/08

	D.	T	RC		WE	LL N	0. M	N-16-04D
AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
5 CS	90		45					
6 ST	90		50-					
7 CS	100		- 55 - -					
		-	60-					
	_				CL			
8 CS	100		65-					
1			-					
9 CS	75	-	70	Change to gray (10YR 5/1) at 79.0 feet.				
10 CS	80		85-	SILTY CLAY mostly clay, little to some silt, trace to few fine to coarse gravel, trace to few fine to coarse sand, low plasticity, dark gray (10YR 4/1), no odor, dry, hard.	CL- ML	H		
			-	LIMESTONE white (10YR 8/1), dry, slight to moderate sulfur odor. Change to wet at 88.0 feet				
			90-	Change to dark gray (10YR 4/1) at 90.0 feet.				
11	50		-			H		
65			95-	Change to white (10YR 8/1) at 96.0 feet. End of boring at 97.0 feet below ground surface.				



WELL NO. MW-17-06

	15		5740										Page 1 of 1
-acilit	y/Proje	ct Nan	ne:	0	-		Date Drilling Starte	d:	Date [Jrilling (Compl	eted:	Project Number:
Delli'r	D	EE	ectric	Company	River Rou	ige Power Plant	6/6/17	Too	Eleverti	6/7/	17 Tetel	Death	2//4/2.0000.000
rilling	g Firm:				Drilling Me	etnod:	Surrace Elev. (ft)		Elevatio		lotal	Deptn (n bgs) Borenole Dia. (ii
loria	St	earns	s Drilli	ng	loogted N.	Direct Push	5/9.9 Berrand	1 5	083.01		D-00	25.0	3./5
oring	Locat	pl	ant buil	ding.	located N of	parking lot Svv of power	Logged By - C. Sc	ieszka			Unilir	ia Ednib	anent.
: 28	4345.8	33 E:	1346	2436.31		1.200	Driller - G. Geerlig	gs				Geo	probe 7822DT
ivil T	own/C	ity/or V	/illage:	County:		State:	Water Level Obser	vations: Date	/Time	6/6/17	00.00		Depth (ft bas) 15.5
F	River I	Roug	е	W	ayne	Michigan	After Drilling:	Date	/Time	6/7/17	09:0	<u> </u>	Depth (ft bgs) 3.99
SAM	PLE					And Anna Area and Area							
AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET			LITHOLOGIC DESCRIPTION			uscs	GRAPHIC LOG	WELL DIAGRAM	PID (PPM)	COMMENTS
ululululu				GRAVE fine to o no odo	L WITH S coarse sau r, dry, den	AND mostly fine to coand, trace silt, dark gray	arse gravel, little ish brown (10YR 4	/2),		000		<1	
Unturbutin	70		F	SANDY sand, tr ▼(10YR 0.5-incl	CLAY m race silt, tr 3/1), no o h thick inte	ostly clay, little to some ace fine gravel, low pla dor, moist, stiff to very erval of brick at 4.5 fee	e fine to medium asticity, very dark g stiff, fill. t.	ray				<1	
dululululu	50											<1	
un number			- 10 -	SILTY (GRAVEL V	MTH SAND mostly fine e to coarse sand. trace	e to coarse gravel, e clay, black (10YR		GM			<1	
ulululululu	50			2/1), no present PEAT	o odor, ha t. 2-inch thic odor mo	rd, dry, trace fine slag k interval of peat, blac	and coal fragments k (10YR 2/1), sligh	s t	CL			<1	
nummin 1			15-	CLAY V sand, k	MTH SAN ow to mec noist, med	D mostly clay, few to li lium plasticity, dark gra ium stiff.	ittle fine to medium ay (10YR 4/1), no		CL			<1	
Introduction introduction	60			Grades mediun moist, r SILTY 4/1) wit	s to SAND medium si SAND mo th yellowis ed, dense	Y CLAY mostly clay, lit w plasticity, light olive g iff. stly fine sand, little silt, h brown (10YR 5/6) m	ttle to some fine to gray (5Y 7/2), no o dark gray (10YR ottles, no odor,	dor, / /	SM			•	
ulululululu	70		20-	Change	e to trace	fine to coarse gravel a	t 20.0 feet.						
