EUICENGINE#1-2, EUICENGINE#2-2 & EUICENGINE#3-2 (FGENGINES-2)

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MALFUNCTION ABATEMENT / PREVENTIVE MAINTENANCE PLAN

State Registration No. (SRN) N2369
Permit No. MI-ROP-N2369-2020b

Facility Address:
1900 North Ogden Highway
Adrian, MI 49221
Lenawee County

Adrian Energy Associates, LLC

1.0 Purpose

The purpose of this Malfunction Abatement/Preventative Maintenance Plan is to establish appropriate process monitoring, malfunction response and preventative maintenance procedures to maintain compliance with applicable air pollutant emission limits for the three (3) landfill gas (LFG) fueled engines that will be operated at the Adrian Energy Associates, LLC (Adrian Energy) location. This revision is being made to update corporate changes and operational employee titles. There are NO technical changes being made to this plan.

This plan has been developed in accordance with the requirements of Permit to Install No. MI-PTI-N2369-2020b, Section 2, Condition III.1. that specifies:

The permittee shall submit to the AQD District Supervisor, for review and approval, a malfunction abatement/preventative maintenance plan for FGENGINES-2. After approval of the malfunction abatement/preventative maintenance plan by the AQD District Supervisor, the permittee shall not operate FGENGINES-2 unless the malfunction abatement/preventative maintenance plan, or an alternate plan approved by the AQD District Supervisor, is implemented and maintained. The plan shall incorporate procedures recommended by the equipment manufacturer as well as incorporating standard industry practices. At a minimum the plan shall include:

a. Identification of the equipment and, if applicable, air-cleaning device, and the supervisory personnel responsible for overseeing the inspection, maintenance, and repair.

b. Description of the items or conditions to be inspected and frequency of the inspections or repairs.

c. Identification of the equipment and, if applicable, air-cleaning device, operating parameters that shall be monitored to detect a malfunction or failure, the normal operating range of these parameters and a description of the method of monitoring or surveillance procedures.

d. Identification of the major replacement parts that shall be maintained in inventory for quick replacement.

e. A description of the corrective procedures or operational changes that shall be taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits.

The above requirements are also applicable with the existing ROP. A copy of the most recent Engine Malfunction Abatement/ Preventative Maintenance Plan is maintained on file at the Adrian Energy facility.

2.0 Facility and General Process Information

Adrian Energy operates three (3) Caterpillar (CAT®) 3516 reciprocating internal combustion (IC) engines that are fueled with LFG and connected to electricity generators (IC engine/generator). The emission units are identified in the permit as EUICENGINE#1-2, EUICENGINE#2-2 & EUICENGINE#3-2.

The LFG generated at the Adrian Landfill (which is the source of the fuel used by Adrian Energy) is collected using a system of wells, gas headers and blowers, which have been installed and are operated by the landfill owner. The LFG is dewatered, filtered and compressed (treated) by the landfill owner before being supplied as fuel to the IC engine/generator sets. The electricity generated is distributed to the local grid.

3.0 IC Engine/Generator Malfunction Abatement

The CAT® 3516 engine is designed to fire low-pressure, lean fuel mixtures (e.g., LFG).

The engine/generator sets are not equipped with add-on emission control devices. Therefore, the units maintain compliance with applicable air pollutant emission limits through the proper operation of the engine and efficient fuel combustion, which:

Reduces the formation of carbon monoxide (CO) and nitrogen oxide (NO_X) emissions.

Destroys methane and nonmethane organic compounds (NMOC) in the LFG fuel (nonmethane hydrocarbons may be classified as volatile organic compounds and/or hazardous air pollutants).

Malfunction Abatement for the CAT® 3516 IC engine consists of monitoring critical engine parameters to ensure proper operation. The engine is equipped with numerous sensors that monitor critical operation parameters. An Electronic Ignition System (EIS) processes the data and adjusts operating variables (ignition timing, engine speed), activate alarms to warn of an out-of-range variable or shuts down the engine.

3.1 Engine Oil / Engine Coolant Temperature

Engine oil and engine coolant conditions do not directly influence air pollutant emissions. However, maintaining proper engine oil/coolant temperature and pressure is critical to the operation of the engine and preventing early or catastrophic mechanical failure.

The engine is equipped with sensors to monitor the engine oil temperature and oil pressure. Notification alarms are activated based on out-of- range conditions (e.g., high oil temperature, low or high oil pressure). An automatic shutdown will occur if the variable exceeds a critical setpoint.

Engine coolant temperature is monitored to assure proper circulation of coolant and cooling of the engine block. Notification alarms are activated based on out-of- range conditions (high or low coolant temperature). An automatic shutdown will occur if the coolant temperature exceeds its critical setpoint temperature.

Abnormal engine operations or shutdowns are logged by the EIS. The cause of the problem is investigated and corrected by the operators and the engine is restarted.

3.2 Air / Fuel Ratio Control

Maintaining proper air/fuel ratio results in efficient fuel combustion and limits the formation of CO and NO_X. The engine is equipped with adjustable carburetor AFR screws to adjust and maintain engine emissions.

If the LFG oxygen level increases, or the methane content decreases, beyond preset values the engine automatically shuts down if the desired air/fuel mix ratio cannot be maintained to prevent excess emissions.

The cause of the excess oxygen or decreased methane is investigated (this is typically caused from landfill wellfield maintenance or adjustments) and corrected by the operators and the engines are restarted.

3.3 Weekly Inspections

The operator performs weekly visual inspections of the engines and logs the following information in a weekly log:

Coolant system level;
Engine air cleaner service indicator;
Engine oil level;
Fuel system fuel filter differential pressure; and
Generator load.

Appendix A provides a form that is used for recording observations of engine/generator set operations.

3.4 On-Call Dial-Out System

The facility is not staffed around the clock. Therefore, the EIS is connected to a dial- out system that notifies the on-call operator of any engine shutdowns and certain faults and warnings during evening/weekend/holiday hours when the facility is not staffed.

4.0 Preventative Maintenance

4.1 Maintenance Schedule

EUENGINE#1-2, EUENGINE#2-2 & EUENGINE#3-2 are maintained per the guidelines in the Caterpillar Operation and Maintenance Manual. The actual maintenance schedule is dependent on actual fuel gas conditions and observations of engine performance.

Proper maintenance of the fuel train ensures good fuel mixing and combustion, which limits CO and NO_X formation. The monitoring and regular replacement of worn engine parts (such as cylinder seals) reduces particulate matter ($PM_{10}/PM_{2.5}$) emissions (primarily engine oil).

