

Vibration from Gas Flares

A number of submitters have reported that on a few occasions they have felt a vibration which they believe is coming from the landfill site. The source of this vibration has since been identified and found to be coming from the landfill gas flares just after they are started-up. There are three permanent enclosed gas flares on site, two of which are on standby to burn off any unused gas and a third flare which is permanently used to heat-up the leachate evaporator unit. The Redvale landfill presently produces electricity by running a number of gas generators on the site. These gas generators can provide up to 12 MW of electricity to the local grid.

In the event of a power outage on the main electricity grid, or if the need arises to switch off a number of gas generators for a prolonged period (e.g. due to maintenance requirements), the gas flares are started up so that they can continue to destroy any unused gas and hence prevent any uncontrolled discharges to atmosphere. The gas flow cannot be stored or held back within the landfill as an excessive gas build-up could lead to gas and odour emissions. Flaring of the gas is a requirement of the Air Quality National Environmental Standard (Air Quality NES) and is important to prevent greenhouse gas emissions and potential odours.

It is well documented¹ that combustion instability can occur in a gas flare when too much air is added through the air intake. This over-aeration causes the flame to lift from the flare tip and the periodic rapid lifting and reattachment of the flame is the mechanism that drives the low frequency vibration or 'rumble'. At Redvale, the flare start-up and potential for the resultant rumble is very infrequent and will usually only follow a prolonged power outage on the main grid. Power outages which have resulted in the need for a flare start-up, have been recorded as occurring up to 6 - 7 times per year. The period of time for which the rumble lasts is usually less than 15 minutes (i.e. the time taken for the flame in the combustion burner to stabilise).

Operational staff investigated the cause and modified the start-up procedures. These have been implemented and recently tested during a start-up which followed a power outage on the 10/06/2014. The new procedures now prevent excessive air inflow into the flare which has shown to have eliminated the vibration rumble during start-up. These procedures will continue to be followed for all future flare start-ups.

¹Reference: The John Zink Combustion Handbook pg. 236
Edited by Charles E Baukal Jr (2001)