

THE SOIL AND GROUNDWATER TECHNOLOGY ASSOCIATION

SAGTA REPORT 29 – REMEDIATION TECHNOLOGIES: STRATEGIES FOR SUCCESS

Introduction

The topic of the SAGTA Workshop held at BAE Farnborough in March 2006 workshop concerned remediation technologies – notably establishing confidence that remediation processes could achieve their required performance criteria.

The perspectives of the regulators, technology vendors, various consultancies and SAGTA members were covered by a series of presentations outlining:

- Guidance and procedures;
- Technology procurement and case history experiences from the problem holder's perspective and from the technology vendor's perspective; and
- Information availability and information exchange.

Overall Discussion

Remediation technologies are being increasingly used in the UK as the impacts of the Landfill Directive begin to bite. Despite many (good and bad) experiences of applications in the UK over the last 10-15 years, the use of technologies for contaminated land remediation is still considered “innovative” and can be perceived as requiring the landholder to have a greater understanding of a broad range of potentially applicable technologies than the simple “excavate and remove to landfill” approach. Consequently, the lack of understanding of the landowner leaves him feeling that his business may be more financially at risk by implementing “innovative” remediation technologies.

With the main theme of the meeting being about “Gaining confidence”, the following were considered:

- Selection criteria of technologies – how to decide which technologies might be applicable;
- Guidance – is there enough and is it being used;
- Experiences :
 - Technology watchpoints, windows of application and “grey areas” where the technology may be potentially applicable under certain circumstances;
 - Site specific information requirements and the link to the application, or non-application of potentially applicable technologies;
 - From a contractor's perspective.
- The use of laboratory tests, treatability trials and pilot trials;
- Accreditation of Contractors/Technology Vendors - The formation of a Federation of Remediation Contractors;
- Access to key information.

Each of these is considered below:

Selection Criteria

Generic information is available from a number of sources (e.g. CIRIA). However there is a lack of information on both financial cost and environmental cost-benefit. Two initiatives are trying to pull together cost information. These are:

- The Cluster project, which is considering costs for the Cluster concept (which only covers a limited number of potential ex-situ treatment technologies used within a treatment centre /“hub” concept);

- The EURODEMO project, where SAGTA members are encouraged to contribute by providing information from case histories.

Guidance

The Environment Agency's CLR 11 Model Procedures document provides an overall framework for the selection and implementation of remediation solutions. It was suggested that provision of training, together with appropriate accreditation, could see a wider uptake in its use. In addition, it was noted that Local Authorities are likely to be looking to see that the CLR 11 process is being followed when planning applications are made for remediation schemes. Feedback on CLR11 usage is welcomed by the Environment Agency and SAGTA members are encouraged to respond. In addition, the use of CLR 11 within the context of CL:AIRE demonstration projects is also suggested as a way of feeding back. Delegates at the meeting noted that optimisation of remediation solutions in terms of the triangle cost-time-quality needs further consideration, as there is a feeling that in applying CLR 11, Local Authorities are putting too much emphasis on "quality" regardless of the other factors.

It was recognised that whilst strategic guidance and generic technology selection guidance is available, there was little guidance on project management relating to managing remediation projects. Of particular importance is guidance on:

- Setting up contracts, and models for contracts;
- Setting realistic performance criteria, performance incentivisation and "pain and gain" mechanisms;
- Controlling costs, and
- The interactions between the land owner, the consultant on the site and the remediation contractors.

Experiences

Building confidence in the use of technologies for remediating contaminated land can only happen as technologies become more widely used and their "operating windows" of application become established. The role of CL:AIRE Demonstration projects in the UK and initiatives such as EURODEMO (with its associated "Database of Demonstration Projects") were seen as being paramount to gaining a greater understanding of technologies and their limitations. However, it was emphasised that the EURODEMO Demonstration Database will only be useful if it is appropriately populated. Thus land owners, consultants and contractors are encouraged to take the time and effort to fill out the proforma on the EURODEMO website (www.eurodemo.info). SAGTA members who had contributed to filling out the SAGTA Remediation Project Assessment Form are also encouraged to complete the EURODEMO proforma.

