

# THE SOIL AND GROUNDWATER TECHNOLOGY ASSOCIATION

## SAGTA REPORT 5 - SAMPLING STRATEGIES

### Introduction

The objectives of the workshop were to review issues relating to site sampling and establish key areas of best practice. Current work, matching site characterisation to modes of sampling and encountered site conditions, was presented and discussed.

1. The decisions required to manage the risks associated with contaminated land need to be based on sound and reliable site investigation data. A sampling strategy is required to achieve high quality, cost-effective management information and minimise the uncertainty inherent in all field data.
2. The design of the sampling strategy for a particular site is important and a conceptual model must be developed before sampling. The model must consolidate the results of the desk study and reconnaissance survey into a set of hypotheses that can be tested quantitatively. The areas of uncertainty within a site should be targeted and uniform coverage avoided to be cost-effective. There is essentially a trade off between cost and uncertainty with field screening techniques allowing comparative testing. Skimping or short-cutting site investigation sampling is a false economy.
3. Software packages, e.g. SITE-ASSESS, are being developed to assist the design of sampling strategies. Such a tool is particularly useful on larger and more complex sites but any system is only as good as input data and these, in turn, are only as good as the understanding and knowledge of those handling them. The potential for widespread use of such software would be improved if further information from trials was available, if it linked well with GIS and if it was developed further to deal with non-radial hotspots and 3-D problems.
4. The purposes of investigative and validation sampling are different. The basis of validation sampling is usually agreed with the regulator beforehand. It may use a combination of approaches based on grids, the original SI and/or visual evidence. It must, however, always be systematic and incorporate a statistical element.
5. A detailed case history showed that the use of a variety of sampling techniques appropriate to local site conditions in a phased investigation was a cost-effective approach.
6. Recent research into the spatial scale of contaminant variation and the geostatistical optimisation of sampling has shown some of the ways in which improved scientific rigour in data analysis can lead to better results than research density of sampling.

## **Feedback from the Syndicate Sessions**

The syndicate discussions identified some advantages and disadvantages of promoting the more widespread use of sampling strategies along with areas where SAGTA could provide input:

### **Advantages of using a site specific sampling strategy**

- increased confidence in the data with an auditable route for comparing different data sets;
- a transparent process which is defensible;
- soft data can be included, with caution, to give cost-effective results;
- when linked with field screening, geophysics and imaging, a sampling strategy has the flexibility to direct investigations into the critical areas.

### **Disadvantages**

- the process is seen as too complex for non-experts;
- the use of statistics is not widely understood which can lead to "black box problems";
- in the short-term the development of a sampling strategy may appear to be costly.

### **Challenges to the widespread use of sampling strategies**

- communication of the complexity of statistics and the need to use them in the correct way;
- promotion and development of more methods of obtaining data on key contaminants;
- encourage consultants, landholders, etc., to develop and use sampling strategies.

### ***Possible areas where SAGTA could lend support or input***

- consultants/Industry workshop;
- evaluation of existing sampling tools;
- development of training packages;
- publicity abstracts.

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