Red Leaf RNG Malfunction Abatement Plan

Form AI-005

June 2024 ROP Application

Preventative Maintenance/Malfunction Abatement Plan

Red Leaf RNG, LLC (P1268)

113 North Lee Road
Saranac, MI 48881

This Preventative Maintenance/Malfunction Abatement Plan (PM/MAP) has been developed as required under Special Conditions III.1, EUGCU and III.1, EUFLARE of Permit to Install No. 89-22 (PTI), and Rule 336.1911 of Michigan's Administrative Rules for Air Pollution Control. The purpose of the PM/MAP is to describe the standard operating procedures that will be used to prevent, detect, and correct malfunctions of the biogas flare control device (EUFLARE),the gas cleaning and upgrading unit and associated thermal oxidizer control device (EUGCU) and the boiler used to heat the manure in the digester (EUBOILER) at the Red Leaf RNG, LLC (Red Leaf) biomethane recovery and pipeline quality renewable natural gas facility in Saranac, Michigan (the RNG facility).

1 Introduction

On July 5, 2022, the Michigan Department of Environment, Great Lakes and Energy, Air Quality Division (AQD) issued the PTI to Red Leaf RNG, LLC (Red Leaf RNG) covering the installation and operation of a new RNG facility on property leased from the Maple Row dairy farm. Under its operational design, cow manure is transferred from the dairy farm to an anaerobic digester, where it is broken down in an oxygen-free environment. The generated biogas is a mixture of methane, carbon dioxide (CO_2), and small amounts of other gases including hydrogen sulfide (H_2S). A gas upgrading plant processes the raw biogas generated in the anaerobic digester to create pipeline quality renewable natural gas (RNG). The RNG is then compressed and injected into a natural gas pipeline.

Tail gases from the gas upgrading plant is controlled with a thermal oxidizer as the primary control device. A backup flare combusts off-specification gas during start-up, shutdown, and malfunction events. The backup flare also serves to combust raw biogas when the gas upgrading plant is not in operation.

This PM/MAP consists of two parts: 1) the preventive maintenance program; and 2) the malfunction abatement and equipment monitoring program. The Plant Manager is responsible for implementing the PM/MAP, and overseeing the inspection, maintenance, and repair of the control equipment.

2 Preventative Maintenance Program

This preventative maintenance program is designed to minimize the potential for equipment malfunctions by establishing an inspection and monitoring schedule for equipment and accessories associated with EUFLARE, EUGCU, and EUBOILER. The preventative maintenance program includes the following elements:

- Identification of the covered equipment;
- Identification of supervisory personnel responsible for overseeing the inspection, maintenance, and repair of the control equipment;
- Description of the items or conditions that will be inspected;
- The frequency of inspection or repairs;
- Identification of the major replacement parts that will be maintained on-site.

These elements are provided in **Table 1**. As specified by the Plant Manager, Red Leaf RNG will maintain a record of equipment inspection and monitoring activities conducted in accordance with this preventative maintenance program. The records, which will be maintained for five years, will be provided to the AQD upon request.

3 Malfunction Abatement Program

This malfunction abatement and equipment monitoring program is intended to detect any abnormal conditions or malfunctions and will be utilized to initiate corrective actions to achieve continued operation in a timely manner. The malfunction abatement and equipment monitoring program includes the following elements:

- Control equipment operating variables that will be monitored to detect any malfunction or failure;
- Normal operating range of these variables;
- Description of the method of monitoring;
- Personnel responsible for monitoring;
- Frequency of monitoring;
- Description of the corrective procedures or operational changes that will be taken in the event of a malfunction.

Equipment for which a malfunction could cause a possible interruption in the operation of the control equipment is listed in **Table 2**. The table also lists the operating variables to be monitored: the normal operating range, the method of monitoring, the frequency of monitoring, the person monitoring the equipment, and the corrective actions to be taken during a malfunction or failure of the equipment.

4 Malfunction Notification and Reporting

Notification/reporting requirements associated with a malfunction of EUFLARE or EUGCU are specified under Rule 336.1912. Pursuant to the rule, Red Leaf must provide notice of an abnormal condition or malfunction that results in:

1. Emissions of a hazardous air pollutant (HAP) or toxic air contaminant (TAC) which continues for more than one hour in excess of any applicable standard or limitation; or

2. Emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation.

The notices required under Rule 336.1912 must be provided to the AQD as soon as reasonably possible, but not later than 2 business days after the discovery of the abnormal conditions or malfunction. Notice may be provided by any reasonable means, including electronic, telephonic, or oral communication.

