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February 22, 2022

Ms. Cindy Koepke
Hydrogeologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Subject: Refuse Hideaway Landfill
December 2021 Operation Monitoring and Maintenance Activities

Dear Cindy:

TRC completed the following operation, monitoring, and maintenance activities at the Refuse Hideaway Landfill in Middleton, WI in December 2021.

- December 3, 2021 – Air Compressor Fitting Repairs
- December 7, 2021 – Monthly Site Visit
- December 13 and 14, 2021 – Gas Extraction System Restart Due to Air Compressor Fault CMP-401 and Follow Up Inspection
- December 20, 2021 – Bimonthly Site Visit
- December 29, 2021 – Electrical Contact Replacement for Air Compressor System and Effluent Stack Modifications.

The gas and leachate extraction systems were operational between December 1 and December 7, 2021. On the afternoon of December 7, while TRC was onsite, both systems shutdown due to air compressor fault CMP-401. The air compressor motor overload contact was tripped due to cold weather conditions causing a full system shutdown. TRC confirmed with Perineal Energy Systems (PEI) that the motor overload contact for the air compressor was undersized, and cold weather conditions caused the system to fault due to higher amperage draw on the motor. PEI ordered a new contact to help reduce the frequency of possible shutdowns.

Due to the cold weather condition on the December 7, the condensate within the gas extraction system froze, blocking air flow in the effluent piping causing a blower shut down (Fault 4981 & 4982 – External Temperature 1 & 2 High Alarms). The effluent stack was equipped with a turbine for air dispersion and the warm effluent exhaust and cold exterior temperatures caused the turbine to freeze, which blocked air flow through the system. Both systems were restarted on December 13, 2021 and were operational through December 14, 2021. TRC conducted a site visit on December 20, 2021, and an air compressor system fault CMP-401 on December 14, 2021, had shut down both systems again due to cold weather conditions. TRC attempted to restart the blower system but was unsuccessful due to freezing conditions.

On December 29, 2021, TRC and Van Ert Electrical conducted a site visit and replaced the air compressor motor overload contact and removed the turbine from the effluent stack. A t-fitting was installed in place of the turbine to allow for cold weather operation. Both systems were attempted to be restarted following system modifications. The air compressor system operated for a short period of time but shutdown while TRC was still on site. Currently, TRC and the compressor manufacturer are

troubleshooting based on the concept that the cold weather conditions are likely causing issues with the compressor oil and effecting the compressor operation. In addition, the blower or effluent gas piping appeared to have a block due to condensate freezing in the system. Based on recommendations from the manufacturer, TRC has proposed to DNR that the air compressor oil reservoir requires heating and/or insulation to allow for cold weather operation and the gas extraction system may need heat trace and insulation on the blower and effluent piping.

TRC continues to work with WDNR and PEI on improvements to allow for the gas and leachate extraction systems to operate in the colder weather. TRC will plan to conduct site visits in January to attempt to restart one or both systems depending on weather conditions. Further details regarding recommended improvements will be provided and further discussed with the WDNR and a summary will be provided in the January 2022 monitoring report.

Attached are the monitoring results collected during the site visits completed in December 2021.

If you have any questions, please contact me at astehn@trccompanies.com or 608-807-8112.

Sincerely,

TRC

Andrew M. Stehn

Andrew Stehn, PE
Project Manager

Attachments

December 2021 Monitoring Results

System Inspection Log
Landfill Gas Extraction and Leachate Pump System
WDNR - Refuse Highway Landfill
Middleton, Wisconsin

Operator Name:	J. Roelke				
Date:	12/7/2021	Arrival Time:	9:00	Departure Time	13:00

Visit Type *(circle all that apply)*	Bi-weekly	**Monthly**	Quarterly	Annual

Weather Conditions:	cloudy	Gas/Instrument Type:	GEM 2000
Ground Condition:	frozen	Serial Number:	11668
Barometric Pressure:	30.31	Date Last Calibrated:	12/7/2021
Barometric Pressure Trend:	steady	Method:	cal. gas
Temperature:	11°F	Pressure Instrument:	Dwyer manometer

