

# Minimising methane emissions from landfills

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## ABSTRACT

WS Atkins is leading a multi-consultancy team to assess methane emissions from municipal landfill sites, particularly during their operational phases. Recent research suggests that a large proportion of the total methane produced during the active phases of a landfill is emitted during the operational phase (Attenborough et al. 2000). Modelling of gas production using input data from field-scale test cells (Cain et al. 1996) indicated that such emissions could be up to 30% of the total expected methane yield. Generally, these emissions are not currently captured and neither has their scale been quantified by field measurement.

This project has been designed in order to gain a clearer understanding of the actual emissions, thereby defining their contribution to anthropogenic greenhouse gas emissions, as well as assessing the potential for increased energy recovery. A critical part of the project will be the development of an effective surface measurement technique for emissions from uncovered or partially covered wastes, including the side slopes of cells.

The project has the following primary objectives:

1. *To identify and develop methods for measuring methane emissions from various parts of operational and restored landfill sites, with emphasis on monitoring high emission rates.*
2. *To assess the scale of methane emissions during (a) the operational phases of landfilling, (b) the early restored phase, and (c) the near-completion phase.*
3. *To identify, design and test cost-effective methods for controlling and collecting methane during the operational phase.*
4. *To identify, develop and test technologies and methodologies to reduce methane emissions during the early restored and the near-completion phases.*

Comparison of initial data using three measurement methods indicated that a modified static chamber, that was designed for high emission rates, has a higher reproducibility than the traditional flux chamber. The dynamic flux chamber was shown to be affected by the sweep gas flow rate (i.e. the pumping speed) and the period of pumping. This is in agreement with research conducted by Williams & Williams (1995), who demonstrated in laboratory-based landfill simulators that the emission rates measured using a dynamic flux chamber were only a small percentage of the correct values.

## REFERENCES

- Attenborough, G.A., Schwarze, S. and Barry, D.L. (2000) *Landfill Methane Surface Emissions - Part I: Measurement Surveys*, WS Atkins, Draft R&D Technical Report for the Environment Agency.
- Cain, M., Davies, S., Campbell, D, Old, C.F, McLeod, S and Brewer, A. (1996) Landfill gas enhancement studies: The Brogborough test cells. *ETSU B/LF/00188/REP/2*.
- Williams, B. and Williams. J. (1995) Measurement of emission rates of selected landfill gases from municipal solid waste landfills. *Report PMD/95-4*. Pollution Measurement Division, Technology Development Directorate, Environment Canada, Environmental Technology Centre.