

## **11a. LANDFILL GAS HAZARDS ASSESSMENT (TTAL SITE)**

### **11a.1 Introduction**

11a.1.1.1 The landfill gas hazard assessment undertaken in the EIA Study identified the hazards that are likely to be generated from the proposed WENT Landfill Extensions, during the construction and operation phases of this Project and evaluated the associated risk. The EIA Report recommended that significant engineering protection measures would be required to protect the IWMF from the landfill gas risk associated with WENT Landfill Extensions. Use of “active control of gas, including barriers and detection systems”, and other appropriate gas control protection systems referenced from the EPD’s *Landfill Gas Hazard Assessment Guidance Note* were recommended. Regular monitoring during operation phase was also recommended.

### **11a.2 Monitoring and Measurement of Landfill Gas**

11a.2.1.1 The measurements mentioned in s.11a.2.1.2 to s.11a.2.1.5 are required only when the IWMF project is delayed relative to the WENT Landfill Extension project such that the WENT landfill extension project is in operation when the IWMF is under construction.

11a.2.1.2 During construction of the IWMF, if the WENT Extension project is in operation, a Safety Officer should be appointed to carry out the monitoring works. The monitoring frequency and areas to be monitored should be set down prior to commencement of ground-works either by the Safety Officer or an approved and appropriated qualified person. The routine monitoring should be carried out in all excavations, manholes, chambers, relocation of monitoring wells and any other confined spaces that may have been created. All measurements in excavations should be made with the extended monitoring tube located not more than 10 mm from the exposed ground surface. Monitoring should be performed properly to make sure that the area is free of landfill gas before any man enters in the area.

11a.2.1.3 For excavations deeper than 1m, measurements should be carried out:

- at the ground surface before excavation commences;
- immediately before any worker enters the excavation;
- at the beginning of each working day for the entire period the excavation remains open; and
- periodically through the working day whilst workers are in the excavation.

11a.2.1.4 For excavations between 300mm and 1m deep, measurements should be carried out:

- directly after the excavation has been completed; and
- periodically whilst the excavation remains open

11a.2.1.5 For excavations less than 300mm, monitoring may be omitted, at the discretion of the Safety Officer or other appropriately qualified person.

11a.2.1.6 Depending on the results of the measurements, actions required will vary and should be set down by the Safety Officer or other appropriately qualified person. As a minimum these should encompass those actions specified as follows:

Parameter	Measurement	Action
Oxygen	< 19 %	<ul style="list-style-type: none"> <li>Ventilate to restore oxygen to &gt; 19 %</li> </ul>
	< 18 %	<ul style="list-style-type: none"> <li>Stop works</li> <li>Evacuate personnel/prohibit entry</li> <li>Increase ventilation to restore oxygen to &gt; 19 %</li> </ul>
Methane	> 10 % LEL (i.e. > 0.5 % by volume)	<ul style="list-style-type: none"> <li>Prohibit hot works</li> <li>Ventilate to restore methane to &lt; 10% LEL</li> </ul>
	> 20 % LEL (i.e. > 1 % by volume)	<ul style="list-style-type: none"> <li>Stop works</li> <li>Evacuate personnel/prohibit entry</li> <li>Increase ventilation to restore methane to &lt; 10 % LEL</li> </ul>
Carbon Dioxide	> 0.5 %	<ul style="list-style-type: none"> <li>Ventilate to restore carbon dioxide to &lt; 0.5%</li> </ul>
	> 1.5 %	<ul style="list-style-type: none"> <li>Stop works</li> <li>Evacuate personnel/prohibit entry</li> <li>Increase ventilation to restore carbon dioxide to &lt;0.5%</li> </ul>

LEL: Lower Explosion Limit

11a.2.1.7 Referencing WENT Landfill Extensions EIA Report, it was proposed that landfill gas cut-off trench barrier will be built along the boundary between the IWMF and the WENT Landfill Extensions under the WENT Landfill Extensions project. This will cut off any gas migration to the IWMF from the WENT Landfill Extensions. The indicative location of the proposed cut-off trench barrier is shown in **Figure 12a.6** of the EIA Report.

11a.2.1.8 It was recommended that several landfill gas monitoring wells be installed into the ground on the development side of the gas barrier. These would be used to measure the concentrations of CH<sub>4</sub> and CO<sub>2</sub> within the ground and hence determine the effectiveness of the measures in preventing LFG migration.

11a.2.1.9 During operation, regular monitoring of landfill gas should be done at the monitoring wells mentioned above in **Section 11a.2.1.7**, as well as underground service voids and manholes by the IWMF contractor. Monitoring would be required to verify the effectiveness and to ensure the continued performance of the implemented protection measures. As mentioned in **Section 12a.8.3.16-17** of the EIA report, a detailed LFG monitoring programme will be prepared by the DBO contractor at the detailed design stage and it will be submitted to EPD for vetting.