STARTUP, SHUTDOWN, MALFUNCTION PLAN
LANDFILL GAS TREATMENT & COMPRESSION SYSTEM
BLUE WATER RENEWABLES, LLC
SMITH'S CREEK, MI

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1.0 INTRODUCTION

1.1 Background

This Startup, Shutdown, and Malfunction (SSM) Plan was prepared to satisfy the requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for municipal solid waste (MSW) landfills (40 CFR Part 63, subparts A and AAAA). The purpose of the NESHAP is to prevent excess emissions of hazardous air pollutants (HAPs) during a startup, shutdown, or malfunction event of the landfill gas collection and control system (LFGCCS) and associated monitoring equipment. This Plan was specifically prepared for the Smiths Creek Landfill (SCL), located at 6779 Smiths Creek Road, Smiths Creek, St. Clair County, Michigan. The SCL is a licensed Type II MSW landfill, owned by the County of St. Clair, Michigan.

This SSM Plan should be followed during all SSM events at SCL. The Plan identifies the procedures for operating and maintaining the LFGCCS during SSM events. The Plan identifies procedures to adequately provide corrective actions to repair the malfunctioning equipment as soon as practicable and to minimize excess emissions of HAPs. Recordkeeping documents and reporting requirements are also included.

In November of 2011, a landfill gas to energy project owned and operated by Blue Water Renewables (BWR) will begin initial operation. As part of the landfill gas to energy project, operation of a new blower skid and existing flare will be performed by BWR staff under the guidance and supervision of SCL. The new BWR blower skid will become the default primary mover of LFG at SCL and will compress it for the purpose of power generation. Excess LFG not used power generation will be sent to the existing flare for destruction. SSM events related to the Open Flare Control Device will be recorded by BWR while operating the BWR blower skid and SCL flare and transmitted to SCL for review and further action. In the event of a prolonged malfunction and/or shutdown of the BWR blower skid, operation of the flare will be turned back over to SCL, and its blower skid will be restarted as the alternate primary mover of LFG.

1.2 Definitions

The NESHAP defines the following terms:

Startup: "the setting in operation of an affected source or portion of an affected source for any purpose".

Shutdown: "the cessation of operation of an affected source or portion of an affected source for any purpose".

Malfunction: "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."

1.3 Excluded Components

The following items are not included in the requirements of the NESHAP or this SSM Plan:

- Failure of portable analyzers used to monitor landfill gas quality or conduct surface emissions monitoring (i.e., GEM, EAGLE, FID).
- Exceedances of parameters monitored monthly at individual landfill gas (LFG) extraction wells (temperature greater than 55 degrees Celsius, zero or positive pressure, and either nitrogen concentration greater than 20% or oxygen concentration greater than 5%).
- Exceedances of required quarterly monitoring of methane concentration at the landfill surface (surface emissions greater than 500 parts per million above background concentration).
- IC engines operated on treated landfill gas.

The Smiths Creek Landfill provides landfill gas to BWR, for use as fuel in the production of electricity by internal combustion engines. Because the gas is treated for sale

1.4 Included Components

The following items are included in the requirements of the NESHAP and this SSM Plan:

- The landfill gas collection system including, but not limited to, header piping, extraction wells, collection trenches, driplegs, condensate knockout pots, condensate/leachate pumps, and valves.

- The landfill gas control system including, but not limited to the open flare, blower and motor, compressors, solar flares, ignition and operation equipment, continuous recording devices.

- Any future gas treatment system, such as leachate evaporation, landfill gas treatment and compression for use as fuel, and electrical generating equipment.

1.5 Contacts

All reporting information related to the SSM Plan should be submitted to the Department of Environment, Great Lakes, and Energy (EGLE) at the following address:

EGLE Air Quality Division

Mailing Address:
Southeast Michigan District Office
27700 Donald Court
Warren, MI 48092-2793

Facility Contact
Blue Water Renewables, LLC
Smiths Creek Landfill
6779 Smiths Creek Road
Smiths Creek, MI 48074

Jeff Neumann, Facility Manager
Cell Phone: 734-216-6979

Owner Contact

DTE Biomass Energy

One Energy Plaza, 400 WCB

Detroit, MI 48226

Doug Ayers, Director – Operations

Cell Phone: 734-678-3572

Corporate Environmental Contact

DTE Vantage – Environmental Affairs

One Energy Plaza, 400 WCB

Detroit, MI 48226

Maureen Bennett, Environmental Engineer

Cell: 734-834-0005

2.0 SSM SCENARIOS

For SSM recordkeeping and reporting purposes, the LFGCCS has been divided into three main components; the collection system (including wells, piping, valves, and driplegs), the open flare (including the skid mounted flare system and mechanical dripleg and pumping station), and the solar flares. Likely malfunctions for each of these main components are listed below along with immediate and corrective actions to be taken. For each SSM event, an SSM Recordkeeping Form, included in Appendix A, must be completed. The person completing the Form will refer to the list below to identify the component affected, the likely malfunction, the immediate action, and the recommended corrective action.