Red Leaf must submit to the AQD a written report of an abnormal condition or malfunction that results in emissions of any air contaminant continuing for more than 2 hours in excess of a standard or limitation established by any applicable requirement. The written report shall be submitted within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal conditions or malfunction, whichever is first. The written reports shall include all of the following information:

1. The time and date, the probable causes or reasons for, and the duration of the abnormal condition or malfunction.
2. An identification of the source, process, or process equipment that experienced abnormal conditions or which malfunctioned and all other affected process or process equipment that have emissions in excess of an applicable requirement, including a description of the type and, where known or where it is reasonably possible to estimate, the quantity or magnitude of emissions in excess of applicable requirements.
3. Information describing the measures taken and air pollution control practices followed to minimize emissions.
4. The report shall also include a summary of the actions taken to correct and to prevent a reoccurrence of the abnormal conditions or malfunction and the time taken to correct the malfunction.

The truth, accuracy, and completeness of the written reports required under this rule for a stationary source subject to the requirements of R 336.1210 shall be certified by the Responsible Official.

If a reportable abnormal condition or malfunction were to occur, the facility manager will immediately report it to the Red Leaf Director of Safety and Environmental Permitting:

Mr. Christopher Anglin
Director of Safety and Environmental Permitting
canglin@novillarng.com
(734) 915-2384

Mr. Anglin (or his designated agent) will be responsible for investigating and reporting the abnormal condition or malfunction.

TABLE 1
PREVENTATIVE MAINTENANCE PROGRAM
Red Leaf RNG, LLC

Covered Equipment				Preventative Maintenance Activity - Frequency of Inspection							
Emissions Unit	Description	Control/Monitoring Equipment	Manufacturer / Model	Daily	Weekly	Monthly	Quarterly or greater	Annual or greater	Responsibility	Recordkeeping	Replacement Parts
EUFLARE	Digester Gas Flare	Flare	Perennial	no recommended daily PM items	no recommended weekly PM items	1) Test/exercise blower, verify flare pilot is lit, and shutdown valve if the device has not been in service during the month.	Quarterly: 1) Inspect blower bearings & grease per manufacturers requirements 2) Record all set points for reference. Compare to the approved set point values, resolve any deviations.	Annually: 1) Calibrate pressure transmitters per manufacturers recommendations 2) Replace UPS battery 3) Test & document all safety functions. This is listed in the SAFETY ALARM & SHUTDOWN TEST REPORT. Contact PEI if safety functions are not working. 4) Thermally scan all control & junction panels while running under load for a minimum of 3 hours. Remediate hot connections. 5) With power off, check tightness on all electrical connections & terminal blocks. 6) Check gas & air lines for leaks using your standard corporate methodologies & procedures, remediate any leaks. 7) Check blower alignment, remediate as required. 8) Replace ignition cables Inspect ignition system, replace as needed.	operations personnel	on site	Refer to operation manual for proper replacement parts.
		Flow Meter	Kurz					Every 6 years: Follow Kurz flow meter maintenace procedure			
		H2S Monitor	Hobre				Quaterly: Calibrate H2S monitor 6 months: Replace condensate trap filter on Hobre				
		Thermocouple	ThermX or equilvant manufacturer					Annually: Field calibrate or replace Thermocouple's			
EUGCU	Thermal Oxidizer used to destroy tailgas off the Gas Cleaning and Upgrading Unit	Thermal Oxidizer	Perennial	no recommended daily PM items	no recommended weekly PM items	no recommeded Monthly PM items	Quarterly: 1) Visually inspect exterior of TOU while operational & at temperature and remediate as necessary i) Burned or scorched areas that indicate a hot spot through the insulation. ii) Warped or damaged louvers that will not sufficiently close during operation. iii) Thermally scan the exterior of the flare from all four sides, note any hot spots that warrant additional internal investigation. Save these photos to a file for future reference, note the date, time, exterior temperature, precipitation & firing rates 2) Record all set points for reference. Compare to the approved set point values, resolve any deviations.	Annually: 1) Visually Inspect Interior of TOU. A) Power down and cool off. Following your corporate protocols, lock out/tag out the control panels, the airlines, the natural gas line & the tail gas lines. open the manway &inspect thefollowing, remediate damaged items as indicated: i) Burner tip. Ensure that it is intact & undamaged. Photograph for record. Compare current state to past. Contact Power Flame service shop if replacement is required. ii) Injection ports. Ensure they are intact & undamaged. Photograph for record. Compare current state to past. Contact PEI if replacement is required. iii) Insulation & pins. Ensure that it is intact & securely affixed to the TOU. Pay particular attention to any hot spots identified in step 1) above. Photograph for record. Compare current state to past. Remediate any damaged insulation. iv) Manway door insulation. Ensure that it is intact & in good shape. Photograph for record. Compare current state to past. Remediate any damage. B) Remove any SiO2 or other debris in combustion chamber. Use appropriate PPE per your corporate policy. 2) Calibrate pressure transmitters per manufacturer recommendations 3) Replace UPS battery 4) Test & document all safety functions. This is listed in the SAFETY ALARM & SHUTDOWN TEST REPORT. Contact PEI if safety functions are not working. 5) Thermally scan all control & junction panels while running under load for a minimum of 3 hours. Remediate hot connections. 6) With power off, check tightness on all electrical connections & terminal blocks. 7) Check gas & air lines for leaks using your standard corporate methodologies & procedures, remediate any leaks.	operations personnel	on site	Refer to operation manual for proper replacement parts.
		Flow Meter	Kurz				Quaterly: Calibrate H2S Monitor 6 months: Replace condensate trap filter on Hobre	Every 6 years: Follow Kurz flow meter maintenace procedure			
		H2S Meter	Hobre								
		Thermocouple	ThermX or equilvant manufacturer					Annually: Field calibrate or replace Thermocouple's			
EUBOILER	A 5.5 MMBtu/hr natural gas or propane-fired boiler for heating the digester	Boiler	Bryan Boilers	Visual inspection of guages,monitors, and indicatorsand record readings in boiler log. Visual check on instr. and equip. settings against factory recommended specs.	1) On units equipped with firing rate control, verify it is functioning correctly by ajusting control and observing if input changes accordingly. 2) Make visual inspection of pilot flame. Check flame signal strength and main flame operation as specified in burner manual. 3) Check pilot and main fuel valves for correct operation. Open limimt switch-make audible and visual check- Check valve position indicators and check fuel meters, if supplied. 4) Confirm boiler area is free of combustable materials and that there is nothing obstructing air openings, relief openings, etc. 5) Check combustion safety controls for flalme failure and flame sifn=gnal strength as specified in manufacturer's instructions in the burner maual. 6) Check all limit ontrols as specified in section 2.4 of the burner manual. 7)Check float low water cutoff as described above.	1) Make visual inspection of linkage and proper operation of flue, vent, stack, or outlet dampers. Check draft as specified in Section 2 of the boiler manual. 2) Check float low water cutoff as described above. 3) Check low draft, fan,air pressure and damper position interlocks as specified in burner manual. 4) Check high and low gas pressure interlocks. Refer to manufacturer's instructions for correct procedure. 5) Chek high and low oil pressure interlocks. Refer to manufacturer's instructions for correct procedure.	no recommended quarterly PM items	Annually: 1) Perform leakage on pilot and main gas valves as specified in manufacturer's instructions. 2) Check operating control, high limit, low fire start control, and low water cutoff as specified in manufacturer's instruction. 3) check air atomizing interlock, fule valveintelock switch, purge switch, burner positioninterlock, and fule changeover control, as specified in burner manual.	operations personnel	on site	Refer to operation manual for proper replacement parts.

