

# THE SOIL AND GROUNDWATER TECHNOLOGY ASSOCIATION

## SAGTA REPORT 22 – COST BENEFIT

The assessment of costs and benefits associated with determining the reasonableness of remedial actions for contaminated land is a part of Part IIA legislation. Since an earlier SAGTA workshop in June 1998, and since the publication of EA Research reports (P279 and P316) more quantitative approaches are emerging.

This SAGTA workshop held on 11<sup>th</sup> June 2003, and hosted by National Grid Transco in Coventry, is an update of the current state-of-play with cost-benefit analysis (CBA). The workshop considered:

- The regulatory framework for soils and groundwater
- Tools and methods, measurement criteria and linkage to risk assessment
- Comparison of different approaches
- Developments of European experiences
- Current guidance
- Role of cost benefit with land portfolios.

### Summary of the Workshop Outputs

Speakers were invited from industry, specialist consultancies and the regulators. Following the presentations, workshop participants debated three themes:

#### 1 Making the CBA Process Transparent

In order to make the CBA process transparent, it should be simple to follow (even though the subject matter may be complex) CBA should consider concepts, principles, stages and watchpoints. Of particular importance is the need to be able to demonstrate confidence in the data used by showing that:

- Source data is reliable and traceable
- Assumptions or uncertainties are identified, documented and communicated
- Data and its use is checked and approved by peer review – particularly monetarised values.

Communication is seen as being the key to the CBA process – specifically in terms of the definition of “benefits” and of reasonableness in terms of ALARP. Where there are disagreements, there needs to be ways of resolving or managing them.

It was noted that CBA should not be the fall back for shortcomings in other parts of contaminated land legislation. This comment was specifically targeted to some of the Soil Guideline Values which are currently being developed, which appear to be overly conservative, thereby potentially making many areas of land “potentially contaminated” and therefore requiring the expense of site specific risk assessment and CBA to justify no remedial action.

#### 2 Developing a Road Map for the Application of CBA

CBA can be used as a tool not only for the assessment of land quality management measures but also for developing policy and legislation. For both types of application the following route is suggested:

- Define the problem/issue- including identification of constraints – regulatory, liabilities, company PR, budgets and stakeholders
- Define the objectives – what is the aim

- Define priority factors – what is important, what are the drivers, what are the roadblocks, what are the commitments to the stakeholders
- Assess the factors in terms of monetarised values
- Appraise the results and carry out a sensitivity analysis
- Report results and make recommendations.

In developing this roadmap, it was identified that there are also lessons to be learned from other parts of the industry (e.g. Control of Major Accident Hazards - COMAH-) and also from other countries.

### **3 Identifying Limitations and Data Gaps**

As a relatively recent development for assessing contaminated land remediation, there are still large data gaps and very little regulatory guidance. Whilst fully quantitative CBA is being carried out in industry, it was recognised that the approach can be expensive and that for some small sites a cheaper more qualitative approach was required.

A set of common needs were identified to support the application of CBA. These were as follows:

- The need for a data source book which monetarises input parameters used in CBA
- CBA Training – approved by industry and the regulators
- The development of a process flow diagram for CBA which links to relevant legislation.

#### ***Areas where SAGTA can contribute***

Areas where SAGTA can make particular contributions to the on-going development and application of CBA were identified as:

- Contributing case history information from application of CBA
- Reviewing any developing regulatory guidance
- Assisting in CBA training by inputting to training packages – particularly with respect to providing industry perspective and case histories.

#### **Summary of Workshop Papers**

Papers presented at the Workshop covered:

- Overview of CBA Methodology
- Experiences of Application
- Legislative Perspective and Regulatory Guidance

#### **Overview of CBA Methodology**

CBA previously was focused on cost but with very little on the benefits – particularly to society as a whole. CBA is about making better decisions about the appropriateness of remediation based on:

- Sound understanding
- Legal aspects
- Environmental sustainability
- Stakeholder views
- Positive economic benefit to a particular business and also to society as a whole.

Contaminated land remediation can be expensive but more recently has been based on “reasonable cost” rather than “excessive cost”. CBA is about being able to demonstrate “reasonableness” whilst still meeting

the requirements of the legislation. Quantitative CBA achieves this by looking at **all the costs** to achieve a particular objective.

Whilst the traditional approach to a financial assessment of remediation is to cost investigation, design, capital cost of remedial equipment, operation and maintenance, monitoring and reporting and internal and external costs, the CBA approach would also embrace aspects such as the cost of liability reduction, avoidance of prosecution and fines, increased property value, improved health and safety and public relations benefit. In addition, external benefits are also included such as ecosystem protection, resource protection, removal of blight and protection of human health. The latter group are expressed in terms of “damage avoidance”.

Assessing the sum of the benefits minus the costs, taking into account time and discount rate produces a value for a particular option. The largest positive value is then the most effective solution. The key to carrying out CBA is to ensure that remedial objectives are clearly defined. Only then should potential solutions be assessed (technology selection) and it is against these solutions that an economic analysis in terms of costs and benefits is carried out. Costs are related to the cost of remediation and the secondary “damages” from the remediation. The benefits should be costed in terms of factors such as increased public access, increase in property value, reduction in blight in the area and protection of particular aspects of the environment.

This analysis should be considered in terms of the full life cycle of a particular area/development and therefore should take into account the long term costs and benefits as well as those in the near term.

### **Case study experiences**

The presentations covered case study experiences: Cost benefit and management of radiological contamination; Risk based remediation of explosive ordnance; and Cost benefit analysis for groundwater contamination.

CBA is being used to varying degrees in the selection of remedial measures. Whilst some companies were using the approach outlined in the “Overview” section above, others were assessing costs and benefits in a more qualitative sense - generally following the BPEO type of approach, or an approach which concentrated on assessing costs to meet risk based remedial objectives without costing the benefits.

In the context of presentations on groundwater, one of the concepts discussed associated with the “benefits” was that of “damage avoidance as a function of time”. The example was of a contaminated groundwater plume which, as it spreads, has the potential to cause damage to a larger number of receptors. Thus, containment of a plume may benefit the surrounding land by reducing the number of receptors affected. Conversely, if the down stream receptor is a river polluted by other sources, then the instigation of the containment system will have no monetary benefit associated with the impact on the river.

### **Legislative Perspective and Regulatory Guidance**

Three presentations addressed: Cost benefit in related regimes; Legislative Perspectives; and Developing a Transparent Cost Benefit Framework.

As well as incorporation into contaminated land legislation, cost benefit analysis is also explicitly or implicitly part of IPPC, COMAH and in the forthcoming Environmental Liability Directive. It was noted that CBA in COMAH in particular was a relatively mature concept with guidelines relating to the value of preventing an accident. COMAH also incorporates the concept of risk and risk assessment. Thus, this approach may be able to be adapted for environmental societal risks.

Research reports have been issued by the EA on the development of a framework and case histories on the use of CBA on contaminated land and groundwater (Reports P278, 279, P2-078/TR and P316). Particular difficulties associated with the application of CBA concern the valuation of health, environmental and social

effects. Approaches considered in the reports were both qualitative and quantitative. The suggested approach in the reports was one of selection of remedial measures in stages as follows:

Screening, qualitative analysis, combined cost-effectiveness and multi-criteria analysis, cost-benefit analysis and a sensitivity analysis.

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For further information on SAGTA please contact the Secretary of the Association Doug Laidler at [douglas.laidler@atkinsglobal.com](mailto:douglas.laidler@atkinsglobal.com) or Tel +44 01372 726140

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