din hu hu hu hu			25	gravel, no odo	L WITH S little medi or, saturate	and mostly fine to co um to coarse sand, da ed, dense.	arse subrounded rk gray (10YR 4/1)	6	GW	000			
			20-	CLAY mediur moist, i End of	mostly cla n plasticity medium s boring at	y, trace fine to mediun /, dark grayish brown (tiff. 25.0 feet below groun	n sand, trace silt, 10YR 4/2), no odo d surface.	or,					
Inat	ture.			1	v l	Firm: TR	C Environmental	Corpoi	ration			0.0	734.971.70



WELL NO. MW-17-07

DTE Electric Company River Rouge Power Plant 6/14/17 6/14/17 6/14/17 2/7472.0000.00 Diring Firm: Direct Push/Hollow Stem Auger Stance Elev (N) Tocal Depth (Tbag) Bordio Local Boring Local Direct Push/Hollow Stem Auger 583.0 583.0 Stance Elev (N) Tocal Depth (Tbag) Boring Local 8/3.75/2 Boring Local Lit 14/17 Coll Line Company Rever Rouge Direct Push/Hollow Stem Auger Fall Stance Elev (N) Tocal Depth (Tbag) Boring Local Boring L	Facilit	y/Proje	ct Nan	ne:				Date Drilling Starte	d:	Date D	Drilling	Compl	eted:	Page 1 of 1 Project Number:
Status Defining Deriver Pushtage Status Status Description Status		D	re el	ectric	Company	River Rou	ge Power Plant	6/14/17		-	6/14	/17		277472.0000.000
Steams Limiting [Direct / usin/riolow Stem Auger 580.0 583.05 25.0 8/3.75/2 Sign Lookin, N. (1940) Berannel Logge By - C. Sclesska Drilling Equipment Drilling Equipment Li 2833/37 /E Li 2461938 a2 Drilling Equipment Sign Participation Sign Participation Geoprobe 7822DT River Rouge Wayne Michigan Mater Dolling Deltrine 0.1417/20000 Q Depth (fb.gs) SAMFLE Sign Participation Sign Participation Sign Participation Sign Participation Q	Drilling	g Firm:				Drilling Me	ethod:	Surface Elev. (ft)	TOC	Elevatio	on (ft)	Total	Depth ((ft bgs) Borehole Dia. (in
Barly counts. In detailable real earlight rate elitinitic, algoent to 3 Performe Logal By - C. Soleszka Driller - 6. Geetings Drilling Eclupitient: Barly County State: Driller - 6. Geetings Geoprobe 7822DT Wate Lead USS-addottin: March 2010 Soleszka Driller - 6. Geetings Geoprobe 7822DT River Rouge Wayne Michigan Aner Drilling Geoprobe 7822DT SAMPLE LITHOLOGIC DESCRIPTION O 0 Geoprobe 7822DT Samp Lead Sill TY SAND mosily fine to medium sand, little to some sill, trace to few fine gravel, brown (10VR 5/3), no odor, dry, olose. Sill TY SAND mosily fine to medium sand, little to some sill, trace to few fine gravel, brown (10VR 5/3), no odor, dry, olose. Sill TY SAND mosily fine to medium sand, little to some sill, for to title fine to coarse sand, few to little fine to coarse gravel, no to low plasticity, very slight sheen on pore water at 5.0 feet. Sol annet actuate the prote of slight hydrocarbon dor, very slight sheen on pore water at 5.0 feet. CAAL WITH SAND FILL mosily file to file fine to medium sand, sized coal fragments, few to little slag fragments, trace slit, headum plasticity, black (10VR 2/1), no odor, moist, soft. CL PEAT file or onsit, gravel file to file file file to medium sand, no plasticity, grav (10VR 4/1) at 15.0 feet. Nittle state fragments file soft, file or to diffile state port & diffile words, coal, trace slit, medium plasticity, gray (10VR 5/1), no odor, moist, soft. 20 CLAY mostly clay, trace slit, medium plasticity, gray (10VR 5/1), no odor, moist, medium stiff at 2.0 feet.	lori	St	earns	s Drilli	ng	Direct P	ush/Hollow Stem Auger	580.0	5	583.05)	D-111	25.0	8/3.75/2
Bitlet Wayne State: Weide Level Observations: Weide Difficition: Bitlet: Bitlet: Weide Difficition: Bitlet: Bitle: Bitle: Bitle	i: 28	3337.3	ion: N pr 37 E:	of entra operty 1346	ance road, ne boundary. 1939.92	ar Belanger	Park entrance, adjacent to S	Logged By - C. Sc Driller - G. Geerlig	cieszka gs			Drillin	Geo	oment: probe 7822DT
River Rouge Wayne Michigan While Drilling: Aner Dnilling: Aner Dnilling: Date Time All AT 2002 Deptit (https) 2.5 SAMFLE Image: Comparison of the second of the s	ivil T	own/C	ity/or V	'illage:	County:		State:	Water Level Obser	vations:	1.1.1		a local		
SAMPLE The fine T	F	River F	Rona	e	Wa	avne	Michigan	While Drilling: After Drilling:	Date	/Time	6/14/	17 00:0	<u>00</u> ⊻	Depth (ft bgs) 2.5 Depth (ft bgs) 3.44
USA 1900 To 2011 The second	SAM	PLE	loug			ayrio	Miningan	Pitter Drining.	Duic					