2.1 Collection System

Likely Malfunction	Immediate Action	Corrective Action
No/low flow due to pinched/damaged/settled piping/frozen piping	Open or close control valves to allow continued flow to the control system and to prevent unnecessary air intrusion.	Determine location of damage/settling. Repair piping by replacing damaged pipe, regrading settled areas, or thawing/covering frozen pipe.
Failure of control valves	If LFG is leaking to atmosphere or causing air intrusion, close/open surrounding valves and/or wellheads.	Isolate affected area and replace valve.
Failure of an extraction well due to: frozen or broken flexhose, fire, high water level	If LFG is leaking to atmosphere or causing air intrusion, close/open surrounding valves and/or wellheads or temporarily cap wellhead.	Replace/repair flexhose, isolate well/remove vacuum to control fire, pump extraction well or surrounding leachate collection system. If required, replace extraction well.
Failure of a dripleg	Isolate dripleg by closing surrounding valves to prevent air intrusion.	Refill dripleg with water, cleanout blockage, or if necessary excavate area and check for damage.
Collection system expansion	Isolate header line affected by the expansion by closing surrounding valves to prevent air intrusion.	Complete expansion of the LGCCS using best available engineering practices.

2.2 Open Flare Control Device

Likely Malfunction	Immediate Action	Corrective Action
Wind/storm blowing out flame	Flare system automatically closes actuator valve to prevent LFG venting.	Follow SOP for flare startup.
High water level in the mechanical dripleg (Condensate Tank Full)	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Pump condensate from mechanical dripleg into approved storage/transportation container.
Failure/malfunction of the mechanical dripleg pump	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Repair pump or use temporary pump to remove condensate.
Not able to restart due to ambient temperature, frozen pilot	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Use override function to initiate startup at lower temperature. Thaw the pilot.
Failure of blower, including bearings, belts, fan wheel, etc.	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Repair blower using appropriate replacement parts.
Failure of motor	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Repair motor using appropriate replacement parts.
Failure of compressor, airlines, fittings, actuators, solenoids	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting. If actuator fails, close the flare inlet valve.	Repair the failed component using appropriate methods/replacement parts.
Failure of the programmable logic control (PLC) unit	If shutdown occurs, the flare system automatically closes the actuator valve to prevent LFG venting. If actuator fails, close the flare inlet valve	Repair the PLC unit as appropriate if replacement parts are available. Replace with new unit if unit cannot be repaired.
Too much oxygen in the gas or lack of LFG flow to the flare	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Identify cause of oxygen or blockage of flow and repair according to SSM Plan. If oxygen level is due to extraction wells that are out of compliance, adjust wellfield to compensate.

Likely Malfunction	Immediate Action	Corrective Action
Loss of electricity	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Monitor surface emissions until electrical supply is restored to demonstrate compliance with air emissions standards.
Failure of the flow and temperature recorder and/or meter – out of paper, out of ink, paper jam, electrical malfunction	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting. Manually verify ongoing operation of the control device.	Replace affected component; paper, ink, pens, recorder, meter. Repair electrical supply as necessary.
Not able to restart due to lack of pilot fuel (propane)	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Switch to existing backup fuel supply and replenish primary supply.
Failure of the thermocouple	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Replace thermocouple with onsite backup unit.
Failure of the flame arrestor (clogging, freezing, etc.)	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Clean flame arrestor or replace if necessary.
Failure of the knockout pot, including plugging of the filter, high water level, etc.	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Clean the filter, remove collected water.
Shutdown of flare due to high water levels in flare stack	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Empty flare stack drain(s).
Accidental pressing of emergency STOP button	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Follow SOP for flare startup.
Routine Maintenance	If shutdown occurs, flare system automatically closes actuator valve to prevent LFG venting.	Follow SOP for flare startup.

2.3 Solar Flare Control Device

Likely Malfunction	Immediate Action	Corrective Action
Failure of the datalogger, including the battery	Replace the battery on the datalogger and attempt data recovery.	Replace the battery or datalogger using onsite spare equipment.
Failure of the spark plug	Close stack valve to prevent LFG venting. Check the battery and the solar panel to ensure power supply.	Replace/repair the spark plug as necessary.
Failure of thermocouple	Close stack valve to prevent LFG venting. Note if spark is still present and note if flame is present.	Replace/repair the thermocouple.
Freezing, clogging, other failure of the header piping	Close stack valve to prevent LFG venting. Remove clogs if possible.	Repair header piping by removing clogs, drain collected water.
Failure of the battery/solar panel	Close stack valve to prevent LFG venting.	Repair/replace the battery/solar panel
Clogging or other failure of the flame arrestor	Close stack valve to prevent LFG venting.	Clean or replace the flame arrestor as necessary.
Failure of the wind screen	Close stack valve to prevent LFG venting.	Repair/replace the wind screen.