4.2 Oil Sampling Program

When engine oil is changed per the preventative maintenance schedule (typically monthly), a sample of the oil is sent for analysis of several properties. The oil analysis results are used to determine fuel condition, the level of engine wear or parts that may need attention (inspection or replacement). Depending upon the results, the maintenance schedule may be adjusted from the manufacturer's guidelines.

4.3 Parts Inventory

Important engine and generator parts are available on-site and kept on inventory. A sample of these parts include air filters, oil filters, spark plugs, sensors, pumps, thermostats, heads, new engine oil and coolant.

5.0 Recordkeeping

The following information will be maintained to verify proper operation and maintenance of the Sumpter Energy CAT® 3516 engines and that proper procedures were implemented in response to malfunction requirements:

1. Weekly records of the equipment monitoring parameters that are presented in this document (Section 3.3 Weekly Inspections and Appendix A).

2. Equipment maintenance records for those systems that affect the operation of the engine.

3. Engine faults, alarms and shutdowns are recorded and logged by the EIS.

4. Records of process malfunctions or equipment failures if such events are different from those covered in this Plan. Particularly, if it is suspected that emission limits may have been exceeded or LFG was vented to the atmosphere from the Adrian Energy facility.

6.0 Personnel Responsibilities

The PGD Operations Specialist is responsible for operating the engines, regular inspections and monitoring (completing checklists), maintaining spare parts, and preventative maintenance as specified in this Plan. Major engine maintenance or malfunctions are reported to the PGD Operations Leader.

The PGD Operations Leader and PGD Operations Specialist will determine when revision of this Plan are necessary.

The PGD Operations Leader and PGD Operations Specialist are responsible for ensuring that this Plan is maintained on file, is accessible and kept up-to-date.

Appendix B provides a contact list for facility personnel.

7.0 Plan Revisions

Permit to Install No. MI-PTI-N2369-2020b, Section 2, Condition III.1 and MI-ROP-N2369-2020b, FGENGINES-2, Section 2, Condition III.1 specifies that:

If the plan fails to address or inadequately addresses an event that meets the characteristics of a malfunction at the time the plan is initially developed, the owner or operator shall revise the plan within 45 days after such an event occurs and submit the revised plan for approval to the AQD District Supervisor. Should the AQD determine the malfunction abatement/preventative maintenance plan to be inadequate, the AQD District Supervisor may request modification of the plan to address those inadequacies.

This Malfunction Abatement/Preventative Maintenance Plan will be:

1. Amended or modified if equipment or processes are added that are not covered under the Plan; or

2. Revised within 45 days of an event if the procedures described in this document do not adequately address any malfunction event that occurs at the facility.

Plan revisions will be documented using the revision history log (Appendix C) and submitted to the AQD District Supervisor as required by the Permit.

8.0 Appendices

The following documents and materials are included as part of this Malfunction Abatement/Preventative Maintenance Plan:

Appendix A: Weekly Readings Form

Appendix B: Responsible Personnel Contact List

Appendix C: Malfunction Abatement/Preventative Maintenance Plan Revision History

Adrian Energy Associates, LLC

APPENDIX A

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WEEKLY READINGS FORM

4/29/2024

Adrian Energy
Weekly Readings

Date/Time		Ambient Temp		Operator Completing Report				
Engine Readings				Plant Readings Control Room				
	Unit 1	Unit 2	Unit 3	Draw "H2O		Flow Scfm		
Manifold Psi				LFG Total Kcf		Gas Press Psi		
Oil Psi @ ESCM				Parasitic load Kwh		Gas Temp F		
Oil Temp @ ESCM				Export Volt		Kwh		
Kw Load				Personal Gas Monitor		Methane Detector		
Kw				Utility Meter Readings				
Oil Level				Time	14	15	16	
DEQ Hours								
Engine Hours			Same	Plant Readings Engine Room				
Oil Filter Psid				Air Comp Psi		Oil level /		
JW Temp	/	/	/	Gas readings				
M/U Oil Level				CH4	CO2	O2	Co	
Vent Fan				H2s	Bal%			
CCV Draw				Plant Readings Blower Room				
SCAC Temp	/	/	/	Draw "HG				
Comb. Temp				Filter Tower "H2O, <2psi		Liquid Lvl		
Radiator Motor				Polishing Tower Psi, <1 psi		Liquid Lvl		
Make-Up Oil Added				Blower, Gas cooler				
Transformer Readings				Amps		Inlet Bearing Temp F		
Temp	Psi	Oil Lvl		Outlet Psi		Outlet Bearing Temp F		
Landfill Readings				Outlet temp		Motor		
Draw "H2O	Air Comp	Psi		Tank Readings				
MCC readings, Eom only				New Oil Tank "		Waste Oil Tank "		
Parasitic load (Mwh)				Condensate Tank				

Time	

Adrian Energy Associates, LLC

APPENDIX B
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RESPONSIBLE PERSONNEL CONTACT LIST

Responsible Personnel Contact List

Employee Name	Position / Title	Contact Number
David Mooney	PGD Operations Manager	(432) 385-4463
Josh Wrubel	PGD Operations Leader	(810) 689-8316
Eric Bisco	PGD Operations Specialist	(517) 301-1828
Robert Meads	PGD Sr. Gas Operations Technician	(734) 672-4933
Ed Wentling	PGD Environmental Services Manager	(215) 767-5131

Adrian Energy Associates, LLC

APPENDIX C
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MALFUNCTION ABATEMENT / PREVENTIVE MAINTENANCE PLAN REVISION HISTORY

Adrian Energy Associates, LLC

Malfunction Abatement/Preventative Maintenance Plan
Revision History

This Plan will be amended if equipment or processes are added that are not covered under the plan or will be revised within 45 days of non-conforming events if the procedures described herein do not adequately address any malfunction or start- up/shutdown events that occur at the facility. A copy of the original plan and all revisions/addendums will be kept on file at the facility for at least five (5) years.

Date of Revision	Reason For Revision
7/23/2009	Initial draft of the Malfunction Abatement/Preventative Maintenance Plan
12/7/2017	Responsible Personnel Contact List updates
04/29/2024	Referenced current ROP number, updated Appendix A – Weekly Readings Sheet, Appendix B contact list, and updated plant personnel titles. General technical / engine operations & maintenance information was not revised and is still appropriate as per the revised Plan.