90 SILTY SAND mostly fine to medium sand, title to some silt, trace to few fine gravel, brown (10YR 5/3), no odor, dry, loce. SM SM Sult sample and duplication of the sample collected (0.2) a minute collected (0.2) a single collected (0.2) a 90 SILTY CLAY WITH SAND AND GRAVEL mostly clay, some silt, etw to little fine to coarse gand, etw to little fine to coarse gravel, no to low plasticity, very dark brown (10YR 43,0), no odor, dry stiff, trace to few slag, cinder, and wood fragments present. COAL WITH SLAG FILL mostly fine to medium sand sized coal fragments, few to little slag fragments, trace silt, black (10YR 2/1), no odor, moist, sont. CL 7/2 N 10 FEAT high organic content, woody, very dark brown (10YR 3/3), no odor, dry to moist, spongy. CL 7/2 N CLAY mostly clay, trace silt, medium plasticity, dark gray (10YR 2/1), no odor, moist, spongy. CL 7/2 N 15 Change to nest, gray (10YR 4/1) at 15.0 feet. CL 10.0 feet balow gray flay (10YR 4/1) at 15.0 feet. 16 SLT WITH SAND mostly fine grave (low R 4/1) at 15.0 feet. ML 16 CLAY mostly clay, trace silt, medium plasticity, gray (10YR 5/1), no odor, moist, and will gravel seam, mostly fine to coarse sand, few to little fine gravel, gray (10YR 5/6), no odor, saturated, diff. ML 17 CLAY mostly clay, trace silt, medium plasticity, gray (10YR 5/1), no odor, moist, medium stiff. 0.25-inch thick sand with gravel seam, mostly fine to coarse sand, few to little fine gravel, gray (10YR 5/6), no odor, saturated, dense at2.0.5 feet. <td< td=""><td>AND TYPE</td><td>RECOVERY (%)</td><td>BLOW COUNTS</td><td>DEPTH IN FEET</td><td></td><td></td><td>LITHOLOGIC DESCRIPTION</td><td></td><td></td><td>uscs</td><td>GRAPHIC LOG</td><td>WELL DIAGRAM</td><td>PID (PPM)</td><td>COMMENTS</td></td<>	AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET			LITHOLOGIC DESCRIPTION			uscs	GRAPHIC LOG	WELL DIAGRAM	PID (PPM)	COMMENTS
90 Weight Sand AND GRAVEL mostly clay, some sit, few to little fine to coarse sand, few to little fine to coarse gravel, no to low plasticity, very dark brown (10YR 3/3), no odor, dny, stiff, trace to few slag, cinder, and wood (fragments, few to little slag fragments, trace slit, black (10YR 2/1), no odor, saturated, medium dense. Change to slight hydrocarbon odor, very slight sheen on pore water at 5.0 feet. CLAW mostly GRAVEL mostly fine to medium sand sized coal fragments, few to little slag fragments, trace slit, black (10YR 2/1), no odor, moist, soft. CLAW mostly clay, trace slit, medium plasticity, black (10YR 2/1), no odor, moist, soft. 10 PEAT high organic content, woody, very dark brown (10YR 2/1), no odor, moist, soft. CLAW mostly clay, trace to few slit, medium plasticity, black (10YR 2/1), no odor, moist, soft. 11 Change to dark gray (10YR 4/1) at 15.0 feet. SILT WITH SAND mostly slit, few to little fine to medium sand, no plasticity, gray (10YR 5/1), no odor, moist to saturated, stiff. 20 CLAY mostly clay, trace sit, medium plasticity, gray (10YR 5/1), no odor, moist, gray (10YR 5/1), no odor, moist to saturated, stiff. 20 CLAY mostly clay, trace sit, medium plasticity, gray (10YR 5/1), no odor, moist, medium stiff. 20 CLAY mostly clay, trace sit, medium plasticity, gray (10YR 5/1), no odor, moist, medium stiff. 21 CLAY mostly clay, trace sit, medium plasticity, gray (10YR 5/1), no odor, moist, medium stiff. 22 CLAY mostly clay, trace sit, medium plasticity, gray (10YR 5/1), mo odor, moist, medium stiff at 24.0 feet. 22 <td>nhh</td> <td></td> <td></td> <td>1</td> <td>SILTY S</td> <td>AND mo e to few fi</td> <td>stly fine to medium sand ne gravel, brown (10YR</td> <td>, little to some 5/3), no odor, dr</td> <td>у, г</td> <td>SM</td> <td>1 1 1 1</td> <td>1.</td> <td></td> <td>Soil sample and duplicate</td>	nhh			1	SILTY S	AND mo e to few fi	stly fine to medium sand ne gravel, brown (10YR	, little to some 5/3), no odor, dr	у, г	SM	1 1 1 1	1.		Soil sample and duplicate
 sand, no plasticity, gray (10YR 5/1), no odor, moist to saturated, stiff. Change to brown (10YR 5/3) at 18.5 feet. CLAY mostly clay, trace silt, medium plasticity, gray (10YR 5/1), no odor, moist, medium stiff. 0.25-inch thick sand with gravel seam, mostly fine to coarse sand, few to little fine gravel, yellowish brown (10YR 5/6), no odor, saturated, dense at 20.5 feet. Change to trace coarse sand to fine gravel, gray (10YR 5/1) with light reddish brown (5YR 6/4) mottles, dry to moist, very stiff at 21.0 feet. Change to moist, medium stiff at 24.0 feet. End of boring at 25.0 feet below ground surface. 		