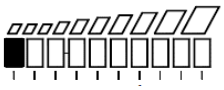
Landfill Gas Extraction System

System	*Location*	*Tag #*	*Equipment Description*	*Set Point*	*Typical Range*	*Field Reading*
Blower Motor	Remote	GHS-BLR-301	Amperage	-	3 - 4 amps	3.72
			Speed	-	1800 - 1900 rpm	1844.25
			Frequency	-	30 - 35 Hz	31.04
	HMI		Amperage	-	3 -4 amps	3.7
	HMI		Speed	-	-	-
	HMI		Hours	-	-	4395
Blower Operating (yes/no). Note excessive noise or issues observed.						
Blower Inlet	HMI	PT-301	Blower Inlet Vacuum	-7.0 in. w.c.	-7.0 in. w.c.	-7.0
	HMI	TE-301	Blower Inlet Temperature	-	50 - 90 °F	41
	Local	GHS-PI-301	Blower Inlet Vacuum	-7.0 in. w.c.	-7.0 in. w.c.	-6.79
	Local	GHS-TI-301	Blower Inlet Temperature	-	50 - 90 °F	36
	Local	Sample Port	Gas Composition - % Methane	-	-	4.4
			Gas Composition - % CO2	-	-	5.6
			Gas Composition - % Oxygen	-	-	17.1
			Gas Composition - % Balance	-	-	72.9
Demister	Local	GHS-PDI-301	Demister Differential Pressure	-	1-2 in w.c	-
	Local		Slight Glass: Liquid Present	-	-	(yes/**no**)
	HMI	LS-701	Level Indication	-	-	condensate on sight glass
Blower Outlet	HMI	PT-302	Blower Outlet Flow Pressure	-	<1.0 in. w.c.	0.0
	HMI	TE-302	Blower Outlet Temperature	-	20 - 90 °F	39
	HMI	PDT-301	Blower Outlet Flow Differential Pressure	-	1-2 in w.c	1.56
	HMI	-	Blower Outlet Flow Rate	-	180 - 200 scfm	187
	Local	GHS-PI-302	Blower Outlet Flow Pressure	-	<1.0 in. w.c.	6.81
	Local	GHS-TI-302	Blower Outlet Temperature	-	20 - 90 °F	36
	Local	Sample Port	Gas Composition - % Methane	-	-	4.6
			Gas Composition - % CO2	-	-	5.5
			Gas Composition - % Oxygen	-	-	17.0
			Gas Composition - % Balance	-	-	72.9
Branch Headers	Local	North	North Branch Vacuum	-	-5 - 7 in w.c.	-5.62
	Local	North	Valve Position	-	6 turns open	6
	Local	North Sample Port	Gas Composition - % Methane	-	-	13.2
			Gas Composition - % CO2	-	-	11.4
			Gas Composition - % Oxygen	-	-	11.9
			Gas Composition - % Balance	-	-	63.5
	Local	Central	Central Branch Vacuum	-	-5 - 7 in w.c.	-4.81
	Local	Central	Valve Position	-	6 turns open	6
	Local	Central Sample Port	Gas Composition - % Methane	-	-	3.7
			Gas Composition - % CO2	-	-	4.8
			Gas Composition - % Oxygen	-	-	17.7
			Gas Composition - % Balance	-	-	73.8
	Local	South	South Branch Vacuum	-	-5 - 7 in w.c.	-5.59
	Local	South	Valve Position	-	6 turns open	6
	Local	South Sample Port	Gas Composition - % Methane	-	-	4.7
			Gas Composition - % CO2	-	-	6.4
			Gas Composition - % Oxygen	-	-	16.7
			Gas Composition - % Balance	-	-	72.2

System Inspection Log
Landfill Gas Extraction and Leachate Pump System
WDNR - Refuse Highway Landfill
Middleton, Wisconsin

Air Compressor System[1]

Operational Settings	Pressure Set Points					Condensate Set Points		
	Tank Low (psi)	Tank High (psi)	Well Field (psi)	On (min.)	Off (min.)	Open (sec.)	Closed (min.)	Test Operation
	135	185	53	2'15"	12'45"	4	20	(**yes**/no)

Air Dryer System[1]		Electrical Status		HMI Heater/Air Conditioner	
System Operational:	(**yes**/no)	3-Phase Power Indicator:	__3___ of 3	Operational	(**yes**/no)
Condensate Drain Operational:	(**yes**/no)	GFI 1 Status:	(**Green**/ Red)	Temperature	
Alarm Indictor:	(on/**off**)	GFI 2 Status:	(**Green**/ Red)	Filter Cleaned	(yes/**no**)
Condenser Cleaned[2]:	(yes/**no**)	**Leachate Tank/Loadout**			
Dew Point Indicator:				Visual Check: √	
	Indicate which bars are green(G) or red (R) and note (F) if flashing.	Liquid Level (inches):	19.5	· Evidence of Tank Overflow: (yes/**no**)	
		Leak Detection Test Completed:	(yes/**no**)	· Inspect concrete pad and storm sewer for damage or backup	
		Overfill Float Functional:	(**yes**/no)		
		Exhaust Stack			
		Drain Stack Sump (vol. removed)	Froze	Stack Condition:	Condensate buildup

1. Check all air lines and gas extraction lines for leaks during each site visit. Drain inline air filters and replace as needed.

2. Air Dryer - Clean the condenser monthly using an air jet (max. 2 bar / 30 psig) inside out. Make sure not to damage the aluminum lamellae of the cooling package.