EGLE

RENEWABLE OPERATING PERMIT APPLICATION
AI-001: ADDITIONAL INFORMATION

This information is required by Article II, Chapter 1, part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.

	SRN: N2369	Section Number (if applicable): 02

1. Additional Information ID
AI-TRMTSYS-MA/PMP

Additional Information

2. Is This Information Confidential? ☐ Yes ☒ No

Malfunction Abatement & Preventative Maintenance Plan for LFG treatment system

ADRIAN ENERGY ASSOCIATES, LLC

LANDFILL GAS TREATMENT SYSTEM
MALFUNCTION ABATEMENT/PREVENTATIVE MAINTENANCE PLAN

State Registration No. (SRN) N2369
Permit No. MI-ROP-N2369-2020b

Facility Address:
1900 N. Ogden Highway
Adrian, MI 49221
Lenawee County

Adrian Energy Associates, LLC

1.0 Purpose

The purpose of the Gas Treatment System Preventative Maintenance (PMP) Monitoring and Startup, Shutdown and Malfunction (SSM) Plan that is presented in this document is to establish appropriate preventative maintenance, monitoring, operating and malfunction response procedures for the landfill gas treatment system that is operated at Adrian Energy Associates (Adrian Energy).

This plan has been developed in accordance with provisions of the Municipal Solid Waste (MSW) Landfill New Source Performance Standards (NSPS, 40 CFR Part 62, Subpart OOO) and the MSW Landfill National Emissions Standards for Hazardous Air Pollutants (NESHAP, 40 CFR Part 63, Subpart AAAA).

~~40 CFR §60.765(d) of the MSW Landfill NSPS specifies that if a device other than an open flare or an enclosed combustor is used as the control system for landfill gas emissions, then information is to be prepared describing the operation of the control device, the operating parameters that indicate proper performance and appropriate monitoring procedures. The MSW Landfill NESHAP requires owners of affected facilities to document standard procedures for equipment startup and shutdown and develop procedures for responding to equipment malfunctions.~~

The above regulatory requirements have been superseded by regulations in 40 CFR Part 62, Subpart OOO. In addition, the current ROP MI-ROP-N2369-2020b – Section 2, FGTREATMENTSYS-OOO-2 & FGTREATMENTSYS-AAAA-2 have been added to the permit requirements. As such, Appendix A of this Plan is Adrian Energy's Site Specific Treatment System Monitoring Plan. Note: previous SSM requirements no longer apply.

A copy of the original Gas Treatment System Preventative Maintenance, Monitoring and SSM Plan and revised Plan is kept on file at Adrian Energy for the entire length of time the facility is in operation.

2.0 Facility and General Process Information

Landfill gas generated at the Adrian Landfill (which is the source of the fuel used by Adrian Energy) is collected using a system of wells, gas headers and blowers, which have been installed and are operated by the landfill owner. Adrian Energy has a contract with the landfill owner/operator to purchase the collected landfill gas for use as fuel to power three (3) identical reciprocating internal combustion (IC) engine and electricity generator sets. The electricity that is generated by Adrian Energy is sold to a third party under a power purchase agreement for distribution to the local grid.

The landfill gas generated by the Adrian Landfill and collected by the landfill owner/operator is treated prior to being used as fuel in the Adrian Energy electricity generation processes. USEPA has issued regulatory clarifications that define treated landfill gas as "landfill gas processed in a treatment system that filters, de-waters, and compresses the gas."

The gas received from the Adrian Landfill is initially de-watered in knockout tanks that are located upstream of the Adrian Energy landfill gas treatment system where a portion of the condensate in the landfill gas is removed.

After the initial knockout tank de-watering, the landfill gas is treated in equipment and processes operated by Adrian Energy that consist of:

1. A primary filter vessel that contains a coalescing filter, which is designed to remove particles in the gas stream that are 0.3 microns and larger. Condensate collected by the coalescing filter falls to the bottom of the vessel where it is transferred by gravity to a sump that transfers the liquid back to the landfill for processing.

2. Gas blowers for compression of the de-watered landfill gas.

3. An air-to-gas cooler to reduce the temperature of the gas (which is heated by the blower during gas compression).

4. A polishing filter vessel that contains a coalescing filter, which is designed to remove particles that are 0.3 microns and larger. Condensate collected by the coalescing filter falls to the bottom of the vessel where it is immediately transferred by gravity feed to the sump that transfers the liquid back to the landfill for processing.

3.0 Gas Treatment System Monitoring and Preventative Maintenance

Based on the design of the Adrian Energy landfill gas treatment system, the following equipment and process components will be monitored daily to verify that the system is operating properly.

Knockout Chamber Condensate Accumulation: The primary and polishing filters typically operate without any noticeable condensate accumulation (no water is typically indicated to be present in the vessels). Noticeable water (condensate) accumulation is an indication that the upstream landfill gas de-watering equipment may have malfunctioned.

If condensate accumulation in the knockout vessels is greater than 50% (based on the water level indicated on chamber sight glass), the electricity generation processes will be shutdown to avoid condensate carryover to the downstream components of the gas treatment system or the electricity generation engines. An investigation of the equipment will be performed and corrective actions implemented.

Blower Discharge Pressure: The pressure at the discharge of the blower is measured with an analog pressure gauge. The landfill gas blower should be operated such that the minimum pressure observed on the discharge side of the equipment is at least two (2) pounds per square inch gauge (2 psig). Blower discharge pressures less than 2 psig are an indication of problems with the gas compression system.

If the blower discharge pressure is less than 2 psig, an investigation of the equipment will be performed and corrective actions implemented.

Coalescing Filter Differential Pressure: The pressure drop across each of the coalescing filters is monitored using an analog differential pressure gauge. Large differential pressures (dP) indicate that the filters are wet or loaded with particulate matter and should be replaced. The dP across the primary filter (vacuum side of blower) should be less than or equal to 1 pound per square inch differential (psid). The dP across the polishing filter (pressure side of blower and downstream of the gas cooler) should be less than or equal to 2 psid. If the pressure drop across the coalescing filters is greater than the specified values, the associated filter will be replaced.

The replacement filters will be of comparable design for critical air or gas service applications where high-efficiency removal of oil or water droplets and particulate solids is required. Adrian Energy uses LG Liquid and Gas Coalescing Cartridges that are rated for 50 psid and measure 30 inches in length and 70 mm in diameter. The filters are rated for particulate matter removal to 0.3 microns and the nominal filter area is approximately 9.6 sq. ft.

