

# Online Lab results Accelerate Remediation Processes

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**In this article, Simon Turner, Commercial Director (Environmental, UK&I) at ALcontrol Laboratories, explains how recent internet-based advances in the management of analytical work have radically increased the speed and efficiency with which results are supplied to remediation contractors.**



*The Avenue Thermal Treatment Plant*



## **Summary**

Fast analytical data is critical to the efficiency of remediation processes. However, analysis times are rarely the limiting factor; too often there are delays between sampling and analysis or between analysis and the delivery of results, or worse still; samples are non-conforming and cannot be accepted. ALcontrol has therefore developed an online tool known as '@mis' to resolve these issues and the following article will explain how the new tool is helping remediation contractors at one of the UK's largest and most heavily contaminated sites to exploit the benefits of fast analytical data.

In addition to the online delivery of test data, the remediation contractor, VSD Avenue, is also utilising @mis to schedule analytical work so that the availability of results does not delay any of the remediation work.

The £172.3m clean-up operation at the Avenue Coking Works near Chesterfield in Derbyshire has been underway for over a year and project director, Marcus Fowweather says: "Over the lifespan of this project ALcontrol will have tested in excess of 10,000 samples for between 5 and 18 species. This data is critical to the ongoing management of the remediation activities, enabling us to identify soils for treatment and to check that cleaning operations comply with the required specifications. Almost all process management decisions are therefore affected by test data, so the ability to access results through ALcontrol's online @mis system has been a fundamentally important part of the project's success."

## **Background**

Historically, the land at the Avenue has hosted a variety of industries; primarily the coking works but also a large chemical plant, a liquor by-products works, a large rail head, a hazardous waste tip and two large contaminated silt lagoons. Covering 80 hectares (almost the size of 200 football pitches), the site presented a substantial challenge to VSD Avenue which is a joint venture consisting of civil engineering contractor VolkerStevin Ltd, DEME environmental contractors (DEC) and SITA Remediation.

The reclamation and remediation is being funded by the Homes and Communities Agency (HCA) through the National Coalfields Program. The site remains owned by the East Midlands Development Agency (emda) which is acting as delivery agent for the project. This redevelopment process started as early as 1999 with the emptying of above ground storage tanks and the dismantling and demolition of the above ground infrastructure and buildings. The site was razed but was left with a host of contamination problems below ground including the remaining sub surface infrastructure and contaminated soil and groundwater.

The completed project will create a substantial development platform for residential plots and employment space for light industry. The remaining three quarters of the site, once remediated, will be returned to the community for various uses,





including open spaces, sports pitches and a nature reserve, creating high quality habitats for a wide range of local flora and fauna including water voles, bats, butterflies, great crested newts and many other species.

### Complex remediation challenge

The volumes associated with the project are unprecedented in the UK remediation sector; over 2 million cubic metres of material are being excavated with a significant volume of this having to be processed. Within this over 100,000m<sup>3</sup> of contaminated sediments from the site's silt lagoons are also being processed.

The lagoons were originally built either side of the River Rother which passes through the site and there is a waste tip above one of the lagoons.

The range of contaminants and the breadth of physical variation of the material have called for a number of different remediation techniques.



The site's thermal desorption plant is the largest in the UK and utilises advanced 'off gas' treatment and filtration systems to ensure compliance with stringent emissions criteria.

Two large aerated bio beds treat a further 75,000 m<sup>3</sup> of hydrocarbon contaminated material and an innovative onsite water treatment facility employing a combination of chemical oxidation and biological degradation treat the cocktail of phenols, thiocyanates, benzene and ammonia in the waters.



Other operations include the manual sorting of 237,000 m<sup>3</sup> of tip materials. This reuse in conjunction with the reuse on site of material from the thermal desorption plant and the bioremediation treatments allows a very high percentage of all the excavated materials to be reused on site with only a very small fraction of material leaving the site for landfill. This reuse of material on site obviates the need for imported materials and

saves many thousands of lorry movements, thereby reducing emissions and traffic congestion.

Further information on the Avenue is available at [www.theavenueproject.co.uk](http://www.theavenueproject.co.uk).

### The role of analytical chemistry

Soil and water analysis at the Avenue performs two key functions. Firstly, to inform the management of the treatment processes and secondly to provide verification that either treated soils meet with the required specification or that treated water complies with the site's discharge permit.



"The turnaround time for analysis is critical," says earthwork planning engineer Steve Dobson. "Results for most of the analyses are required within 5 days, so that we can plan remediation activities accordingly. It has been necessary, therefore, to work in close partnership with the technical staff at Alcontrol to ensure the delivery of timely analytical data.

"The online @mis system has helped enormously to provide us with fast results from what we call 'sentencing testing' – tests that help determine the appropriate method and level of remediation. In addition, the facility to schedule analytical work means that we get the data we need to maximise the efficiency of the remediation work, which helps to minimise costs.

"We worked very closely with Alcontrol to develop a bespoke testing strategy to ensure compliance with the project's requirements and the ability of the @mis system to export in AGS format has helped us to manage the enormous volume of data that is being produced."

### The analytical process

Staff at The Avenue utilise @mis to schedule analytical work by pre-ordering sample containers that are bar-coded before delivery. Using the online system, each sample's details are associated with the individual bar-code so that once the sample is collected it can be transported straight into the laboratory without any logging in or acceptance delays – this saves around one day on average. The samples are simply scanned on arrival into the Alcontrol LIMS (Laboratory Information Management System), which manages the analytical process and the samples are then immediately passed to the preparation area.

In addition to bottles containing preservatives for specific measurands, the main sample containers employed at The Avenue are as follows.

#### Soils:

- Plastic tubs for soils
- 250g glass jars for organics
- 60g glass jars for volatiles

#### Water:

- 1 litre glass bottles for organics

- 1 litre plastic bottles for inorganics
- 40ml glass vials for volatiles

Samples are transported in chilled containers (MCERTS for Waters specifies a sample storage temperature of 5 +/- 3 Deg C) to the laboratory and the temperature is checked by a remote infra-red thermometer on arrival. Sample delivery normally takes place at 6am on the day following sampling.

Samples from The Avenue are analysed at Alcontrol's Hawarden site utilising a range of technologies including GC, GCMS, ICP and HPLC and data is downloaded automatically into the LIMS. Following analysis, online results are immediately available via @mis, from which it is also possible to print test certificates.

The Avenue presents an interesting analytical challenge both in terms of the volume of samples and the range of pollutants to be tested. However, two of the main advantages to be gained from an organisation the size of Alcontrol are an ability to manage an extremely high volume of samples and the analytical resources to be able to measure almost anything - the Alcontrol laboratories are UKAS and MCERTS accredited and provide over 3,000 different tests.



### Looking Forward

The utilisation of the Internet to provide analytical data has been given a high priority at Alcontrol and as a result, six full-time IT staff are employed to continuously improve the @mis system in line with requirements that are driven by customers and end-users. For example, the team has recently developed a capability for @mis to automatically issue sms mobile phone alarms when results meet an SGV (Soil Guideline Value) or pre-set alarm level.

Currently, only about 30% of UK customers use the online system and whilst this figure is growing, it contrasts significantly with customers in France, for example, where 80% use the system. There is no extra charge for online results, so it is surprising that it is not yet used by everyone, particularly since the data remains online as a permanent, easily accessible archive. This means that customers can access their data at any time and create reports, in a choice of formats, by selecting specific dates.

Fast results are clearly essential to effective site investigation and efficient remediation, and for this reason the number of engineers and consultants benefiting from the @mis online system is growing rapidly.