

# START-UP, SHUTDOWN & MALFUNCTION ABATEMENT PLAN

FOR

## DELTA SOLID WASTE MANAGEMENT AUTHORITY

5701 19<sup>TH</sup> Ave N  
Escanaba, Michigan  
SRN: N6035

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## **1.0 INTRODUCTION**

In compliance with both the New Source Performance Standard (NSPS 40 CFR Part 60, Subpart WWW) and the NESHAP (40 CFR Part 63, Subpart AAAA), the Delta Solid Waste Management Authority (DSWMA) must develop a Start-up Shutdown and Malfunction Abatement Plan (SSM Plan) for their Type II Municipal Solid Waste Landfill Gas Collection and Control System. This plan is designed to ensure that proper procedures are followed during periods of startup, shutdown, and malfunction events which minimize emissions in a manner consistent with good air pollution control practices.

### **1.1 SITE LOCATION**

The facility located at 5701 19<sup>th</sup> Avenue N, Escanaba, Michigan consists of two separate Type II landfills. The Southern Landfill commenced accepting waste in 1985 and was closed in July 2016. The Northern Landfill consists of thirteen (13) cells, by design, but has been only accepting waste in Cell 5 (1<sup>st</sup> cell of this landfill) since 2015. Commencing on January 14, 2022, Cell 6A and a portion of Cell 6B began accepting household waste, with Cell 5 accepting construction debris only. Both landfills are equipped with a landfill gas collection system and an open flare to control landfill gas emissions. This plan currently covers the operations at the Northern and Southern Type II landfills.

### **1.2 LANDFILL GAS COLLECTION AND CONTROL SYSTEM**

The Southern Landfill is segregated into five (5) separate cells (1,2,3A, 3B, and 4). Each cell contains gas collection wells which connect to a gas collection header and routed to an open flare control device. The collection and control system was designed according to Section 60.752 (b)(2)(i). and is designed as an active gas collection system. There are currently sixteen (16) extraction wells and five (5) side slope wells.

The Northern Landfill, by design, is separated into thirteen (13) separate cells (5, 6A, 6B, 6C, 7A, 7B, 7C, 8A, 8B, 8C, 9A, 9B, and 9C). Cell 5 has a gas collection system installed and operating with an open flare. This system was installed in 2020 with landfill gas being delivered to the flare starting September 2020.

Extraction Wells are designed from 4" HDPE. The extraction end of the well pipe is embedded in stone with drilled holes in the pipe to draw landfill gas. The encased pipe rises through multiple layers of covering to the surface where connects to a 3" Well Head.

The Well Head consists of a series of 150 psi PVC flanges and a butterfly valve used throttle the well head pressure. From the Well Head the collected gas enters into a 3" Gas Collection pipe. This pipe, along with gas collection pipes from the other extraction wells are connected into an 8" HDPE gas collection header that delivers the collected

gas to the Blower and Flare control unit. This unit is located in an enclosed building located to the north-eastern end of the Southern Landfill. The Northern Landfill flare is located to the southeast of Cell 5.

The 8" gas collection header is reduced to a 6" HDPE line prior to entering the blower. The blower is capable of moving 600 cfm of landfill gas at vacuums of up to 50 inches of water column. The piping between the blower and flare is equipped with sampling ports for flow measurements and gas sample collection. The flare is an open style flare and is equipped with a pilot sensor and pilot/igniter assembly for initiating the combustion process. The device includes a flame detector that allows the blower to be shut down and to close an in-line valve to prevent discharge of untreated gas to the atmosphere.

The collection and control system was designed to handle the maximum expected landfill gas flow rate from the entire landfill (Section 60.752(b)(2)(ii)(A)(1)). The Northern Landfill is designed so that the system can gradually expand using phased construction as the landfill is developed. This will allow the facility to install equipment as it becomes needed such that the system is operating in areas that warrant landfill gas control.