90			Sill TY Coarse Sill TY Coarse Some si coarse 3/3), no fragmer COAL V coal frag (10YR 2 Change pore was CLAY r (10YR 2 CLAY r (10	CLAY WIT it, few to I gravel, no odor, dry its preser VITH SLAW gments, fe 2/1), no of to slight ater at 5.0 mostly clay 4/1), no of igh orgar 3/3), no of mostly clay 2/1), no of igh orgar 3/3), no of to no silt et on silt et.	H SAND AND GRAVEL r ittle fine to coarse sand, to low plasticity, very da s, stiff, trace to few slag, o t. 3 FILL mostly fine to me ew to little slag fragments dor, saturated, medium of hydrocarbon odor, very s feet. y, trace silt, medium plas dor, moist, soft. hic content, woody, very dor, dry to moist, spongy y, trace to few silt, mediu dor, moist, soft. greenish gray (GLEY1 mostly silt, few to little fi	nostly clay, few to little fine to rk brown (10YR cinder, and wood dium sand sized s, trace silt, black fense. slight sheen on ticity, dark gray dark brown ticity, dark gray dark brown 5/1), medium stil eet.	b b c c c c c c c c c c c c c c c c c c	CL CL				Sample collected (0-2') at 1100. 10.0 feet below ground surface prior to drilling through confining clay un
90 90 90 90 90 90 90 90 90 90	P	85			sand, n saturate Change	o plasticity ed, stiff. e to brown	y, gray (10YR 5/1), no oo i (10YR 5/3) at 18.5 feet	dor, moist to		ML				
25 stiff at 21.0 feet. Change to moist, medium stiff at 24.0 feet. End of boring at 25.0 feet below ground surface.	5 P	90			5/1), no 0.25-ind sand, fe odor, sa Change with lick	odor, mo ch thick sa ew to little aturated, o to trace	y, nace sit, medium plas sist, medium stiff. and with gravel seam, mo fine gravel, yellowish bro dense at 20.5 feet. coarse sand to fine grave brown (5YR 6/4) mother	ostly fine to coars wn (10YR 5/6), el, gray (10YR 5/	se no (1)	CL			-	
	1			25	stiff at 2 Change End of	1.0 feet. to moist, boring at 2	medium stiff at 24.0 fee 25.0 feet below ground s	t. surface.						

CTF	RC	WELL CONST	RUCTION DIAGR	٩M						
PROJ. NAME:	DTE Ele	t	WELL ID:	MW-16	-01					
PROJ. NO:	231828.	0005 DATE INSTALLED: 6/13/2016	INSTALLED BY: C. Scieszka		CHECK	ED BY: M. I	Powers			
ELEVAT	ION	DEPTH BELOW OR ABOVE	CASING AN	D SCREE	N DET	AILS				
(BENCHMAR	K: USGS)	GROUND SURFACE (FEET)	TYPE OF RISER: <u>2-INCH PVC</u>							
583.02	—	2.6 TOP OF CASING	PIPE SCHEDULE: 40							
↑			PIPE JOINTS: <u>THREADE</u>	D O-RING	<u>3</u>					
			SCREEN TYPE: 2-INCH P	<u>/C</u>						
580.46	41	0.0 GROUND SURFACE	SCR. SLOT SIZE: 0.01-INCH	<u>I</u>						
		1.0 CEMENT SURFACE PLUG	BOREHOLE DIAMETER:	<u>6</u> IN. <u>4</u> IN.	FROM FROM	0 TO 23.5 TO	23.5 FT. 26.5 FT.			
ENGTH		GROUT/BACKFILL MATERIAL BENTONITE SLURRY	SURF. CASING DIAMETER:	IN.	FROM	то	FT.			
		GROUT/BACKFILL METHOD		IN.	FROM	то	FT.			
<u></u>		IREMIE	WELL DEVELOPMENT							
			DEVELOPMENT METHOD: <u>SURGE AND PUMP</u>							
		BENTONITE SEAL MATERIAL	TIME DEVELOPING:	1	HOURS	6				
		TIME RELEASE PELLETS	WATER REMOVED:	75	GALLO	NS				
		16.0 BENTONITE SEAL	WATER ADDED:	0	GALLO	NS				
<u>561.5</u>		18.5 TOP OF SCREEN	WATER CLARITY BE	FORE / AF1	ER DE	VELOPMEN	IT			
Ē			CLARITY BEFORE: <u>VERY</u>	TURBID						
5.00			COLOR BEFORE: BROW	/NISH GRE	Y					
SCREEL		WEDIOM, WASHED SAND	CLARITY AFTER: <u>CLEAI</u>	<u>R</u>						
<u>556.5</u>	E	23.5 BOTTOM OF SCREEN	ODOR (IF PRESENT): NONE							
		23.5 BOTTOM OF FILTER PACK	· · · · ·							
			WATER LEVEL SUMMARY							
		NA BENTONITE PLUG	MEASUREMENT (FE	ET)		DATE	TIME			
			DTB BEFORE DEVELOPING:	26.68	T/PVC	6/13/2016	15:10			
		BACKFILL MATERIAL		26.67	T/PVC	6/14/2016	10:45			
		NATURAL COLLAPSE		7.95 8.02		0/13/2016	10:45			
554.0			OTHER SWI	0.05	T/PVC	0/14/2010	10.40			
554.0			OTHER SWL:		T/PVC					
NOTES:			PROTECTI	VE CASING	DETAI	LS				
			PERMANENT, LEGIBLE WELL	LABEL AD	DED?	VES	NO			
			PROTECTIVE COVER AND LOCK INSTALLED? VES NO							
			LOCK KEY NUMBER: <u>3120</u>							

CTR	С	WELL CONS	ΓF	RUCTION DIAGE	RAM						
PROJ. NAME:	DTE Elec	tric Company River Rouge Power Pla	ant		WELL ID:	WELL ID: MW-16-02					
PROJ. NO:	231828.0	005 DATE INSTALLED: 6/13/2016	IN	ISTALLED BY: C. Scieszka		CHECKED BY: M.	Powers				
ELEVATIO	ON	DEPTH BELOW OR ABOVE		CASING A	ND SCREE	N DETAILS					
(BENCHMARK:	USGS)	GROUND SURFACE (FEET)		TYPE OF RISER: 2-INCH PVC							
582.79		2.9 TOP OF CASING		PIPE SCHEDULE: 40							
				PIPE JOINTS: <u>THREA</u>	DED O-RING	<u>s</u>					
				SCREEN TYPE: <u>2-INCH</u>	<u>PVC</u>						
579.86	-	0.0 GROUND SURFACE		SCR. SLOT SIZE: 0.01-IN	<u>CH</u>						
	_	1.0 CEMENT SURFACE PLUG		BOREHOLE DIAMETER:	<u>6</u> IN. <u>4</u> IN.	FROM <u>0</u> TO FROM <u>23.5</u> TO	23.5 FT. 25.5 FT.				
