

Case Study

Unauthorised Landfill Investigations

Environment Agency



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Since 2000, Geotechnology has been retained by the Groundwater and Contaminated Land Team of Environment Agency Wales as technical advisors. The role is primarily related to providing technical review of current landfill design proposals submitted by landfill operators and their consultants and engineers. On several occasions during the contract, Geotechnology has also been requested to design and undertake site investigations of unauthorised landfills.



Unlike conventional site investigations, the investigation of suspected illegal operations often necessitates warrants in order to gain access to the site. In many instances Geotechnology would be accompanied during the site investigation by warranted officers from the Environment Agency backed up by police teams following lengthy surveillance operations



The development of statistically robust and justifiable sampling plans is a key element of the investigation undertaken by Geotechnology at the planning stage. Design of the sampling plan needs to ensure that a sufficient number of samples will be collected during the single opportunity for access. As the source of the material is often not known, dangerous substances that may be present are also unknown. As a consequence, a large number of samples need to be collected in a short period of time under strict quality control. A wide range of liquid and solid sample containers are therefore pre-prepared. Following sample collection the samples are transferred to a suitably qualified independent laboratory under strict Chain of Custody



Parallel to the collection of samples, the site investigation also provides an opportunity for a detailed visual, topographic and photographic inspection of the site and the properties of the material. Geotechnology also inspects the site's setting to identify other potential contaminant



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sources, pollutant pathways and receptors.

Upon receipt of the initial test results the properties of the material are evaluated in the context of several regulatory regimes. The need for additional testing is also determined. As the material sampled is often suspected of being waste, the material is first assigned a provisional European Waste Catalogue code. This is often a mirror entry which necessitates the concentration of dangerous substances to be determined. The concentration of dangerous substances is therefore evaluated against the thresholds for hazardous waste.

According to Annex III of the Hazardous Waste Directive there are 14 hazardous properties (H1 – H14) that require evaluation. Geotechnology evaluates each of these properties in accordance

with Technical Guidance WM2 and HWR08 issued by the Environment Agency. The assessment involves evaluation of the compounds likely to be present, the associated risk phrases and comparison of the concentration of dangerous substances with the H1 – H14 thresholds. If the thresholds are exceeded the material contains dangerous substances that classify it as hazardous. If the concentration of dangerous substances is below the threshold the material is classified as non-hazardous on the basis of the available data.

Where required, additional testing of the material is undertaken to assess its leaching properties relative to current landfill Waste Acceptance Criteria. This testing is often referred to as WAC testing. In combination with the results of the



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hazardous waste assessment, these tests can be used to determine the class of landfill that could accept the material.

Parallel to the classification of the material, the risk it poses to environmental and human receptors may also need to be evaluated. The requirement for such assessments is determined by the Environment Agency depending upon the specifics of the legal case.



Where such requirements are required, Geotechnology first develops a Conceptual Site Model. This clearly identifies potential pollutant linkages requiring detailed evaluation. The assessment of risks to the environment combines an evaluation of the measurements made on water and gas during the site inspection with the available solids and leachate analytical results. Together, this information is used to provide a preliminary evaluation of the potential risks posed to the environment. If needed, this information may be used to populate contaminant fate and transport models to further refine the assessment. A similar staged approach is taken for the assessment of risks to human health.



Completion of the site investigation report and data evaluation commonly prompts the next step in the legal process. During this process Geotechnology may be requested to provide supplementary technical input to the case. This could include the approach adopted to classify the material as waste, review and interpretation of third party submittals and literature review. Ultimately, Geotechnology personnel may be requested to provide written statements and be asked to attend court proceedings as Expert Witness