Air-to-Gas Cooler Outlet Temperature: The temperature of the gas (fuel) at the outlet of the air-to-gas cooler is measured with an analog temperature gauge. The air-to-gas cooler is used to reduce the temperature of the fuel (which becomes elevated during the compression process). Outlet gas temperatures greater than 120°F are an indication of problems with the operation of the air-to- gas cooler. A temperature switch will sound an alarm if the outlet gas temperatures exceeds 135°F.

If the outlet temperature of the air-to-gas cooler is greater than 120°F, an investigation of the equipment will be performed and corrective actions implemented.

Attachment A of the Appendix A Site Specific Treatment System Monitoring Plan provides an example of the form used for recording Weekly observations of gas treatment system operation parameters.

4.0 Startup Standard Operating Procedure

"Startup means the setting in operation of an affected source or portion of an affected source for any purpose." (40 CFR §63.2)

The standard operating procedure for the startup of the landfill gas treatment system is to:

1. Ensure that no unsafe conditions are present.

2. Contact, prior to startup, the Adrian Energy in charge Plant Operations Specialist.

3. Ensure that the system is ready to start by one or more of the following:

    a. Valves are positioned in their proper operating locations.
    b. Appropriate gas and fluid levels, pressures and temperatures are within the values of their normal starting range.
    c. Alarms are cleared.
    d. Power is on, and available to the control panel and to energized equipment.
    e. Emergency Stop is de-energized.

4. Initiate the proper equipment, process and system start sequences.

5. Observe that the system achieves normal operating ranges for appropriate gas and fluid levels, pressures and temperatures (see 3.0 Gas Treatment System Monitoring).

6. Refer to Operations and Maintenance Manuals as determined to be necessary.

5.0 Shutdown Standard Operating Procedures

"Shutdown means the cessation of an affected source or portion of an affected source or portion of an affected source for any purpose." (40 CFR §63.2).

The standard operating procedure for shutdown of the landfill gas treatment system is to:

1. Ensure that no unsafe conditions are present.

2. Contact, prior to shutdown, the Adrian Energy in charge Plant Operations Specialist and notify appropriate Adrian Landfill representatives that the landfill gas treatment and electricity generation processes will be shutdown.

Extended shutdowns of the specified equipment will require startup of the Republic Service's Adrian Landfill gas flaring processes.

3. Initiate the proper equipment, process and system shutdown sequence by one or more of the following:

   a. Press Emergency Stop as determined to be necessary.
   b. Close On / Off switch(es) or Push On / Off button(s).
   c. Close adjacent valves as determined to be necessary.

4. Observe that system achieves normal shutdown ranges for appropriate gas and fluid levels, pressures and temperatures.

5. Refer to Operations and Maintenance Manuals as determined to be necessary.

6.0 Malfunction Standard Operating Procedures

"Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions." (40 CFR §63.2).

1. If landfill gas is determined to be venting from the gas treatment system, the equipment and processes will be immediately isolated from the Adrian Landfill gas collection system.

   Appropriate Adrian Landfill representatives will be contacted to inform them that the gas treatment and electricity generation processes are off-line.

2. An investigation of the equipment that caused the malfunction will be performed and corrective actions implemented.

3. After the cause of the malfunction has been identified and corrective actions implemented, the fuel use and electricity generation processes will be restarted using the procedures specified in this document (Section 4.0 Startup Operating Procedures).

4. Refer to Operations and Maintenance Manuals as determined to be necessary.

7.0 Recordkeeping

The following information will be maintained to verify proper operation and maintenance of the Adrian Energy gas treatment system and that proper procedures were implemented in response to equipment startup, shutdown and malfunction requirements:

1. Weekly records of the equipment monitoring parameters that are presented in this document (Section 3.0 Gas Treatment System Monitoring).

2. Equipment maintenance and/or modification records that affect the operation of the gas treatment system.

3. Treatment System downtime records for each event (forms are provided in Appendix B).

4. Treatment System records that document the actions taken during these events, when such actions are different from those specified in this document (Section 4.0 Startup Operating Procedures, Section 5.0 Shutdown Operating Procedures, Section 6.0 Malfunction Operating Procedures).

5. A deviation report will be completed when any of the Treatment System monitored parameters are out of range.

8.0 Plan Revisions

This Gas Treatment System Preventative Maintenance, Monitoring and SSM Plan will be:

1. Amended or modified if equipment or processes are added that are not covered under the Plan; or

2. Revised within 45 days of a nonconforming event if the procedures described in the document do not adequately address any startup, shutdown and/or malfunction event that occur at the facility.

Plan revisions will be documented using the revision history log (Appendix C).

9.0 Appendices

The following documents and materials are included as part of the Gas Treatment System Preventative Maintenance, Monitoring and SSM Plan:

Appendix A: Adrian Energy's Site Specific Treatment System Monitoring Plan

Appendix B: Startup / Shutdown / Malfunction Report Form

Appendix C: Gas Treatment System Monitoring and SSM Plan Revision History

Adrian Energy Associates, LLC

APPENDIX A

SITE SPECIFIC TREATMENT SYSTEM MONITORING PLAN

Adrian Landfill, Inc. & Adrian Energy Associates, LLC
1970 North Ogden Hwy. Adrian, MI 48108
Gas Plant Owner/Operator
Adrian Energy Associates, LLC / SRN: N2369 / Air Permit # MI-ROP-N2369-2020

Site-Specific Treatment System Monitoring Plan
40 CFR 62, Subpart OOO and 40 CFR 63, Subpart AAAA

The regulatory language in the Federal Plan Subpart OOO and NESHAP AAAA are similar but not identical, similar citations are grouped together.

This Site-Specific Treatment System Monitoring Plan is being prepared because Adrian Landfill, Inc. – Adrian Landfill is or will be subject to control requirements under 40 CFR 62, Subpart OOO and 40 CFR 63, Subpart AAAA. As part of the landfill gas collection and control system (GCCS) on-site, all or a portion of the landfill gas is "treated" as part of its overall management prior to sale or beneficial use. Per §62.16730/§63.1990, a treatment system is one that filters, de-waters, and compresses landfill gas for sale or beneficial use.