Pilot Trials

Laboratory tests, treatability trials and pilot trials were seen as aiding understanding, and enable business risks to be minimised as they can give an indication of the expected performance of a full scale application. However, those commissioning pilot trials need to be clear about the aims of the pilot trial. They therefore need to develop proper scientific protocols by which the tests are carried out and by which performance can be robustly assessed. Poorly designed pilot trials will yield poor information about the potential application of a technology. This is not only a waste of money with respect to the trial, but can also wrongly discredit some technologies because they may be being inappropriately applied to a problem outside their window of application. Pilot trials should only be carried out when adequate site characterisation and treatability trials have been carried out. Only then can the potential performance be assessed and judged against the remediation targets for the site.

It was noted that the CL:AIRE initiative includes pilot scale trials. Before acceptance as a CL:AIRE project, the Technology and Research Group (TRG) requires the project to provide details of the testing and sampling protocols for the trial.

In addition to the technical aspects of carrying out pilot trials and demonstration projects, it was also recommended that pilot trials could be used to test procurement processes, contract terms and conditions and remediation performance targets.

Accreditation of Contractors/Technology Vendors - The formation of a Federation of Remediation Contractors

As the use of remediation technologies become more established, it was recognised there is a need to ensure that those contractors carrying out the work are suitably qualified and experienced. It was suggested that a Federation of Remediation Contractors should be formed. Membership to this body would include a formal accreditation process. Whilst the need is recognised, a suitable independent body to set-up and administer this professional body could not readily be identified. Lessons could be learned from other European Countries (The Netherlands and Belgium) who have set-up similar bodies.

Access to Key Information

During the course of the meeting several information sources were mentioned. The recently developed EUGRIS website was noted as being a useful portal to accessing information on soil and groundwater information within Europe. There are currently >80 technical information zones within EUGRIS. Further development of this pan-European gateway is anticipated to be on a “hub” model, where participating countries develop their own country website (e.g. UK EUGRIS) which is then linked to the main EUGRIS site. SAGTA members are encouraged to post information to the EUGRIS website on reports, projects and conference papers relating to the contaminated land experiences of their respective organisations. In addition training on the use of EUGRIS was also offered to SAGTA members.

Summary of Workshop Presentations

The key message in the opening address to the meeting and in the presentation from the regulators was that the strategy for success for the application of remediation technologies must be based on confidence – that is:

- Confidence that the measurements made in the field during characterisation adequately define the contamination problem;
- Confidence that the remediation technology can meet the required remediation objectives, and once applied can be shown through appropriate verification to have met the remediation objections (or confident that the technology will eventually meet the remediation objectives, and that any long term monitoring will reassure rather than alarm);
- Confidence that the remediation technology is understood such that potential environmental impacts can be minimised.

Thus, being confident of success needs to be based on a good understanding of:

- The setting, the contaminants of concern and the conceptual model;
- The remedial technology/solution and that it has addressed the pollutant linkages of concern; and
- The means by which remedial objectives can be shown to have been met – i.e. testing and measurement based on multiple lines of evidence.

Several examples were presented at the meeting where pilot demonstration projects had been carried out as a precursor to developing a full scale remediation plan. This approach:

- (i) Minimises the business risk of applying a technology which may not be applicable and
- (ii) Provides performance data on which to base remediation targets and to develop an appropriate contract strategy.

Although generally considered the preferred way forward, pilot scale trials are not always required. Where pilot scale trials are not used, sufficient relevant information is required not only about the contamination of concern, but also about the ability of the remediation technology to treat the contamination within the context of the site setting. Several technology vendors at the meeting noted that in many cases they were asked to tender for work which had a very tight response time and for which there was inadequate

information from characterisation and investigation studies which was relevant to assessing whether the solutions proposed could meet the remediation objectives in the timeframe required.

As mentioned in the section above on “experiences,” it is important to know the operating windows for technologies. A research project was presented in which an operating window “toolbox” for monitored natural attenuation (MNA) is being developed. The project involves collecting data from sites with contaminant plumes, developing a statistical model to predict the variability of MNA, validating the predictive model, and then using the model to define the operating window for MNA. A plea was made by the presenter to the attendees for further sites for case studies.