PIPE LENGTH	-	GROUT/BACKFILL MATERIAL BENTONITE SLURRY GROUT/BACKFILL METHOD		SURF. CASING DIAMETER:	IN. IN.	FROMTO	FT.				
<u>21.5</u>	-	TREMIE		WEI		MENT					
	_	<u>14.0</u> GROUT		DEVELOPMENT METHOD:	SURGE A	ND PUMP					
		BENTONITE SEAL MATERIAL		TIME DEVELOPING:	0.75	HOURS					
					0	GALLONS					
		17.0 BENTONITE SEAL		WATER ADDED.	0	GALLONS					
<u>561.3</u>		18.5 TOP OF SCREEN		WATER CLARITY E	SEFORE / AF	TER DEVELOPMEN	IT				
BTH				CLARITY BEFORE: VEF	<u>RY TURBID</u>						
<u>5.00</u>		MEDIUM WASHED SAND		COLOR BEFORE: BRO	DWNISH GRE	<u>EY</u>					
SCREE				CLARITY AFTER: <u>CLE</u>							
<u>556.3</u>	目 -	23.5 BOTTOM OF SCREEN		ODOR (IF PRESENT): NOI							
		23.5 BOTTOM OF FILTER PACK		· · · ·							
				WATE	R LEVEL SU	MMARY					
		NA BENTONITE PLUG		MEASUREMENT (FEET)	DATE	TIME				
				DTB BEFORE DEVELOPING:	26.68	T/PVC 6/13/2016	13:20				
		BACKFILL MATERIAL		DIBAFIER DEVELOPING:	26.68	T/PVC 6/14/2016	10:50				
	-	NATURAL COLLAPSE		SWL BEFORE DEVELOPING:	7.73	T/PVC 6/13/2016	13:20				
554.4				OTHER SWI	1.01	T/PVC	10.00				
004.4				OTHER SWL:		T/PVC					
NOTES:			-11	PROTEC		G DETAILS					
				PERMANENT, LEGIBLE WE	LL LABEL AD	DED? VES	NO				
				PROTECTIVE COVER AND	LOCK INSTA	LLED? 🔽 YES					
				LOCK KEY NUMBER: <u>3120</u>							

CTF	CTRC WELL CONSTRUCTION DIAGRAM								
PROJ. NAME:	DTE Ele	ctric Company River Rouge Power Pla	nt	WELL ID:	MW-16-03				
PROJ. NO:	231828.0	0005 DATE INSTALLED: 6/10/2016	INSTALLED BY: C. Scieszka		CHECKED BY: M. Powers				
ELEVAT	ION	DEPTH BELOW OR ABOVE	CASING AN	D SCREE	N DETAILS				
(BENCHMAR)	K: USGS)	GROUND SURFACE (FEET)	TYPE OF RISER: <u>2-INCH P</u>	<u>VC</u>					
582.75		2.9 TOP OF CASING	PIPE SCHEDULE: 40						
↓ ↑			PIPE JOINTS: <u>THREADE</u>	ED O-RINGS	<u>6</u>				
			SCREEN TYPE: <u>2-INCH P</u>	<u>VC</u>					
579.90	41	0.0 GROUND SURFACE	SCR. SLOT SIZE: 0.01-INCH	<u>I</u>					
		1.0 CEMENT SURFACE PLUG	BOREHOLE DIAMETER:	<u>6</u> IN. <u>4</u> IN.	FROM <u>0</u> TO <u>23.5</u> FT. FROM <u>23.5</u> TO <u>30</u> FT.				
PLEONET Edite H		GROUT/BACKFILL MATERIAL BENTONITE SLURRY GROUT/BACKFILL METHOD TREMIE	SURF. CASING DIAMETER:	IN.	FROM TO FT. FROM TO FT.				