3.0 STANDARD OPERATING PROCEDURES FOR SCL BLOWER SKID/FLARE

Following are standard operating procedures (SOP) for startup and shutdown events of the control system (open flare). These SOPs must be followed during every startup and shutdown event while the BWR Blower Skid is sending gas to the flare.

3.1 Control System Startup

1. Check for unsafe conditions in the surrounding area, i.e. exposed fan belts, leaking LFG or propane gas, etc.

2. Check that the valves are open and in proper operating position

3. Reset the emergency stop button if necessary

4. Check the fuel supply for the spark ignition (propane gas)

5. Check for adequate electrical supply to the control system. Reset circuit breakers or other controls if necessary.

6. Start the control system by turning the “flare power” dial “on” and pressing the “start” button

7. Verify that the system is operating properly (check flow rate, temperature, and pressure)

3.2 Control System Shutdown

1. Check for unsafe conditions in the surrounding are, i.e. exposed fan belts, leaking LFG or propane gas, etc.

2. Shutdown the control system by any of the following: press the emergency stop button; turn the “Flare Power” knob to off, turn off the electrical supply using the main electric panel switch. In an emergency where access to the fenced control system area is blocked, the two LFG header pipe valves near Cell A can be closed, thereby stopping LFG flow to the flare.

3. Check that the actuator valve on the flare skid is in the “closed” position

4. Verify that the system is properly shutdown (check flow rate, temperature, pressure).

4.0 MODIFICATIONS, RECORDKEEPING, AND REPORTING

4.1 Modifications

The SSM Plan must be periodically modified to reflect changes in the landfill equipment, operations, or procedures. The Plan should be modified if any of the following are true:

- SSM Plan does not address an SSM event that has occurred.
- SSM Plan fails to provide for the operation of the air pollution control and monitoring equipment during an SSM event in a manner consistent with safety and good air pollution control practices to minimize emissions.
- SSM Plan does not provide adequate procedures for correcting the malfunctioning process and/or monitoring equipment as quickly as practicable.
- SSM Plan includes an event that does not meet the definition of an SSM event.
- SSM Plan does not address or adequately address a malfunction event. If this is true, the SSM Plan must be revised within 45 days after the event to include detailed procedures for operating and maintaining the LFGCCS during similar malfunctions. The revised Plan should include a corrective action program for similar malfunctions.

Each revision or modification of the SSM Plan must be reported in the semi-annual SSM report (detailed below). Revisions or modifications to the Plan do not constitute Title V air permit revisions. Previous versions of the SSM Plan should be available for inspection by the US EPA or the EGLE for five (5) years after the revisions are made. In order to track revisions or modifications to the plan, a summary table of revisions is included in Appendix B.

4.2 Recordkeeping

The SSM Plan should be kept as a record of all SSM events and made available to the US EPA or EGLE as requested. An SSM Report Form containing the required recordkeeping information is included in Appendix A. If an SSM event occurs, the form should be filled out completely and placed in Appendix A of this Plan.

4.3 Reporting

4.3.1 Immediate SSM Reports

If the actions taken during an SSM event were not consistent with this SSM Plan and BWR exceeded the applicable emission limitation in the landfill NESHAP, BWR must report the actions by telephone or fax within two (2) working days after commencing actions inconsistent with the Plan. Also, a letter must be sent within seven (7) working days after the end of the SSM event. The letter should include the following information:

- Name, title, and certifying signature of the owner or operator or other responsible official.
- Explanation of the circumstances of the event.
- The reasons BWR did not follow this SSM Plan.
- A description of all excess emissions and/or parameter monitoring exceedances believed to have occurred during the SSM event.

4.3.2 Semi-Annual Reports

If an SSM event occurs during a semiannual reporting period (January 1 through June 30 and July 1 through December 31), the SCL must submit a semi-annual report containing the following information:

- Name, title, and certifying signature of the owner or operator or other responsible official.
- Statement that the actions taken during the SSM event were consistent with the SSM Plan (if that is true).
- Identification of any instance where any action taken during an SSM event (including actions taken to correct a malfunction) is not consistent with the SSM Plan, but the Site did not exceed any applicable emission limitation in the NESHAP.

- The number, duration, and brief description of each SSM event which caused, or may have caused, an applicable emission limit to be exceeded.

- If the SSM Plan was revised during the semi-annual reporting period to reflect changes to the MSW landfill operations or procedures, BWR must report each revision to the SSM Plan in the semi-annual report.

The semi-annual SSM report may be combined with the NSPS report. The NSPS report was previously required annually. However, the NESHAP now requires the NSPS report to be submitted semi-annually.