A treatment system is one of the acceptable "control systems" under the NSPS/NESHAP rule as set forth in §62.16714(c)(3)/§63.1959(b)(2)(iii)(C), which read that the owner may:

> *Route the collected gas to a treatment system that processes the collected gas for subsequent sale or beneficial use such as fuel for combustion, production of vehicle fuel, production of high-Btu gas for pipeline injection, or use as a raw material in a chemical manufacturing process. Venting of treated landfill gas to the ambient air is not allowed. If the treated landfill gas cannot be routed for subsequent sale or beneficial use, then the treated landfill gas must be controlled according to* §62.16714 *(c)(1) or (c)(2)/* §63.1959(b)(2)(iii)(A) or (B).

Since the Landfill has a treatment system which will act as a control system for the landfill gas subject to NSPS/NESHAP control, the monitoring requirements, specifically §62.16722(g)/ §63.1961(g) require that:

> *"The treatment system must maintain and operate all monitoring systems associated with the treatment system in accordance with the site-specific treatment system monitoring plan required in §62.16726(b)(5)(ii)/*§63.1983(b)(5)(ii).

This site-specific treatment system monitoring plan satisfies the requirements of §62.16726(b)(5)(ii)/§63.1983(b)(5)(ii). Each element of the monitoring plan is listed here followed by the site-specific information related to this specific treatment system. The requirement will be shown in bold, italicized text followed by the site-specific response for the Site.

§62.16726(b)(5)(ii)(A)/§63.1983(b)(5)(ii)(A) Monitoring records of parameters that are identified in the treatment system monitoring plan and that ensure the treatment system is operating properly for each intended end use of the treated landfill gas. At a minimum, records should include records of filtration, de-watering, and compression parameters that ensure the treatment system is operating properly for each intended end use of the treated landfill gas.

Per §62.16722(g)(1)/§63.1961(g)(1), flow must be continuously (at least once every 15 minutes) monitored into the treatment system. The flow measurement device will be maintained and calibrated per manufacturer's recommendations. Also, per §62.16722(g)(2)/§63.1961(g)(2), if there is a bypass line, from the treatment system, it must be secured in the closed position and inspected at least monthly to verify that gas is not being diverted to the bypass line and circumventing appropriate NSPS control. The treatment system does have a bypass line that is air actuated. To prevent the bypass line from opening, the actuator has been disconnected from its air supply.

Per §62.16726/§63.1983 all records must be 5 years up-to-date, readily accessible, on-site. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable. The person(s) performing the inspection as per the frequency listed in Table 1, will record the observed value and determine if the value is within the range of operation. If the recorded value is out of the range of operation, they will immediately take corrective action, including contacting all relevant staff, as necessary. Furthermore, collected data and a description of the actions taken will be placed into the plant file.

§62.16726 (b)(5)(ii)(B)/§63.1983(b)(5)(ii)(B) Monitoring methods, frequencies, and operating ranges for each monitored operating parameter based on manufacturer's recommendations or engineering analysis for each intended end use of the treated landfill gas.

Table 1 describes monitoring methods, frequencies, and operating ranges for each monitored treatment operating parameter. In addition, Table 1 documents the monitoring methods, data, and ranges for each monitored treatment system operating parameter – see Attachment A for the recordkeeping log.

§62.16726 (b)(5)(ii)(C)/ §63.1983(b)(5)(ii)(C) Documentation of the monitoring methods and ranges, along with justification for their use.

The justification for the monitoring methods and ranges for each monitored treatment operating parameter is based on operational experience and/or manufacturer recommendation. This section is required since the ranges of these treatment parameters are not prescribed by the NSPS rules, rather, they are to be set on a site-specific basis (since different beneficial uses and gas sales require different levels of treatment). The facility has gained operational knowledge from the facility's operation as a basis of proper operation.

§62.16726 (b)(5)(ii)(D)/§63.1983(b)(5)(ii)(D) Identify who is responsible (by job title) for data collection.

Employees with the following job titles are authorized to take these treatment system readings:

- Plant Manager;
- Operations & Maintenance Manager; and
- Plant Operator

§62.16726 (b)(5)(ii)(E)/§63.1983(b)(5)(ii)(E) Processes and methods used to collect the necessary data.

Table 1 demonstrates how each type of treatment parameter (filtration, de-watering, and compression) will be monitored.

§62.16726 (b)(5)(ii)(F)/§63.1983(b)(5)(ii)(F) Description of the procedures and methods that are used for quality assurance, maintenance, and repair of all continuous monitoring systems.

The data and equipment are reviewed regularly during the month to verify accuracy and to evaluate for trends that may be characteristic of diminishing performance. Additionally, staff will perform visual inspections of the equipment and note issues as they arise. Repairs will be made as necessary. At a minimum, filters will be cleaned and or replaced as needed to maintain the listed operational parameters.

Table 1 - Landfill Gas Treatment System Monitoring Plan

Equipment	Parameter	Inspection Frequency	Monitoring Device	Range of Operation	Basis (Manufacturer/ Engineering Analysis)
Condensate Accumulation in Knockout Vessels	Condensate Level	Weekly	Sight Glass	≤ 50% full	Operational Knowledge
Compressor/ Blower	Discharge Pressure (compression)	Weekly	Pressure monitoring device	≥ 2 psig	Operational Knowledge
Primary Coalescing Filter Vessel	Differential Pressure (filtration)	Weekly	Pressure monitoring device	≤ 2 psid	Operational Knowledge
Secondary Polishing Filter Vessel	Differential Pressure (filtration)	Weekly	Pressure monitoring device	≤ 1 psid	Operational Knowledge
Gas Cooler (moisture removal)	Differential Temperature (de-watering)	Weekly	Temperature monitoring device	Outlet Gas Temperature ≤ 120°F	Operational Knowledge

Treatment System Operator Review / Approval

Adrian Energy Associates, LLC

Name: Matt Strine

Title: Manager of Operations

Signature: Matt Strine

Date: 9/23/2021

Attachment A

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Treatment System Monitoring & Recordkeeping Log

The attached monitoring parameter record keeping document is an example of the document used to record the treatment system monitoring parameters. The log sheet is maintained electronically at the LFGTE facility.