TABLE 2
MALFUNCTION ABATEMENT AND EQUIPMENT MONITORING PROGRAM
Red Leaf RNG, LLC

Emission Unit	Control Equipment	Operating Variables Monitored	Normal Operating Range	Method of Monitoring	Frequency of Monitoring	Personnel Responsible	Corrective Procedure or Operational Change in the Event of Equipment Malfunction or Failure
EUFLARE	Flare (includes flow and termperature) Hobre Gas Analyser	Flow Rate Temperature Hydrogen Sulfide	0> and ≤571 SCFM Presence of a pilot light ≤7,000 ppm H2S	Human Machine Interface and visual monitoring	Daily	Operators	Flare: Reference Perennial Flare Troublshooting and Alarm Shutdown Procedure Hobre: Reference Hobre manufacturer guidance if equipment malfuncitons, take daily H2S readings manually until repaired. Step 2) If a Malufunction occurs that isn't listed in the above manual's then the operator will evaluate the malufuncation and contact the manufacturer to help identify the corrective action.
EUGCU	Thermal Oxidizer (includes flow and termperature) Hobre Gas Analyser	Flow Rate Temperature Hydrogen Sulfide	0> and ≤278 SCFM ≥1400 F Combusion Chamber ≤18,000 ppm H2S	Human Machine Interface and visual monitoring	Daily	Operators	TOX: Reference Perennial Thermal Oxidizer Troublshooting and Alarm Shutdown Procedure Hobre: Reference Hobre manufacturer guidance if equipment malfuncitons, take daily H2S readings manually until repaired. Step 2: If a Malufunction occurs that isn't listed in the above manual's then the operator will evaluate the malufuncation and contact the manufacturer to help identify the corrective action.
EUBOILER	A 5.5 MMBtu/hr natural gas or propane-fired boiler for heating the digester	Temperature Flow	98 F≥ and ≤140 F 430 gpm≥ and ≤440gpm	Human Machine Interface and visual monitoring	Daily	Operators	Step 1: Reference Section 5.7 (Trouble Shooting) of Bryan Boilers Operation Manual Step 2: If a Malufunction occurs that isn't listed in the above manual's then the operator will evaluate the malufuncation and contact the manufacturer to help identify the corrective action.