3. On a quarterly basis change the oil and check/clean the air filters and intercoolers for the air compressor.

4. Inspect mounting brackets and bolts for the air compressor and effluent stack for tightness.

Comments/Notes:
Gas extraction and compressor systems operating at arrival but shutdown due to cold conditions while TRC was onsite. Ice built up on the effluent stack causing air flow to be restricted. Gas extraction wells GW-6, GW-10, and GW-13 were not balanced because blower faults - 4981 & 4982, External Temp. 1 & Temp. too high due to ice buildup. Air compressor fault CMP-401 tripped while onsite, alarm cleared, and compressor restarted. Excessive noise observed from compressor motor and compressor shutdown.

LANDFILL GAS MONITORING FORM
REFUSE HIDEAWAY GAS MONITORING PROGRAM (EPA ID: WID980610604, Facility ID: 113112010)

			STARTING	ENDING
TECHNICIAN(S):	J. Roelke	DATE:	12/7/21	12/7/21
GAS/INSTRUMENT TYPE:	GEM 2000	TIME:	9:00 AM	12:50 PM
SERIAL NO.:	11668	BAROMETRIC PRESSURE [25]	30.31 in. Hg	30.17 in. Hg
DATE LAST CALIBRATED:	12/7/2021	BAROMETRIC TREND [46381]	falling	falling
METHOD:	Standard Calibration Gases	WEATHER CONDITIONS:	cloudy	
PRESSURE INSTRUMENT:	Dwyer Digital Manometer	TEMPERATURE [21]	11 °F	16 °F
Project #	335719	GROUND CONDITIONS [No DNR ID]:	frozen	frozen

BLOWER MONITORING

Well Location	Inlet Header Temp. (°F)	Local Header Pressure (in. W.C.)	HMI Header Pressure (in. W.C.)	HMI Flow Rate (SCFM)	Gas Measurement			Valve Setting (% open)		
					Methane (%, by vol.)	Carbon Dioxide (%, by vol.)	Oxygen (%, by vol.)			
Influent	36	-6.79	-7.0	187.0	4.4	5.6	17.1			
South Header	36	-5.59			4.7	6.4	16.7	6	/	6
Central Header	36	-4.59			3.7	4.8	17.7	6	/	6
North Header	36	-5.62			13.2	11.4	11.9	6	/	6
Effluent	36	(1)	(1)				(1)	(1)	(1)	(1)

Well No.	Time	Well Temp. (°F)	Available Header Pressure (in. W.C.)	Applied Well Pressure (in. W.C.)	Differential Pressure (in. W.C.)	Final Well Pressure (in. W.C.)	Final Differential Pressure (in. W.C.)	Estimated Gas Flow (scfm)	Methane (%, by vol.)	Carbon Dioxide (%, by vol.)	Oxygen (%, by vol.)	Initial Valve Setting (% open)	Final Valve Setting (% open)	Pump Counter
GW-1	10:03	38	-4.40	-0.40	0.01	--	--	NA	10.3	26.5	0.4	1 / 12	1 / 12	Counter #: 9185
GW-2	10:16	22	-4.34	-1.10	0.02	--	--	NA	20.6	25.1	6.3	1 / 12	1 / 12	Counter #: 66990
GW-3	10:28	46	-4.41	-3.69	0.04	--	--	NA	30.8	23.8	0.4	3.5 / 12	3.5 / 12	No Pump Installed
GW-4	10:34	20	-4.09	-0.25	0.01	--	--	NA	5.9	3.9	17.1	0.5 / 12	1 / 12	Counter #: 71309
GW-5	10:39	20	-4.15	-1.47	0.0	-1.3	0.01	NA	22.2	17.0	9.1	0.88 / 12	0.25 / 12	Counter #: 226144
GW-6	11:36	22	(1)	(1)	(1)	(1)	(1)	NA	0.0	0.2	20.6	3 / 12	3 / 12	No Pump Installed
GW-7	10:48	26	-4.27	-4.11	0.01	-4.21	0.01	NA	37.4	31.2	0.3	2.75 / 12	3 / 12	Counter #: 82163
GW-8	10:52	20	-4.18	-2.05	0.01	-3.71	0.01	NA	41.6	18.9	2.9	1.65 / 12	1.75 / 12	Counter #: 74835
GW-9	11:01	18	-4.09	-0.04	0.01	--	--	NA	20.5	4.3	13.9	0.75 / 12	0.75 / 12	Counter #: 54058
GW-10	11:30	18	(1)	(1)	(1)	--	--	NA	25.2	26.4	1.1	0.5 / 12	1 / 12	Counter #: 26509
GW-11	11:09	12	(1)	(1)	(1)	--	--	NA	29.7	12.8	2.6	0.65 / 12	0.65 / 12	Counter #: 16234
GW-12	11:16	14	(1)	(1)	(1)	--	--	NA	NM	NM	NM	0.35 / 12	0.35 / 12	Counter #: 93865
GW-13	11:23	12	(1)	(1)	(1)	--	--	NA	11.9	9.2	12.5	1.25 / 12	0.25 / 12	Counter #: 36532

Notes:
(1): Not monitored due to the blower shutting down. Cold weather/freezing conditions caused condensate in the system to freeze and restrict air flow.

"NA" = Data Not Available
"NM" = Not Monitored