

THE SOIL AND GROUNDWATER TECHNOLOGY ASSOCIATION

SAGTA REPORT 7 - COST BENEFIT ANALYSIS

Introduction

Defining relevant criteria on which to establish costs and benefits for contaminated land remediation remains an emerging area. Various issues for consideration include:

- the present national and international picture and known initiatives;
- available practical tools for addressing the issue of cost benefit analysis;
- uncertainties within the process;
- experiences in other sectors that may be transferable to contaminated land.

The aim of this SAGTA's workshop on 10 June 1998 was to:

- provide SAGTA members with the opportunity to develop better understanding of available frameworks for cost benefit approaches and to share experience in their application;
- share approaches and experience with the Agency and DETR and investigate areas to develop ways forward in concert with the Agency.

Syndicates

Three themes were explored during syndicate sessions. These were as follows:

- the application of available methods on real sites;
- qualitative v. quantitative approaches;
- practicability of application to small sites.

1. The Application of Available Methods on Real Sites

BPEO. BPEO has had little application to contaminated land and there is little guidance on how to use it. The general perception of the BPEO method was that it took too long to converge on a single end-point (the best practicable environmental option). One reason suggested was that practical constraints were not identified early enough in the process. It was thought that the method would be stronger if it was combined with other methodologies.

REC. By definition the REC method only considers three criteria - Risk reduction, Environmental merit and Cost. Like BPEO it was thought that the REC process could be too remote from the problem and that practical constraints may not be taken into account. The method was recognised as being a powerful tool to justify particular remediation options but that stakeholder involvement was not part of the process. It was thought that the process could be more robust by taking into account public and regulatory aspects - perhaps by using a weightings system in the environmental merit assessment.

Cost Benefit Analysis. This was recognised as being too narrow in its scope to consider wider issues such as public acceptability of the option or the full environmental benefit/disbenefit. As a method, it was again thought that practical site constraints may not be considered until a late stage and therefore time may be wasted on analysing options that are impractical.

It was concluded that currently no one method covers all the required elements to derive an optimum remedial solution and that further development of methods/tools is necessary. To be widely used and therefore to gain acceptance and durability, these methods/tools should be generic and the methodology transparent. A tiered approach was considered as the most appropriate, with early consideration of constraints at the coarse screening stage to enable rapid convergence to a solution.

SAGTA Contribution

It was thought that SAGTA could play a role in the development of these methods and tools particularly by relating practical experiences of trials and case studies. A further outcome could be assist in an authoritative best practice document.

2 Qualitative V. Quantitative Approaches

In deriving optimised remedial solutions to contaminated land problems qualitative factors were being considered either implicitly or explicitly. Explicit solutions necessitate quantifying qualitative factors. It was felt that an implicit solution could probably be derived rapidly through a group of “experts” with a broad, but relevant range of experience. A tiered and transparent approach was suggested with public involvement right at the beginning so that their opinions could be seen to be taken into consideration. It was thought that the public might require “educating” to allay wrongly held prejudices about both the contaminants and the remedial solution.

SAGTA Contribution

A SAGTA members’ meeting was proposed where members could candidly discuss successes and failures when involving the public and the regulators in managing contaminated sites. SAGTA members’ experiences could also assist in the development of a best practice document.

3. Practicability of Application to Small Sites

For small sites it was recognised that costs and benefits would to be closely related to “reasonableness” of the remedial solution. As with large sites, a tiered approach was suggested for assessing the remedial measures required. However, with a small site it was recognised that small companies are unlikely to have the resource (money, in-house expertise) to undertake an in-depth assessment of their site. The small site owner was therefore more likely to be dependent on advice from consultants.

SAGTA Contribution

- assemble information from case studies, assessing the viability and robustness of specific processes and carrying out “back evaluation” of completed projects (particularly where the remedial measures have been based on risk management solutions);
- generate and publish technical reviews of best practice;
- link with the EA Research and Development teams and to offer advice and industrial expert opinion on approaches and remedial solutions which may be applicable to small sites;
- assist in best practice document production.

Further Discussion and Summary of Potential Contributions from SAGTA to Cost Benefit Analysis

- contribute a “viewpoint” article to the Environment Agency’s *Talking Action*;
- produce a best practice document which also assesses the “operating window” (eg large site, small site etc) and constraints of the particular methods used;
- SAGTA members to offer assistance to the research bodies by providing an industrial focus on steering committees and by peer reviewing initiatives and reports;
- assist the Environment Agency by providing comment/feedback on Agency guidance documents.

Overview of the Workshop Presentations

1. General Approaches and Issues

From its perspective for assessing costs and benefits in Remediating Contaminated Ground, the Environment Agency is developing generic guidance for their regulators and for local authorities as support to the implementation of Part IIA Section 74E(4). In developing this guidance the Agency will be reviewing various cost-benefit methodologies so that they will be able to assess appropriate level of “reasonableness” for proposed or enforced remedial measures.

An initiative under the NOBIS programme in The Netherlands considers cost effective solutions to remediation, which take into account land use, soil and groundwater quality, and time. Key questions to be addressed include: what soil quality should be achieved; where does the soil quality need to be improved first; is the soil quality improvement a contribution to the environment as a whole; how much does it cost (to achieve the improvement); how much time is available, and what is the optimum balance between remedial option, cost, time and redevelopment of the contaminated site?

2. Specific Methodologies

The REC Approach. The REC approach (Risk, Environmental merit and Cost) is being developed in The Netherlands and will be incorporated into the Dutch Remediation Act. Although multifunctionality remains the strategic objective for remediation in The Netherlands it has been recognised that as an objective for all sites, the cost is too expensive. There has thus been a change by the Dutch to site-specific remediation based on “environmental effectiveness” (as opposed to meeting contaminant-specific clean-up levels). The REC system was developed as a decision support system within this framework.

A UK Industry Approach. Environmental cost-benefit is being developed around the corporate goals of “no damage to the environment” and “eliminating specified emissions to the atmosphere by 2001”. Measuring “benefit” is being considered in a number of ways namely: one type of impact; many types of impact; monetary. A system of weightings is used to evaluate the relative importance of the pollutants to the themes. It was suggested that a problem with this approach is that it might be seen as a “black box” producing a set of numbers - which may then be difficult to justify.

Development of BPEO Methodology for Contaminated Site Management. BPEO is being used to assess remedial options in another industry sector. Although some guidance was available, this was mainly targeted at using BPEO for Integrated Pollution Control. The methodology described is based on identifying a number of stakeholders and assessing their likely response to a number of attributes. The attributes included technical feasibility, cost, regulatory robustness, environmental risk, health risk to the public, health risk to workers, and socio-political issues.

Application of Life Cycle Analysis (LCA). In LCA, multicriteria evaluation with weights is used. These criteria consider cost, resources (including materials recovery, materials diversion, energy recovery), environmental impact (including transport, pollution, potential to cause injury [mortality, serious, minor], disamenity). Sensitivity analysis is used to explore the effects of varying the weights on the options being considered. Although not widely applied to the remediation of contaminated soil a number of problems were identified.

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