Contaminated Land Research Report

A QUALITY APPROACH FOR CONTAMINATED LAND CONSULTANCY

CLR Report No 12

1997
Department of the Environment:
Contaminated Land Research Report

A QUALITY APPROACH
FOR CONTAMINATED
LAND CONSULTANCY

Prepared by the Environmental Industries Commission
in association with the
Laboratory of the Government Chemist

CLR Report No 12
1997
DEPARTMENT OF THE ENVIRONMENT

CONTAMINATED LAND: Identification, assessment and control

A QUALITY APPROACH FOR CONTAMINATED LAND CONSULTANCY

THE ENVIRONMENTAL INDUSTRIES COMMISSION IN ASSOCIATION WITH THE LABORATORY OF THE GOVERNMENT CHEMIST

This report is one of a series of reports financed under the contaminated land research programme of the Department of the Environment. The current series deals with: information needed to assess risks; procedures for categorising and assessing risks; and evaluation and selection of remedial methods.

The purpose of the reports is to provide regulators, developers and other interested parties with authoritative and researched advice on how best to identify and assess the problems contamination can pose and what can be done to tackle them. They cannot, however, address the specific circumstances of each site. Every site is unique. Anyone using the information in a report must, therefore, make appropriate and specific assessments of any particular site or group of sites. Neither the Department nor the authors can accept liability for the use or interpretation of the contents of any report.

General guidance on assessing contaminated land and developing remedial solutions which is complementary to the series is provided by the Construction Industry Research and Information Association (CIRIA).

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FOREWORD

Managing contaminated land in a safe, effective and economic way requires well informed and constructive interaction between a variety of technical, commercial, legal, regulatory and lay organisations.

Environmental consultants often play a key role in this process, providing technical advice to clients on a range of issues including identifying and characterising contaminated land; assessing health and environmental risks; selecting and designing necessary remedial measures; and supervising and monitoring their implementation. In undertaking these activities, environmental consultants are often required to liaise with funding bodies, insurers, regulatory bodies and the local community on behalf of their clients.

The promotion of high quality expertise in the management of contaminated land is a key factor in improving market confidence in such land. Environmental consultants must have up-to-date knowledge of many complex scientific and technical issues as well as an awareness of the developing economic, legal and policy framework, both in the UK and internationally. Inadequate advice can hamper market confidence in the value of land formerly used for industrial and related purposes; frustrate efforts to keep or restore such land to beneficial use; and increase unsustainable development pressures on greenfield sites.

Guidance on good technical practice in this area is already available. Much of this guidance is designed to reduce the technical uncertainty which may be associated with identifying, assessing and, where necessary, dealing with unacceptable health and environmental risks. However, confidence in the process can be impaired by project management deficiencies, for example, if the terms of reference, methodology and expected outputs of contaminated land projects have been poorly defined, managed or reported.

This document addresses the procurement and delivery of contaminated land consultancy services. It describes what consultants should do to avoid the types of problem described above. It identifies the consultant’s responsibilities for quality assurance and control during the life-cycle of projects; and the steps which can be taken to meet key quality requirements. Consultants should use the report to improve the efficiency of their adopted management system.

The structure focuses on the pre-commissioning and post-commissioning stages of all projects with more depth of information given in four Special Topics. An extensive checklist of sources of further information, relevant contact points and other supporting information is given in appendices.
Although the guidance focuses on the responsibilities of environmental consultants, and is intended to be suitable for incorporation into their quality management systems, it may also be useful to clients when seeking, commissioning and applying technical advice from consultants.

The document has been developed by the Environmental Consultants Group (ECG) of the Environmental Industries Commission (formerly the Association of Environmental Consultancies (AEC)) and Laboratory of the Government Chemist. It forms part of the Department of the Environment’s research programme on contaminated land and has been guided by a Steering Group of representative interests.

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INTRODUCTION

1. INTRODUCTION

This report advises environmental consultants on the critical quality assurance and control issues for managing contaminated land projects from initiation through to completion. The quality of contaminated land consultancy relies on the ability of the consultant to:

- provide sound technical advice;
- effectively manage and report consultancy projects within an agreed and transparent framework which has the confidence of all relevant parties.

The technical content of contaminated land consultancy is addressed in a range of published guidance documents. Key examples are listed in Appendix 1.

The report provides a framework for unifying and raising the quality of advice provided on contaminated land. It addresses specifically those aspects of managing contaminated land projects which are essential to delivering appropriate, sufficient, reliable and timely advice. Consultants should use the report to ensure that suitable procedures are applied within their own management systems to satisfy these key quality criteria.

The report focuses on the consultant’s responsibilities for quality while recognising that clients also have an important role to play, particularly in the pre-commissioning phases of selecting and appointing consultants. Clients who wish to understand more clearly what they can expect from consultants may, therefore, find this a useful reference text.

The structure of the report follows the usual sequence of events that take place before and after a typical contaminated land project is commissioned (see Figure 1.1).

During the pre-commissioning phase, the report highlights the steps which the consultant should take to create the right circumstances for delivery of a good quality project. These include:

- understanding and responding appropriately to the client’s requirements and ensuring they are properly reflected in the project brief;
- ensuring that the client has sufficient information available on the capabilities and resources of the consultant to make appropriate selection decisions;
- ensuring that the terms of appointment for a successful commission are clearly defined and that all obligations made under the agreement can be honoured.
During the post-commissioning stage of a project, the consultant carries the main responsibility for the quality of the work carried out. The report highlights actions for the consultant to take so that specified objectives are met and that an auditable record exists of the progress and outcome of a project. These actions focus the consultant on delivering quality services and advice, so that all tangible achievements of a project and not just the final report, encourage confidence in the job done. Issues covered during the post-commissioning phase are:

- internal project management systems, including the development of Standard Operating Procedures based on British Standards and published technical guidance wherever possible;
- selecting and procuring contractors;
- managing and monitoring contractors;
- identifying, documenting and responding to the needs of third parties;
- reporting, documenting and recording the technical output of a project.
**INTRODUCTION**

**Quality Objectives**

Key quality objectives to be addressed before and after commissioning are listed in the box below.