The system relies on vertical wells to collect landfill gas. The collection wells and header piping design was developed considering:

- a. well spacing that will allow collection from all filled areas,
- b. depth of refuse so that future well depths will provide at least 20 feet of separation between the above the liner and the bottom of well to protect the liner system,
- c. wells designed that are compatible with final cover and with sufficient cover to protect from air intrusion,
- d. header and lateral piping sizes that is capable of carrying the maximum generated flow with minimal vacuum losses,
- e. means to remove condensate from the piping systems and for disposing of it in the leachate collection system,
- f. each well has sample ports to allow the measurement of gage pressure, gas composition and temperature, and
- g. materials of construction including HDPE, PVC and stainless steel to provide protection from heat, corrosion and other environmental degradation, and a master layout that allows phased construction to provide system expandability and installation coordination with filling operations .

## 2.0 SSM PLAN

A landfill is not a typical source that can be started up or shut down. It is a biological process that cannot be stopped or shut down once initiated. For this reason the primary concern for landfill SSM plans is with the malfunction of the landfill gas collection and control system and associated monitoring equipment. The following table identifies the types of scenarios that may result in a malfunction.

EQUIPMENT	PURPOSE	LIKELY MALFUNCTION	IMMEDIATE ACTION	CORRECTIVE ACTION
<b>Collection System</b>				
LFG Collection Well	Collect LFG	Landfill operations eq. hits well	Shut off Valve, Temp Cap	Repair
LFG Collection Well	Collect LFG	Rubber couplings become weathered and crack, leaking LFG	Shut off valve	Repair or Replace coupling
LFG Field Valves	Regulate LFG Flow	Stems break or crack causing valve failure	Isolate the valve	Replace valve & re-instate operation
Blower	Move LFG through lines	Electric motor failure	Send motor in for repair	Re-install motor when repaired
		Blower Failure – fan blades, bearings, belts, electric motor, etc.	Automatic Shutoff of LFG to the flare	Replace Defective Part & Restart flare
<b>Control System</b>				
Flow Recorder	Record gas flow from collection system to open flare	Lightning Strike or Equipment failure	Remove equipment and ship for repair and/or replace	Re-install when equipment is returned & restart flare
Flare	Combust LFG	Power failure	Automatic Shutoff of LFG to the flare	Restore Power Restart Flare
		Blower Failure – fan blades, bearings, belts, electric motor, etc.		Replace Defective Part & Restart flare
		Blowout of Flare due to flow interruption, drop in BTU content		Investigate cause, isolate any failures, make necessary repairs & restart flare
		Flare Thermocouple failure		Replace & restart
		High winds		Restart Flare
		Heavy Snow or Rain		Restart Flare

### 3.0 PREVENTIVE MAINTENANCE PLAN

The following table is a listing of the maintenance activities associated with the landfill gas capture and control system. These periodic activities are scheduled to increase the reliability of the control system.

Frequency	Procedure	Purpose
Weekly	Grease the blower shaft bearing (Southern Landfill Flare only)	Improve longevity of the bearings
	Inspection of the blower house equipment	Verifying that equipment is operating properly
	Collection of gas totalizer meter data	Verify continuous operation or intermittent shutdowns
Semi-Monthly	Collect well and flare gas data	Monitor changes in gas concentrations
Annual	Calibrate the data meter (send to third party)	Maintain accuracy of LFG data
Biennial	Replace the blower bearing	Reduce the possibility of a fatigue failure
	Replace the drive belt between the blower and blower motor. (southern landfill blower only)	Reduce the possibility of an unforeseen belt failure that would shut the control system down
	Clean the spark igniter, as needed	Reduce any buildup which may cause a failure to ignite the flare

The facility spare parts list is limited to maintaining an inventory for the electric eye in the flare, belts for the blower drive, and grease for the blower bearings. For major components (i.e., blowers, motors, etc.) the company relies on an assortment of suppliers to maintain readily available supply that can be shipped overnight.