Date Beginning : 9/8/2021

Adrian Energy Associates Treatment System Preventative Maintenance Plan Monitoring and Recordkeeping Documentation

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Is Condensate Accumulation in the Knockout vessel greater than 50% at the sight glass							
Is discharge blower pressure at least 2 psig?							
Is the primary filter dp less than 2 psid?							
Is the polishing filter dp less than 1 psid?							
Is the outlet gas teperature greater than 120 F							
Weekly Preventative Maintenance Performed							
Signature : **Date:**							

Attachment B
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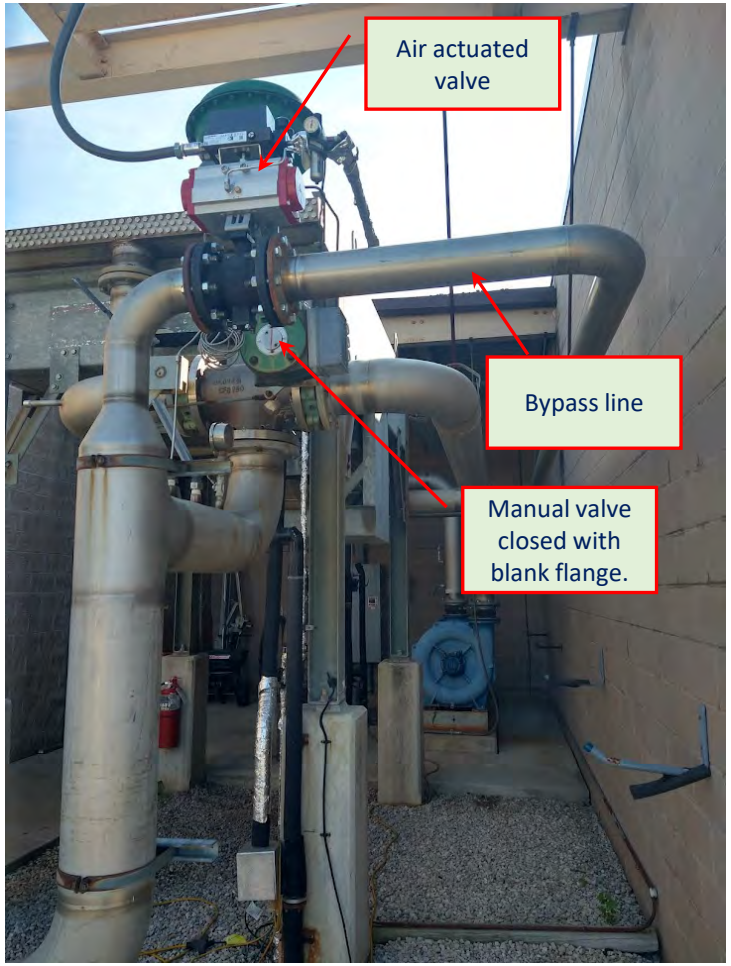
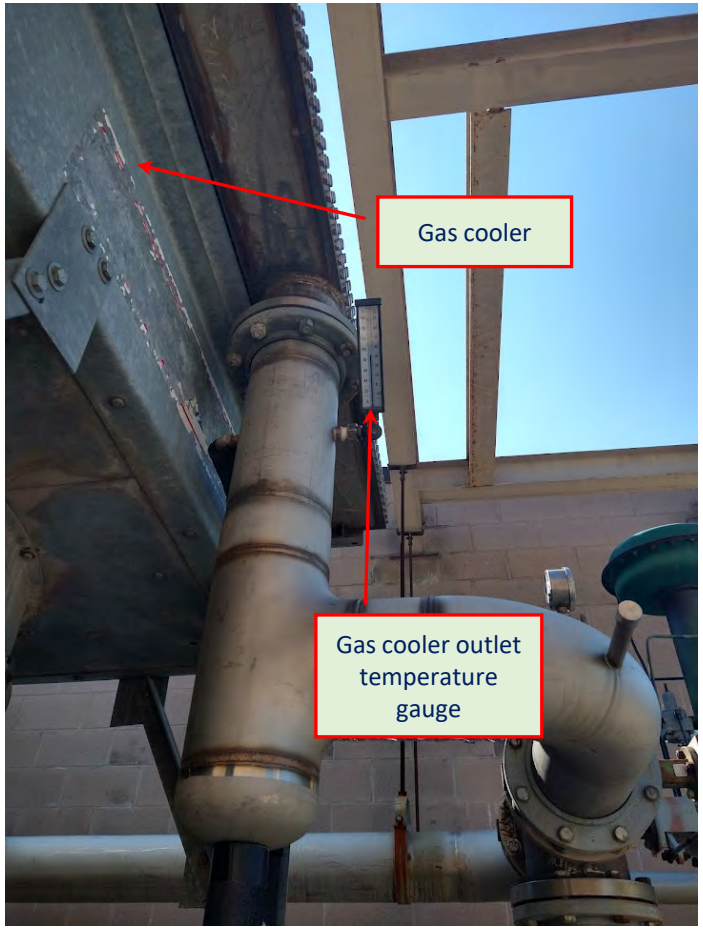
Treatment System Photos & Descriptions

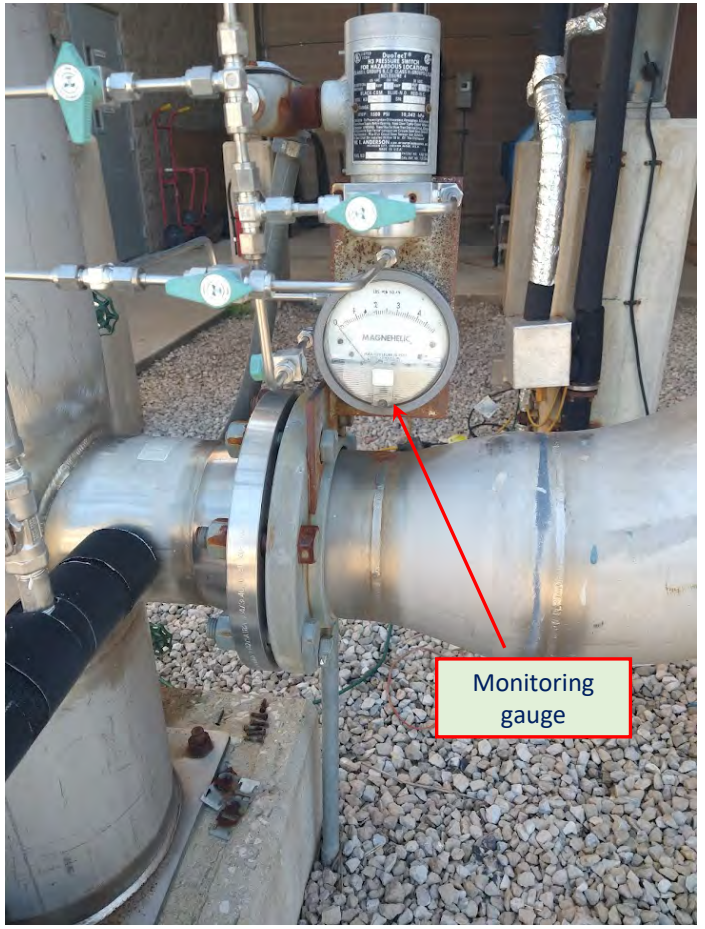
The following are photos of the treatment system equipment and the monitoring points used to verify proper operation of the treatment system.



