Characterising Landfill Waste

The Role of Lab Methodologies

The requirement for a waste producer to treat and characterise its waste in terms of chemical composition and leaching behaviour has had far reaching effects on the analysis of site materials at the UK’s Environmental Labs. This characterisation requires comparison of analytical results with waste acceptance criteria (WAC) to determine the class of landfill able to take the waste. This waste characterisation also applies to the removal of any contaminated land waste destined for disposal at a landfill.

The regulations prescribe the leaching methodologies that the laboratories must follow, with the previous, simple, contaminated land leaching methods deemed inappropriate.

The newly prescribed leaching methods have impacted on the services offered by laboratories. Whereas the turnaround time for chemical analysis for remediation work has reduced considerably over the past few years, with five days becoming the norm, some of the new leaching and percolation tests can take up to 10 weeks to complete.

The most common leaching methods now in use are the BS EN 12457-3, two-stage leaching and the up-flow percolation test. Analysis of the resulting eluate samples (we no longer call them leachate as that term is reserved for landfill sites) can then be compared with waste acceptance criteria, to decide the class of landfill site able to accept the waste.

Further leaching methods such as ‘Maximum Availability’ and ‘pH Dependence’ tests can also be employed for particular waste types, in addition to the ‘Diffusion Tank’ and ‘Compliance Leaching test’ for monolithic wastes.

In all, there are now a plethora of new laboratory testing procedures with analysis testing times far greater than those previously offered.

Characterisation of Waste

The laboratory methods employed in the characterising waste to the new criteria (WAC) are dependent on the chemical nature of the parameters being assessed.

In the main, organic parameters such as, total organic carbon (TOC), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), benzene, toluene, ethyl benzene and xylene (BTEX) and mineral oil are analysed on the eluate analysis covers mainly the inorganic parameters and that the more volatile and less available to UK offering different liquid to solid (L:S) ratios and solids content.

These leaching tests enable predictions of contaminant release to be made for different conditions, such as different pH conditions or very low liquid to solid ratios.

Batch leaching test - BSEN 12457

The newly introduced British Standard, Characterisation of waste-Leaching-Compliance test for leaching of granular waste materials and sludges. Three variants of the leaching test are available to UK offering different liquid to solid (L:S) ratios and solids content.

These leaching methods generate eluates (not leachates, as this term is reserved for liquids generated on landfill sites) for analysis, enabling the assessment of leachability under mild extraction conditions for waste disposal or material reuse options.

The default version in the UK is the version BSEN 12457-3, the two stage leaching method.

The method is only applicable to waste material and sludge having a dry matter content ratio of at least 33%. Where sludges have a very low dried solids content and L:S ratio of 2:1 cannot be achieved, then the single stage BSEN 12457-2 (L:S 10:1) may be undertaken.

These new leaching methods are not only, more time consuming and therefore more costly than the long standing Interim NRB leaching method, but also generate two water samples for analysis and hence twice the cost for chemical analysis.

The cumulative result from the two stage leaching is the one that is used for comparison with the WAC in order to identify the most appropriate class of landfill to accept the waste.

It should be remembered that this eluate analysis covers mainly the inorganic parameters and that the more volatile and organic parameters are analysed on the waste itself.

Up-flow percolation test - prEN 14405

This method falls into the category of the ‘Basic characterisation’ and is used to provide information on short and long term leaching behaviour of inorganic constituents from granular waste. The
The Answer
Lies in the Soil!

There has always been a need for an accurate, quick and convenient field testing system for soil in land sites. Hydrocarbons, in abundance as waste are mostly found in ground where industry has operated — sometimes elsewhere for not such noble reasons.

Now for some years PetroFLAG, available from QUADREX Scientific (UK), has become more widely used and accepted, operating successfully producing the desired results to meet the latest environmental regulations for suspect contaminated land.

The PetroFLAG system makes quantitative determinations in soils contaminated by a wide range of Hydrocarbons including Fuels, Lubricating Oil, Hydraulic Fluids, and greases etc., by providing the user with instant results whilst on-site, thus permitting immediate decisions for remedial action.

No special training is required to operate the PetroFLAG system. Using field calibration standards to achieve a very high degree of accuracy, the results are displayed on an LCD—all in around ten minutes from collecting the sample. All the reagents are environmentally friendly and can be disposed of as harmless laboratory waste.

The PetroFLAG system comes complete with reagents and all necessary ancillary items, contained in a lightweight case which can be easily carried, or transported to the site and operated from the car boot.

Reports from the field have proven to be very positive for its operation, accuracy and satisfaction.