RISE RISE			WELL	DEVELOP	MENT				
		<u>12.0</u> GROUT	DEVELOPMENT METHOD:	SURGE AN	ND PUMP				
		BENTONITE SEAL MATERIAL	TIME DEVELOPING:	HOURS					
		TIME RELEASE PELLETS	WATER REMOVED:	75	GALLONS				
		17.0 BENTONITE SEAL	WATER ADDED:	0	GALLONS				
561.2		18.5 TOP OF SCREEN	WATER CLARITY BE	FORE / AF1	FER DEVELOPMENT				
T E			CLARITY BEFORE: VERY	TURBID					
5.00			COLOR BEFORE: BROW	NISH GRE	<u>:Y</u>				
CREEL		MEDION, WASHED SAND	CLARITY AFTER: <u>CLEAI</u>	<u>R</u>					
<u>556.2</u>		23.5 BOTTOM OF SCREEN	ODOR (IF PRESENT): NONE	<u>.</u>					
		23.5 BOTTOM OF FILTER PACK							
	le l		WATER	LEVEL SUI	MMARY				
		NA BENTONITE PLUG	MEASUREMENT (FEI	ET)	DATE TIME				
			DTB BEFORE DEVELOPING:	26.70	T/PVC 6/13/2016 13:15				
		BACKFILL MATERIAL	DTB AFTER DEVELOPING:	26.70	T/PVC 6/14/2016 10:55				
		NATURAL COLLAPSE	SWL BEFORE DEVELOPING:	7.85	I/PVC 6/13/2016 13:15 T/DVC 0/14/2010 10.55				
			OTHER SMIL	8.14	1/PVC 0/14/2010 10:55				
549.9		30.0 HOLE BOITOM	OTHER SWI		T/PVC				
NOTES:			PROTECTI	VE CASING	DETAILS				
			PERMANENT. LEGIBLE WFU	LABEL AD					
			PROTECTIVE COVER AND LOCK INSTALLED? VES NO						
			LOCK KEY NUMBER: <u>3120</u>						

CTF	CTRC WELL CONSTRUCTION DIAGRAM									
PROJ. NAME:	DTE Ele	ectric Company River Rouge Power Plan	t	WELL ID:	MW-16-04S					
PROJ. NO:	231828.0	0005 DATE INSTALLED: 3/17/2016	INSTALLED BY: A. Knutson		CHECKED BY	′:C. Scieszka				
ELEVAT	ION	DEPTH BELOW OR ABOVE	CASING A	ND SCREE	N DETAILS					
(BENCHMAR	K: USGS)	GROUND SURFACE (FEET)	TYPE OF RISER: <u>2-INCH PVC</u>							
582.41		1.8 TOP OF CASING	PIPE SCHEDULE: 40							
I ↑			PIPE JOINTS: <u>THREAD</u>	ED O-RING	<u>S</u>					
			SCREEN TYPE: <u>2-INCH</u>	PVC						
580.65	4	0.0 GROUND SURFACE	SCR. SLOT SIZE: 0.01-INC	<u>:H</u>						
		1.0 CEMENT SURFACE PLUG	BOREHOLE DIAMETER:	<u>6</u> IN. IN.	N. FROM <u>0</u> TO <u>25</u> FT. N. FROM TO FT.					
NGTH		GROUT/BACKFILL MATERIAL		IN.	FROM	_TOFT.				
		GROUT/BACKFILL METHOD	SUNT : CASING DIAMETER.	IN.	FROM	TOFT.				
		NA	WELL	DEVELOP	MENT					
		NA_GROUT	DEVELOPMENT METHOD:	SURGE A	AND PUMP					
		BENTONITE SEAL MATERIAL	TIME DEVELOPING:	2	HOURS					
		TIME RELEASE PELLETS	WATER REMOVED:	200	GALLONS					
		18.0 BENTONITE SEAL	WATER ADDED:	0	GALLONS					
559.9		19.5 TOP OF SCREEN	WATER CLARITY B	EFORE / AF	TER DEVELOF	PMENT				
Ē			CLARITY BEFORE: <u>TUR</u>	BID						
5.00		FILTER PACK MATERIAL	COLOR BEFORE: <u>GRE</u>	<u>Y</u>						
CREEN		MEDIUM, WASHED SAND	CLARITY AFTER: <u>CLE</u>	<u>AR</u>						
<u>554.9</u> ▼	E	24.5 BOTTOM OF SCREEN	COLOR AFTER: NON	<u>E</u>						
			ODOR (IF PRESENT): <u>SUL</u>	<u>-UR</u>						
		24.3 BOTTOM OF THETERT AGR	WATER LEVEL SUMMARY							
		NA BENTONITE PLUG	MEASUREMENT (F	EET)	DAT	TIME				
			DTB BEFORE DEVELOPING:		T/PVC					
		BACKFILL MATERIAL	DTB AFTER DEVELOPING:	27.82	T/PVC 6/23/2	2016 9:06				
		NATURAL COLLAPSE	SWL BEFORE DEVELOPING:		T/PVC					
			SWL AFTER DEVELOPING:	6.55	T/PVC 4/7/2	016 11:30				
555.7		25.0 HOLE BOTTOM	OTHER SWL:		T/PVC					
NOTES			OTHER SWL:		T/PVC					
NOTES:			PROTECT							
					DED? 🔽 Y					
			PROTECTIVE COVER AND LOCK INSTALLED? V YES NO							
			<u>0120</u>							

CTRC WELL CONSTRUCTION DIAGRAM										
PROJ. NAME:	DTE Ele	ectric Company River Rouge Power Plan	t			WELL ID:	MW-16	-04D		
PROJ. NO:	231828.	0005 DATE INSTALLED: 2/25/2016	IN	STALLED BY: A. Knu	utson		CHECK	ED BY: C. S	Scieszka	
ELEVAT	ΓΙΟΝ	DEPTH BELOW OR ABOVE	CASING AND SCREEN DETAILS							
(BENCHMARK: USGS) GROUND SURFACE (FEET)				TYPE OF RISER: <u>2-II</u>	NCH PV	<u>C</u>				
501 02				PIPE SCHEDULE: 40						
501.03										
				PIPE JOINTS. <u>IH</u>		D O-RINGS	2			
				SCREEN TYPE: <u>2-II</u>	NCH PV	<u>C</u>				
580.28	AI IA	0.0 GROUND SURFACE		SCR. SLOT SIZE: 0.0	01-INCH					
				BOREHOLE DIAMETER	R: -	6 IN. 4 IN.	FROM FROM	0 TO 90 TO	90 FT. 97 FT.	
