

10.0 GENERAL REVIEW OF MONITORING/CONTROL OF LANDFILL GAS

10.1 Introduction

This chapter includes a general Review of Monitoring/Control of Landfill Gas, (Specification 3.8):

- *Effect of uncapped cells on landfill gas production.*
- *Monitoring/control of concentration and migration of methane, carbon dioxide, non-methane organic compounds (NMOCs).*
- *Monitoring/control of lateral migration of landfill gas.*
- *Monitoring/control of airborne particulate and odour.*

The scope of work for the review of landfill gas monitoring and control systems has been limited to a general overview of the issues.

10.2 Effect of Uncapped Cells on Landfill Gas Production

Landfill gas is generated as organic waste decomposes under anaerobic conditions (without oxygen) within the landfill. The rate of gas production is influenced by the amount of water that seeps into the landfill and hence is effected by whether the landfill is capped or not. Landfill gas is presently vented through vent pipes at the top of the capped slopes of Cell #1 and #2. It is also passively vented through the uncapped top of the landfill. Figure 10-1 includes aerial photos of the landfill in which the capped areas can be seen on the landfill slopes.

The passive gas collection and venting piping system incorporates collection piping in the granular layer under the clay cap, and includes the following:

- 100 mm diameter SDR 26 perforated gas footer pipe along the base of the slope.
- 100 mm perforated gas vent pipes spaced about 40 m apart and extending from the footer pipe to the top of the slope and running up through the stone gas venting layer.



June 2004



May 2005

Aerial Photos of Capped and Active Landfill Figure 10-1

- 100 mm perforated gas header pipe at the top of the slope and by the drainage swale. This pipe connects to each vent pipe running up the slope.
- 100 mm diameter solid vent pipes extending 1.0 m above the landfill to vent the gas to the atmosphere. There are fourteen gas vents.

The gas venting system is a passive system, meaning that it is not assisted by any mechanical means like fans or compressors. There is the potential to connect the system in the future to a mechanical system where a vacuum pressure would be put on the system to draw the gas out of the landfill.

By not capping the completed landfill cells, the landfill gas production rate is increased until the cell is capped. Following capping, landfill gas will continue to be generated, but at a slower rate.

10.3 Monitoring/Control of Concentration and Migration of Landfill Gas

Landfill gas is composed mostly of methane and carbon dioxide. It also contains non-methane organic compounds (NMOC's) which includes hydrogen sulfide, sulfites, and other compounds. At present, the landfill gas is not monitored.

The Approval to Operate calls for a high volume air quality sampling station for use during construction (Item 69). This was reportedly installed and operated during the initial operation of the landfill, but has since been removed. This was based on the lack of data (low or no readings) recorded at the site. To comply with the Approval, it is suggested that the station be put into operation during subsequent construction activities.

10.4 Monitoring/Control of Lateral Migration of Landfill Gas

Landfill gas can migrate laterally from a landfill into the surrounding soils. This is a problem more associated with older landfills that did not have synthetic liner systems. At the Crane Mountain Landfill, the HDPE cell liner will prevent lateral off-site gas migration in the lower portion of the landfill. Above the liner, at the perimeter berms, the landfill has been built up above the surrounding land. Therefore lateral gas migration will be contained

at the landfill cell perimeter and vented to the atmosphere rather than into the surrounding soils.

10.5 Monitoring/Control of Airborne Particulate and Odour

Odour from the landfill is evident around the site including along the highway. The odour could be from a combination of landfill gas and vapours from the active face. The difference is the landfill gas is from decomposing wastes, while odour from the active face is directly from fresh garbage. Landfill gas odours can be reduced by capping the landfill to reduce the rate of landfill gas generation. It can be further reduced through collecting and flaring the landfill gas, whereby odourous compounds are converted to a non or reduced odourous state. For example, flaring would convert hydrogen sulfide, a poisonous and rotten egg smelling gas, from H₂S to lower odour sulfur dioxide SO₂.

The Federal Government has endorsed the Kyoto Accord and is therefore encouraging the reduction in greenhouse gas (GHG) emissions. Landfills are a major source of GHGs, particularly methane. Methane is about 20 times more reactive than carbon dioxide and therefore reducing methane emissions from the landfill can have a significant environmental benefit. It is understood that a proposal has been submitted to the government for funding for a gas collection system, with possible utilization at the compost facility. This is an important step that should be implemented.

It is noted that the NBDELG has indicated in a letter on December 10, 2004 regarding raising the height of the landfill, that the "Department has no plans to establish landfill gas management guidelines". Despite this, it is recommended that in the context of local odour control and the Federal government's objective of reducing greenhouse gases, that the FRSWC proceed with a landfill gas system.