

Malfunction Abatement Plan

Arbor Hills Landfill Flares



Updated April 2022

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1.0 Introduction

This Malfunction Abatement Plan (MAP) has been prepared to meet the requirements of Renewable Operating Permit (ROP) MI-ROP-N2688-2011a, subsequent ROP renewal permits and PTI 79-17 issued by the Michigan Department of Environment, Great Lakes, and Energy Air Quality Division (AQD) to Arbor Hills Landfill, Inc. (AHL) flares. The following paragraphs document AHL MAP for the 2 enclosed flares and 1 utility flare, in accordance with the provisions of Rule 911.

1.1 Process/Operational Restrictions

This submittal is designed to address this permit condition and has been prepared in accordance with Michigan Air Pollution Rule R 336.1911 (Rule 911). It includes sections on the following:

- Rule 911(2)(a) A complete preventative maintenance program including identification of the supervisory personnel responsible for overseeing the inspection, maintenance, and repair of air cleaning devices, a description of the items or conditions that shall be inspected, the frequency of the inspections or repairs, and an identification of the major replacement parts that shall be maintained in inventory for quick replacement.
- Rule 911(2)(b) An identification of the source and air-cleaning device operating variables that shall be monitored to detect a malfunction or failure, the normal operating range of these variables, and a description of the method of monitoring or surveillance procedures.
- Rule 911(2)(c) 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 purpose of this document is to summarize the flares MAP requirements. Section 2.0 of this document provides a process description. Section 3.0 summarizes the preventive maintenance program for the flares and Section 4.0 summarizes the operating variables. Finally, Section 5.0 summarizes the corrective actions associated with flare operation outside of accepted operating parameters.

2.0 Process Description

AHL employs three flares to provide additional landfill gas control capacity and operational flexibility. The total capacity of the three flares is 13,000 SCFM, which is sufficient to extract landfill gas and maintain compliance with the applicable air permit requirements. The following provides a summary of the three flares.

Table 2-1 Flare Equipment Summary

ROP Emission Unit ID	Additional Common ID	Design Capacity
EUENCLOSEDFLARE1-S2	Enclosed Flare 1 East Flare Zink Flare Flare 391	3,400 SCFM
EUENCLOSEDFLARE2-S2	Enclosed Flare 2 West Flare McGill Flare Flare 392	4,600 SCFM
EU5000CFMFLARE	Open Flare Utility Flare Flare 393	5,000 SCFM

3.0 Preventive Maintenance Program (Rule 911(2)(a))

Plant management is responsible for verifying that AHL operates in compliance with the environmental requirements and regulations. Plant management delegates day-to-day responsibilities for operation of the flares to Plant Personnel. Inspection records are maintained and saved electronically. In addition, hardcopy records are maintained in a logbook stored onsite.

3.1 Identification of Supervisory Personnel

AHL identifies the following Supervisory personnel for the responsibilities of overseeing inspection, maintenance, and repairs of the flares.

Table 3-1 Supervisory Personnel

Staff	Title
David Seegert	General Manager
Anthony Testa	Site Landfill Engineer
Jason Marsh	Landfill Supervisor

3.2 Equipment Inspection Program

The financial success of AHL depends on proper operation of the equipment to verify reliability, availability, efficiency, and long-term operation. Preventative maintenance is a key component to accomplishing reliability, availability, efficiency and operation of the facility.

Preventative maintenance includes equipment inspections, scheduled replacement of parts, and maintaining an inventory of critical spare parts. Equipment inspections generally occur on a daily, weekly, monthly, semi-annual, or annually basis. The frequency and scope of these inspections will depend on manufacturer recommendations and operator experience.

Operators make rounds and monitor equipment performance using the control system. When performance deteriorates, corrective maintenance will be scheduled. Exception reporting is performed for daily inspections, in which only situations meriting follow-up action are recorded. In addition, AHL has a preventive maintenance program that involves equipment inspections (with repairs or replacement, as necessary). The following items listed in Table 3-2 are inspected or monitored to verify proper operation of the flare systems:

Table 3-2 Preventive Maintenance Inspection Plan

Equipment Inspected/Service	Equipment	Weekly	Monthly	Quarterly	Semiannual	Annual
Test Blower Operation (if blower not previously operated that month)	Blowers		X			
Check and Record Motor Amperage Draw	Blowers	X				
Landfill Gas Blower Lubrication	Blowers			X		
Check Blower Bearing Temperatures	Blowers			X		
Test all Blower Shutdowns	Blowers				X	
Check Condition of Motor Isolation Pads	Blowers				X	
Check Blower Motor Alignment	Blowers					X
Record Line Current and Voltage on Blower Motors	Blowers					X
Perform Vibration Analysis	Blowers					X
Test Flare Operation (if flare not previously operated that month)	Flares		X			
Check Condensate KOP Differential Pressure	Flares	X				
Check Condensate KOP Liquid Level	Flares	X				
Check Flame Arrestor's Differential Pressure	Flares	X				
Check Propane Supply Tank Pressure	Flares	X				
Check Flare Fault Communication System	Flares	X				
Check Combustion Temperatures	Flares	X				
Check Gas Flow Rate	Flares	X				
Check Inlet Vacuum	Flares	X				
Check Inlet Temperature	Flares	X				
Download Data	Flares	X				
Visual Check of Flare Stack and Burner	Flares		X			
Check Pipe Supports	Flares			X		
Check/Clean Flare Flame Detection Equipment	Flares			X		
Check/Clean Flame Arrestor	Flares				X	
Inspect/Clean Flare Ignitor	Flares					X
Calibrate Flow Meter	Flares					X
Complete Inspection Checklist	Flares	X				

In addition to the scheduled preventive maintenance identified in Table 3-2, AHL has implemented a weekly flare system check. The weekly check documents the following:

- Did the Flare Start Appropriately?
- Are Louvers Functioning?
- Was Temperature Achieved?
- Is Actuating Valve Functioning Properly?

As a result of the notification system failure of notifying the AHL personnel of the shutdown of the utility flare on March 19, 2022, AHL installed a backup notification system that communicates through a cellular connection that will operate in parallel with the primary communication. This MAP was updated with these check activities in response to a flare malfunction experienced in March 2022.

3.3 Replacement Parts

AHL stocks spare parts necessary for routine maintenance and other common replacement parts. The flare system spare parts lists are based on the equipment maintenance manuals or AHL operating experience. The supervisor(s) are responsible for updating any spare parts inventory as operational and equipment changes occur.

AHL maintains the following spare parts in inventory.

- Thermocouple (main and pilot)
- Spark plug igniter
- UV detector
- Flow meter
- Pan indicator
- Bulbs
- Grease
- Bearing oil
- Bearing and seal kits
- Mesh filter for knockout pots
- Flare damper motor

4.0 Operating Variables (Rule 911(2)(b))

The following Table 4-1 lists AHL flare operating parameters

Table 4-1 Operating Parameters

Equipment	Operating Parameter	Range
Blower	Motor Amperage Draw	45A-132A and 85A-161A
Blower	Bearing Temperature	Per manufacture's specification
Blower	Vibration	0 IPS - 0.20 IPS
Flare	Condensate KOP Differential Pressure	0-10 inches
Flare	Condensate KOP Liquid Level	Visible on sight glass
Flare	Flame Arrestor's Differential Pressure	
Flare	Autodialer	Power on/enabled
Flare	Visual Check of Flare Stack and Burner	No visible emissions
Flare	Combustion Temp °F (enclosed flares) *	1,396 °F Zink, 1,520 °F McGill
Flare	Gas Flow Rate (cfm at 50% CH ₄) *	(4,600) McGill, (3,400) Zink, (5,000) utility
Flare	Inlet Vacuum	80 inches
Flare	Inlet Temperature	(40 – 90 °F)

*Established during December 19, 2019 stack testing

5.0 Corrective Actions (Rule 911(2)(c))

Operation of the flare system equipment within the acceptable operating parameters, is indicative of proper and compliant operation. While operation outside of the "acceptable" monitoring range may indicate a potential equipment problem, diagnosis and determination of the consequences of these values depends on the information gathered upon response. Therefore, depending on the circumstances of each particular event, it may be possible to conclude that the flare system was operating properly and compliant with the applicable requirements, even if the monitoring values were outside of the "normal or acceptable" range. AHL will track and document when the various equipment or device monitoring falls outside of the acceptable operating range. In the event that simple adjustments cannot clear the problem, AHL will maintain a record of the corrective "response actions" taken when a major maintenance response is required.