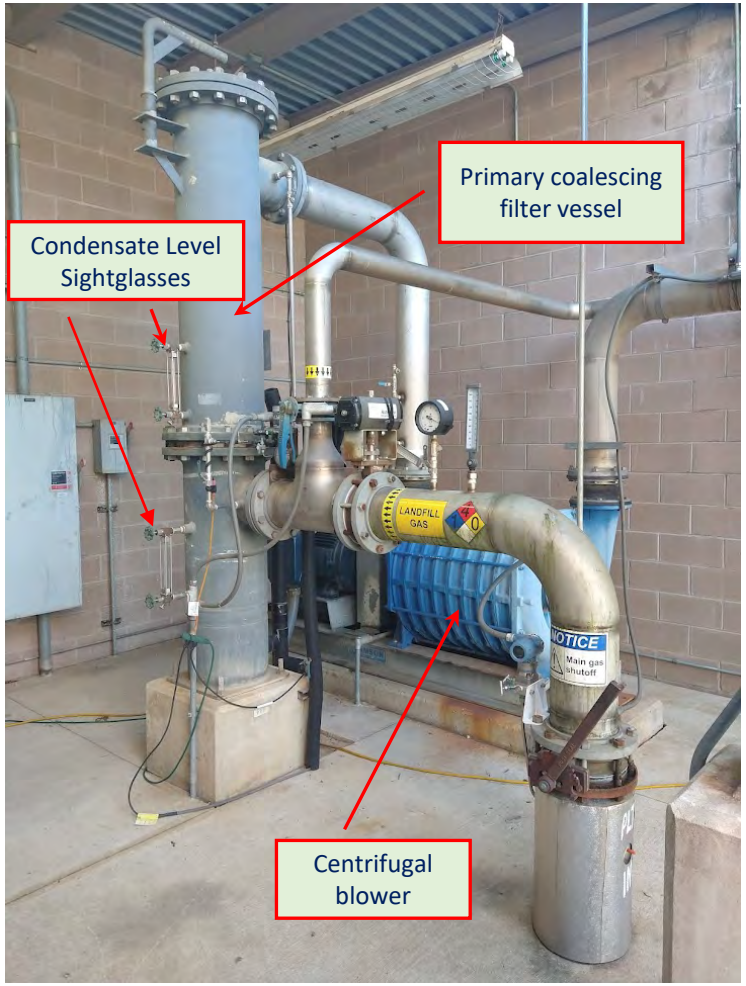
1. Air actuated automatic bypass and manually closed valve.



2. Gas cooler outlet temperature gauge (Deg F)

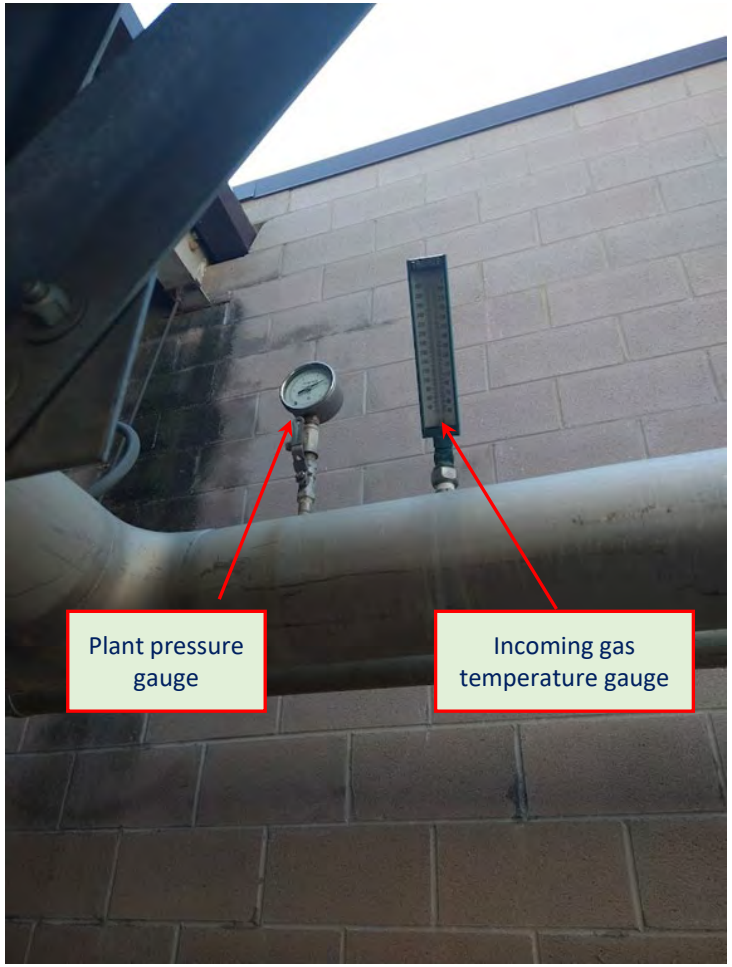


3. Primary polishing filter vessel DP gauge.



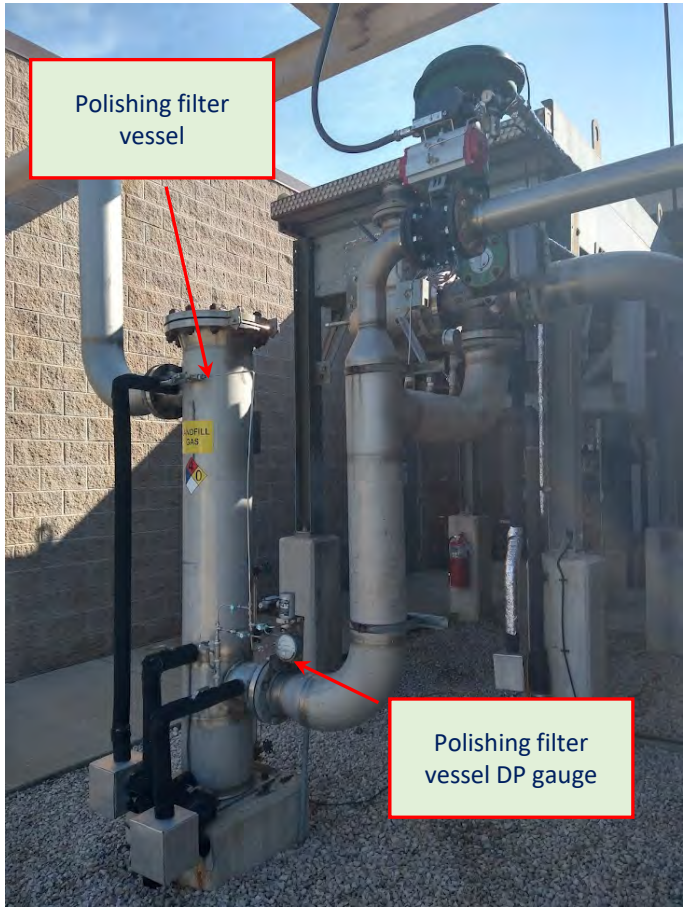
4. Blower and primary coalescing filter vessel.