EK PIPE LENGTH		GROUT/BACKFILL MATERIAL GROUT/BACKFILL METHOD TREMIE		SURF. CASING DIAMET	TER: -	IN. IN.	FROM FROM	то то	FT.	
RISI			EVELOP	PMENT						
		77.0 GROUT	DEVELOPMENT METHOD: <u>SURGE AND PUMP</u>							
		BENTONITE SEAL MATERIAL		TIME DEVELOPING:	_	2.5	HOURS	6		
		TIME RELEASE PELLETS		WATER REMOVED:	_	100	GALLO	NS		
		80.0 BENTONITE SEAL		WATER ADDED:	-	0	GALLO	NS		
493.8		85.0 TOP OF SCREEN		WATER CLARI	ITY BEF	ORE / AFT	ER DE	/ELOPMEN	Т	
TH T			CLARITY BEFORE: <u>VERY TURBID</u>							
5.00 J				COLOR BEFORE:	<u>LACK</u>					
SCREE				CLARITY AFTER:		<u>.</u>				
488.8		90.0 BOTTOM OF SCREEN		ODOR (IF PRESENT):	STRON	IG SULFU	<u>२</u>			
		97.0 BOTTOM OF FILTER PACK								
				W	VATER L	EVEL SUN	MARY			
		NA BENTONITE PLUG			MENT (FEE	T)		DATE	TIME	
					G.	93.14	T/PVC	2/25/2016	1410	
				SWL BEFORE DEVELOPING	ING:		T/PVC			
		INAT URAL CULLAFOE		SWL AFTER DEVELOPIN	IG:		T/PVC			
483.3		97.0 HOLE BOTTOM		OTHER SWL:			T/PVC			
				OTHER SWL:			T/PVC			
NOTES:				PRC	DTECTIV	E CASING	DETAI	LS		
SWL AT TIME	OF INSTAL	FRESENT, UNABLE TO COLLECT LATION.	[PERMANENT, LEGIBLE	E WELL I	LABEL ADI	DED?	✓ YES	NO NO	
				PROTECTIVE COVER A	AND LOO	CK INSTAL	LED?	✓ YES	NO NO	
			LOCK KEY NUMBER:	3120						

OTR	CTRC WELL CONSTRUCTION DIAGRAM											
PROJ. NAME:	DTE Elec	ctric C	ompany River Rouge Power P	ant				WELL ID:	MW-17	-06		
PROJ. NO:	277472.0	0000	DATE INSTALLED: 6/7/2017	IN	ISTALLED BY: (C. S	cieszka		CHECK	ED BY: T. H	less	
ELEVATI	ON	D	EPTH BELOW OR ABOVE		(CAS	SING AN	ID SCREE	N DET	AILS		
(BENCHMARK	: USGS)	G	ROUND SURFACE (FEET)		TYPE OF RISER:	4	2-INCH P	VC				
583.01	—	3.0	TOP OF CASING		PIPE SCHEDULE:	: 4	<u>40</u>					
↓ ↑					PIPE JOINTS:]	THREAD	ED O-RING	<u>5</u>			
					SCREEN TYPE:	4	2-INCH P	VC				
579.9	1 -	0.0	GROUND SURFACE		SCR. SLOT SIZE:	<u>(</u>	0.01-INCH	<u>+</u>				
		1.5	CEMENT SURFACE PLUG		BOREHOLE DIAM	1ETE	ER:	<u>3.75</u> IN. IN.	FROM FROM	<u>0</u> то то	25	FT.
IPE LENGTH	-		GROUT/BACKFILL MATERIAL NA GROUT/BACKFILL METHOD	-	SURF. CASING D	MAI	IETER:	IN. IN.	FROM FROM	то		FT.