APPENDIX A

BLUE WATER RENEWABLES, LLC

SSM Recordkeeping Forms

Bluewater Renewables
Startup/Shutdown/Malfunction Report Form

Section 1 - All Events

List effected piece(s) of equipment

Type of Event		Military Time Date/Time Start		Military Time Date/Time End		Duration (hours)	Event Code (see back of form)	SOP* Followed? Yes	SOP* Followed? No**
	Startup								
	Shutdown								
	Malfunction							Complete Section 2 Below	

*Standard Operating Procedure (SOP) for Flare Startups (Manual & Automatic) and Shutdowns are provided in SSM Plan
If SOP in SSM Plan was not followed, **notify site engineer immediately.

Section 2 - Malfunction Events Only

Step	Corrective Action Procedures for All Malfunctions	☑ *Check one of the following for each step:* Procedure completed	Procedure Not Applicable
1.	Determine if landfill gas is being released to the air (can you smell landfill gas, or measure/detect gas flow?).	☐	
2.	If landfill gas is being released to the air, notify personnel on "Contact List".	☐	☐
3.	Determine if the malfunction is causing an unsafe operating condition (air entering landfill or piping, smoking, vibration, or other problem), which may harm people, the environment or the landfill gas control equipment.	☐	
4.	If unsafe operating condition exists, or landfill gas is being released to the air, **stop** (if possible) **landfill gas flow.**	☐	☐
5.	If Control device or other system component is shutdown due to Step 4, follow Shutdown SOP and Complete Section 1 - "Shutdown".	☐	☐
6.	Determine if other personnel/resource (qualified technician, electrician, consultant or other) are needed for malfunction diagnosis.	☐	
7.	If additional personnel needed, notify qualified personnel: a. Record contact name, date and time:_____ b. Contact site representative with information recorded in #7.a.	☐	☐
8.	Start malfunction diagnosis.	☐	
9.	Determine if other resources are needed to fix the malfunction (qualified technician, electrician, contractor, on-site resources, manufacturer's representative, or other).	☐	
10.	If additional resources needed, contact qualified resource: a. Record contact name, date and time:_____ b. Contact site representative with information recorded in #10.a.	☐	☐
11.	Fix the malfunction.	☐	
12.	Once the malfunction is fixed, re-start the system per SOP if it had been shut down, and record start-up times and dates on this form.	☐	☐
13.	Record date that malfunction occurred, date that malfunction was repaired, and total time that system was out of service in boxes in Section 1 of this form.	☐	
14.	Sign this form, copy it, and place it in the Start-up, Shutdown, Malfunction file.	☐	
15.	If the procedures listed above were not followed, contact the site engineer immediately.	☐	☐

Date Form Filled Out: _____ **Title:** _____

EVENT CODES

For Start-ups and Shutdowns:

Startup: The setting in operation of an affected source or portion of an affects source for any purpose.

Shutdown: The cessation of operation of an affected source or portion of any source for any purpose.

Code	Event
1	Maintenance
2	Suspected Collection System Malfunction
3	Suspected Control Device Malfunction
4	Suspected Continuous Monitoring System Malfunction (Temperature/Flow/Other)
5	Training
6	Gas System Construction/Expansion
99	Other (Describe)Manual startup/shutdown. 480 VAC and 4160 VAC Breaker testing.

For Malfunctions:

Malfunction: Any sudden, infrequent and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

10	Automatic shutdown of control device by designed protective systems
11	Autodialer Callout
12	Shutdown alarms that result in the device not shutting down
13	Unalarmed shutdown
14	Control Device Smoking
15	Inspection identified malfunction
16	Loss of power - utility down
17	Loss of power - unknown
18	Damaged Well, Header or Lateral Piping
19	Leaks at wellheads, valves, flanges, test ports, seals, couplings, etc.
20	Condensate Knock-out Problems
21	Collection Piping Blockages
22	Problems due to Settlement
23	Loss of phase
24	Blower overload condition
25	Blower bearing failure
26	Broken belts (if belt-drive) or broken coupling (if drect-drive) in blower
27	Continuous Monitoring System Malfunction - Thermocouple
28	Continuous Monitoring System Malfunction - UV Scanner
29	Continuous Monitoring System Malfunction - Flow Monitor
30	Continuous Monitoring System Malfuction - Flow Recorder
31	Continuous Monitoring System Malfuction - Temperature Recorder
32	Act of God (i.e., lightening, wind, etc.)
99	Other (Describe)

APPENDIX B

BLUE WATER RENEWABLES. LLC

Summary of SSM Plan Revisions

APPENDIX B

Summary of SSM Plan Revisions

Name of Person Revising Plan	Date of Revision	Page Number(s) Revised	Reason for Revision
Maureen Bennett	11/3/22	1-3 and 1-4	Updated contact info