



For centuries the UK has for the most part simply buried its waste, but landfills are nearly full, and attitudes and practices are changing fast. Over recent years hundreds of landfills have closed, but the organic processes at work underground have not ceased, and the need to monitor the environmental impact of these sites is moving into the digital age. Ben Messenger reports.

# Testing Time for UK Landfills

**D**isposing of our waste in landfill may once have been the option of choice, particularly in the UK, but decades of mass consumption and disposal have left a legacy of hundreds of closed landfills scattered around the country. For the most part the owners of these sites, and hence those responsible for their safe upkeep, are local authorities.

The number of landfill sites operating in the UK has decreased from about 3400 in 1994 to 2300 in 2001, and with the significant and ongoing changes to attitudes and practices in waste management over recent years, the number of disused landfills is set to rise. Many of these sites are now public open spaces such as parks, and are often surrounded by houses.

With around two thirds of landfilled waste being biodegradable, and capable of producing between 200 m<sup>3</sup> and 400 m<sup>3</sup> of landfill gas (predominantly carbon dioxide and methane) per tonne as it decomposes, the ongoing risk of explosion has been well documented. Additionally, closed landfills pose a threat to air and water quality in the local area. Prolonged monitoring is essential, and in the UK there are two levels of regulation in operation.

## Regulations

Many of the more recently closed sites operated under the now defunct Waste Management Licence system, which then

transferred to the Environmental Permitting system. Under these permits, the type and frequency of monitoring at these sites is usually set down by the Environment Agency. However, at older sites that operated in the days before waste management licences and environmental permits, the job of determining what risk an old landfill poses to its surroundings, and how often it should be monitored, is largely down to self regulation by the environmental health department within the local authority.

In theory, the period of time which such sites will need to be monitored is finite, with settlement becoming the only risk once gas generation has ceased. When the government first issued its technical guidance papers in the early 1990s the typical timeframe for a site to wind down and not produce enough gas to be of concern was thought to be around 25 years. However, Martin Dye, senior district officer in the environmental department of Wolverhampton City Council says that this figure is “a little short of the mark”, and explains that the Wolverhampton local authority has sites that were taking waste in the mid 1950s, and which are still capable now of producing enough gas to burn.

Clearly then, monitoring these sites is a long term responsibility for their owners, and an ongoing cost. Traditionally, monitoring has been carried out by personnel using site maps to locate bore holes from which to take samples and measurements, the results of which would be recorded on paper.



## Going digital

In a bid to increase the efficiency and accuracy of the monitoring process, Wolverhampton, UK-based emission and pollution monitoring specialist, enitial, came up with its PDA based data collection system - enidata.

The system incorporates GPS capabilities that enable the technician to quickly and easily find the correct location at which take the samples, and allows for the collation of data covering not just gas migration and water pollution, but also any other irregularities or environmental nuisance issues on the site such as broken fences, vandalised bore hole covers or settlement. The device will timemark and note GPS co-ordinates, and enable the technician to tag the entry with a photo and explanatory notes.

Highlighting the advantages of the digital solution, Ivor Parry, business development director and co-founder of enitial gives the example of a disused landfill that may require a technician to monitor a set number of critical points weekly as part of its permit conditions. In the past this would have been a technician obtaining readings with different instruments, writing the results into a notebook, possibly using a mobile phone to take a picture, and then having to get the data back to the client.

Parry points out that while the real benefit of the enidata management system is not to reduce costs, it does offer significant management time savings by not needing to reprocess data, and in being able to report data and any supporting information efficiently, and is thus cost neutral. Instead, the real aim of the system is to increase the quality of the data produced.

Using the system a technician going out on a job for the day will sync the device to download not only the GPS locations of all the sample points they should be testing or auditing that day, but also the historic data and site specific field information for those locations. If the PDA user enters any anomalous information collected in the field they are prompted to double check, thus ensuring no costly repeat visits. As soon as the data has been collected and verified it is uploaded to enitial's servers over the mobile phone network. If any abnormalities are found, the details can be automatically sent via SMS to client contact numbers.

For Wolverhampton City Council, enitial's technicians provide a full monitoring service at a number of its redundant landfill sites, and using the enidata system, are able to supply the collected data and information not only to the council, but also to



The enidata system incorporates GPS and data collation capabilities

the Environment Agency (EA). According to Dye, enitial is able to flag up not just the larger, more obvious changes that may have occurred, but also the smaller less noticeable changes.

Explaining the 'at a glance' report that the system is able to send, the council's Dye adds: "There's a symbol and traffic light system that uses a cross in a red circle and a tick in a green circle and you can see for example if something is missing from a borehole such as caps and valves, or the tubing that you need for ground water monitoring. It saves you going through every page to comb through what the text may say."

## Conclusion

While even to this day it may still be the largest single form of waste disposal in the UK, driven by European policies and public opinion, the country is finally making significant strides towards moving away from the use of landfill. With so many landfills having closed without replacement over recent years, the sites that remain active are filling fast. As the closures continue, and even accelerate, the legacy they leave behind will be hundreds of millions of tonnes of decaying waste, emitting gases and leachate.

It's clear that these sites will need to be monitored and managed for many years to come. If that's to be done in the most accurate and efficient way then it seems logical that as in other areas of the industry, the best available technology be deployed.

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Pinpointing gas migrating beyond the site's boundary, where it can cause the most harm, is of particular importance