<u>22.7</u>	-		NA	-		_						
	_	NA	GROUT		DEVELOPMENT METHOD: <u>SU</u>				RGE AND PUMP			
			BENTONITE SEAL MATERIAL		TIME DEVELOPIN	NG:		0.75	HOURS	6		
	-		MEDIUM CHIPS	-	WATER REMOVE	D:		75	GALLO	NS		
		8.5	BENTONITE SEAL		WATER ADDED:			0	GALLO	NS		
560.3		20.0	TOP OF SCREEN		WATER	CLA	ARITY BE	FORE / AFT	ER DE	/ELOPMEN	IT	
Η					CLARITY BEFORI	E:	VERY	TURBID				
<u>5.00</u>		DDE			COLOR BEFORE:	:	DARK	GRAYISH	BROWN	1		
SCREE		TINE	TACKED MEDIONI, WACHED CAND	-	CLARITY AFTER:		CLEA	<u>R</u> -				
<u>555.3</u>	▤ -	25.0	BOTTOM OF SCREEN		ODOR (IF PRESE	ENT)	NONE	<u> </u>				
		25.0	BOTTOM OF FILTER PACK									
							WATER	LEVEL SU	MMARY			
		NA	BENTONITE PLUG		MEA	ASUR	REMENT (FE	ET)		DATE	TIN	√E
					DTB BEFORE DEVE	ELO	PING:	28.17	T/PVC	6/7/2017	09	00
			BACKFILL MATERIAL					20.13	T/PVC	6/7/2017	10	40
	-		NA	-	SWL AFTER DEVE	LOP	PING:	6.93	T/PVC	6/20/2017	10	45
555 3		25.0	HOLE BOTTOM		OTHER SWL:			6.85	T/PVC	6/15/2017	16	45
		_0.0			OTHER SWL:				T/PVC		 I	
NOTES:						P	ROTECTI		DETAI	LS		
					PERMANENT, LE	GIB VEF	LE WELL	LABEL AD DCK INSTAL	DED? LED?	✓ YES ✓ YES	M []	10 10
					LOCK KEY NUMB	SER:	<u>3120</u>					

CTR	CTRC WELL CONSTRUCTION DIAGRAM									
PROJ. NAME:	DTE Electr	ric Company River Rouge Po	wer Plant			WELL ID:	MW-17	-07		
PROJ. NO:	277472.00	00 DATE INSTALLED: 6/1	4/2017 l	NSTALLED BY: C.	Scieszka	•	CHECK	ED BY: T. H	less	
ELEVATI	ON	DEPTH BELOW OR ABC	VE	C	ASING AN	ID SCREE	N DET	AILS		
(BENCHMARK	: USGS)	GROUND SURFACE (FE	ET)	TYPE OF RISER:	<u>2-INCH P</u>	VC				
583.05	<u> </u>	3.0 TOP OF CASING		PIPE SCHEDULE:	<u>40</u>					
↓ ↑				PIPE JOINTS:	THREADE	ED O-RING	<u>s</u>			
				SCREEN TYPE:	2-INCH P	VC				
	1 -	0.0 GROUND SURFACE		SCR. SLOT SIZE:	0.01-INCH	<u>1</u>				
		1.0 CEMENT SURFACE PL	UG	BOREHOLE DIAME	TER:	<u>8</u> IN. <u>3.75</u> IN.	FROM FROM	0 TO 10 TO	10 FT. 21 FT.	
ELENGTH		GROUT/BACKFILL MATERIAL				IN.	FROM	<u>21</u> TO	<u>25</u> FT. FT	
19.3 H		NA					T KOM	10		
RIS					WELL	DEVELOP	MENT			
		NA GROUT		DEVELOPMENT METHOD: <u>SURGE AND PUMP</u>						
		BENTONITE SEAL MATERIAL		TIME DEVELOPING	3 :	1.5	HOURS	6		
		MEDIUM CHIPS		WATER REMOVED):	20	GALLO	NS		
	1	4.0 BENTONITE SEAL		WATER ADDED:		0	GALLO	NS		
563.8		6.0 TOP OF SCREEN		WATER C	LARITY BE	FORE / AFT	TER DE	VELOPMEN	IT	
GTH		FILTER PACK MATERIAL		CLARITY BEFORE:	VERY	TURBID				
<u>5.00</u>		PRE PACKED MEDIUM, WASHED S	AND	COLOR BEFORE:	DARK	<u>GRAYISH</u>	BROWN	<u>1</u>		
SCREE				COLOR AFTER:	BROV	VN/CLOUD	<u>10</u> Y			
<u>558.8</u> ¥		21.0 BOTTOM OF SCREEN		ODOR (IF PRESEN	IT): <u>NONE</u>	<u>.</u>				
	2	1.0 BOTTOM OF FILTER P	ACK							
					WATER		MMARY	DATE	70.45	
		NA BENTONITE PLUG				24 30	T/PV/C	DATE 6/15/2017	1145	
				DTB AFTER DEVELO	PING:	24.27	T/PVC	6/15/2017	1400	
				SWL BEFORE DEVE	LOPING:	6.44	T/PVC	6/15/2017	1145	
	-		—	SWL AFTER DEVELO	OPING:	8.11	T/PVC	6/15/2017	1400	
554.8	2	25.0 HOLE BOTTOM		OTHER SWL:			T/PVC			
				OTHER SWL:			T/PVC			
NOTES:					PROTECTI	VE CASING	DETAI	LS		
				PERMANENT, LEGIBLE WELL LABEL ADDED? VES NO						
				LOCK KEY NUMBE	R: <u>3120</u>			_		