

Remediation

Automated Ex-Situ Bioremediation – Verona Gasworks

Bioremediation is a technique with good sustainability credentials. Ex-situ bioremediation comes in several guises and the specific form of ex-situ bioremediation that Ecologia use is Biopiles. Biopiles are engineered piles of soil that include active aeration of the soil using a vacuum blower, collection of leachate and allow the abatement of VOC's possible by capturing the extracted gases. Biopiles operate very quietly with comparatively little operation and maintenance required.

One important aspect Ecologia has focussed upon is the use of energy to aerate the soil. Aeration of the soil biopile can require a great deal of energy. Commonly the aeration blowers are left running 24 hours per day, 7 days per week, or, in case of windrows and large turner is often driven up and down the site burning diesel and releasing VOC's into the atmosphere from the soil. The approach Ecologia has studied and successfully used is to only aerate the soils when it is required.



Ecologia has been monitoring gases within biopiles for many years to provide data upon the health and effectiveness of the biopile. Respiration tests can be undertaken by switching the aeration system off line and measuring the rate of oxygen depletion and carbon dioxide production to assess the rate of contaminant breakdown associated with biological activity. This method provides valuable data upon the progression of the process and when validation soil samples should be taken. Recently, Ecologia has used automated gas analysis and recording the concentrations of oxygen and carbon dioxide every minute by using multiple gas sampling ports and devices within the Biopile. Our fully telemetrically controlled systems allow us to access this data from our office and remotely run respiration tests to see the health of the biopile without the need to get in a van (or an aeroplane) and actually go to site.

It was a relatively short leap to link the automated gas analysis to the process logic controller for the biopile plant and switch the blowers on line only when the carbon dioxide builds up above a certain level. This idea was tested, with our equipment which was designed and built in Kent, at the former gasworks in Verona, Italy. The project in Italy involved the construction of two identical 3,500m³ biopile batches, one after another, on the same treatment pad. The first was run in the traditional manner and the second was aerated automatically.

The two batches of material were treated in the same time but the key difference was that the second batch using the automated system used only 20% of the electrical power that the first batch did. The very large reduction in energy use is combined with the possibility to use smaller equipment in the future, reduced visits to site, and lower running costs due to decreased wear and tear of the equipment, making the process more environmentally and economically sustainable.

The contract was undertaken by Ecologia as a fixed priced sum and achieved the required remediation targets within the original programme.