5. Primary coalescing filter vessel DP Gauge



6. Plant pressure / vacuum & incoming gas temp.

7. Primary coalescing filter DP gauge.

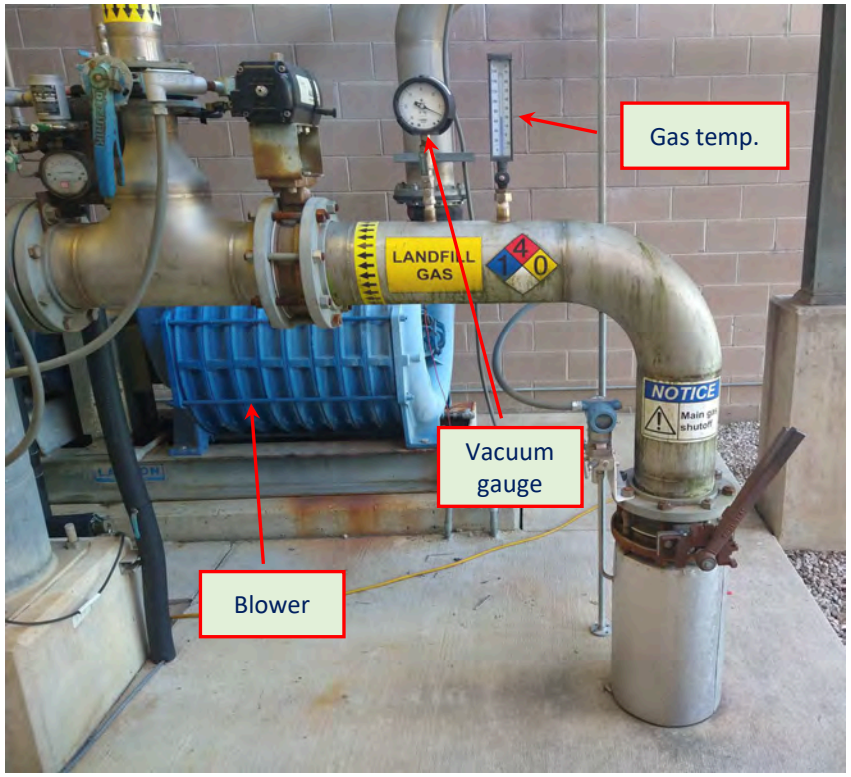


8. Polishing filter vessel DP gauge

9. Gas cooler

10. Polishing filter vessel condensate sight glasses.

11. Yokogawa monitoring device screen.



12. Treatment system blower, Vacuum gauge & landfill gas temp.

Attachment C

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List of Treatment System O&M Documents

The following is a list of Operations & Maintenance (O&M) procedural related items associated with the treatment system equipment. These items are maintained on site in the facility's manual titled "Instruction Manual – Operations and Maintenance". This is only being included as a reference to this plan.

- Amercool – Gas Cooler
- Lamson Corp. – Gas Blower
- MIC Equipment
- Pall – Gas Filtration

INSTRUCTION MANUAL
OPERATION AND MAINTENANCE

CUSTOMER	LANDFILL ENERGY
MODEL	1 F15-097-1
CUSTOMER PO NUMBER	CS 0657
AMERCOOL JOB	94C682

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SECTION **MANUFACTURER/ITEM**

Prepared by Scott Gauthier - Project Manager

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Adrian Energy Associates, LLC

APPENDIX B

STARTUP, SHUTDOWN & MALFUNCTION LOG FORM

Adrian Energy Associates, LLC - Startup, Shutdown & Malfunction List
January 2024

Event #	Date / Time Off	Date / Time On	Duration (hr:min:ss)	Equipment Affected [1]	Was Event a Malfunction [2] (YES / NO)	Description of SSM Event.	SSM Plan Procedure Followed (Yes / No)	Manual / Automatic Shutdown
			0:00:00					
			0:00:00					
			0:00:00					
			0:00:00					
			0:00:00					
			0:00:00					
			0:00:00					
			0:00:00					
			0:00:00					
			0:00:00					
			0:00:00					

[1] Equipment Affected Codes: Treatment System / Gas Skid (TS), Monitoring System (MS), Control Device (CD), or Gas Collection System / Well field related (GCS)

[2] Definition of Malfunction: Any sudden and unavoidable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

[3] Not applicable (N/A) if SSM Plan procedures were followed and found acceptable during SSM event.

Adrian Energy Associates, LLC

APPENDIX C

MALFUNCTION
ABATEMENT/PREVENTATIVE
MAINTENANCE PLAN REVISION HISTORY

Adrian Energy Associates, LLC

Malfunction Abatement/Preventative Maintenance Plan
Revision History

This Plan will be amended if equipment or processes are added that are not covered under the plan or will be revised within 45 days of non-conforming events if the procedures described herein do not adequately address any malfunction or start- up/shutdown events that occur at the facility. A copy of the original plan and all revisions/addendums will be kept on file at the facility for at least five (5) years.

Date of Revision	Reason For Revision
7/23/2009	Initial draft of the Malfunction Abatement/Preventative Maintenance Plan
9/23/2021	Regulatory changes – 40 CFR Part 62 – Subpart OOO (NSPS for Municipal Solid Waste Landfills) – Development of Site Specific Treatment System Monitoring Plan.
4/25/2024	Revised original Malfunction Abatement/Preventive Maintenance Plan as part of the ROP renewal application to include the facility's Site Specific Treatment System Monitoring Plan.