<table>
<thead>
<tr>
<th>QUALITY OBJECTIVES OF THE CONSULTANT DURING PRE-COMMISSIONING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Defining the brief</strong></td>
</tr>
<tr>
<td>- to understand the client’s objectives and rationale for initiating a project</td>
</tr>
<tr>
<td>- to clearly define and agree the project objectives, scope and timescale</td>
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<tr>
<td>- to identify the procedures to be used to assure the technical quality of the output</td>
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<tr>
<td>- to define realistic and attainable project outputs</td>
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<tr>
<td>- to identify all relevant limitations at the outset</td>
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<tr>
<td><strong>Selection</strong></td>
</tr>
<tr>
<td>- to provide clients with sufficient, accurate and relevant information on capabilities</td>
</tr>
<tr>
<td>- to demonstrate that appropriate technical and management skills are available</td>
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<tr>
<td>- to support technical and management skills with appropriate levels of training</td>
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<tr>
<td>- to identify any external resource requirements and the procedures to be used to control the quality of external inputs into the project</td>
</tr>
<tr>
<td><strong>Appointment</strong></td>
</tr>
<tr>
<td>- to ensure a formal appointment agreement is in place before project work commences</td>
</tr>
<tr>
<td>- to define acceptable responsibilities under the agreement</td>
</tr>
<tr>
<td>- to ensure all obligations under the agreement are met</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>QUALITY OBJECTIVES OF THE CONSULTANT DURING POST-COMMISSIONING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project management</strong></td>
</tr>
<tr>
<td>- to identify and brief all members of the project team</td>
</tr>
<tr>
<td>- to identify and make available all necessary resources</td>
</tr>
<tr>
<td>- to establish and follow appropriate lines of communication</td>
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<tr>
<td>- to identify, approve and incorporate into the project all additions and variations to the work</td>
</tr>
<tr>
<td>- to implement regular technical reviews</td>
</tr>
<tr>
<td>- to identify and rectify any deficiencies in the work and ensure similar deficiencies are avoided in the future</td>
</tr>
<tr>
<td><strong>Procuring contractors</strong></td>
</tr>
<tr>
<td>- to ensure ready access to suitably qualified &amp; experienced contractors</td>
</tr>
<tr>
<td>- to ensure appropriate selection and appointment procedures are in place</td>
</tr>
<tr>
<td>- to develop clear project specifications for contract work</td>
</tr>
<tr>
<td>- to ensure all terms and conditions are complied with</td>
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<tr>
<td><strong>Fulfilling third party requirements</strong></td>
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<tr>
<td>- to identify any actual or potential third party involvement at an early stage</td>
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<tr>
<td>- to agree with the client the lines of communication to be followed for third parties</td>
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<tr>
<td>- to keep appropriate records of any formal or informal liaison with third parties</td>
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<tr>
<td>- to ensure all statutory and appropriate third party concerns are identified and addressed during implementation</td>
</tr>
<tr>
<td><strong>Project reports &amp; related documentation</strong></td>
</tr>
<tr>
<td>- to produce clear and concise project reports which properly address the project objectives</td>
</tr>
<tr>
<td>- to ensure project documentation demonstrably satisfies all regulatory or other third party requirements</td>
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<tr>
<td>- to ensure project reports are capable of independent scrutiny</td>
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<tr>
<td>- to ensure proper distribution, use and retention of project reports and related documentation</td>
</tr>
<tr>
<td>- to use all documentation as proof of a systematic quality based approach</td>
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</tbody>
</table>
2. **PRE-COMMISSIONING**

2.1 **THE BRIEF**

2.1.1 **Scope**

This section:

- describes the process of defining the project brief;
- identifies items that should always be included in a project brief; and
- indicates how a consultant should respond to a brief.

At the outset of a contaminated land project, consultants must agree a suitable project brief with the client. The project brief should set out the objectives, scope, proposed methodology and expected outputs of the project. Although it is the client’s responsibility to develop the project brief, in practice consultants are often asked to participate in this process. Before commencing any project work consultants must agree and reach a clear understanding with the client on the content of the project brief.

To do this, consultants need to:

- understand the client’s rationale for initiating the project;
- be clear about the client’s purpose for the output of the project;
- be aware of the way in which the client intends to define the project brief;
- be specific about the type of project involved;
- provide appropriate input into the definition of the project brief;
- review any existing information on reports relevant to defining the brief;
- understand the requirements of any third parties such as lenders, investors or regulatory authorities to ensure their specific requirements are met by the brief;
- highlight any issues (such as technical limitations or working arrangements) which may affect the implementation or output of the project;
- respond with all the information the client needs to commission the project.

2.1.2 **Rationale for Projects**

Consultants must understand the client’s reasons for initiating a project before they can contribute effectively to the development of a project brief.
PRE-COMMISSIONING

Most projects relate to a particular site or group of sites although others require a wider policy or research perspective, relate to legal proceedings or involve professional development and training (see Special Topic 2). The breadth of work required may also be influenced by the needs of third parties (see Section 3.3).

Reasons for initiating contaminated land projects are diverse (see Box below). Typically, site-based projects are driven by one or both of the following:

- commercial pressures (for example to maximise asset values, implement corporate policy, or avoid or minimise potential financial or legal liabilities);

- regulatory pressures (e.g. to satisfy specific requirements under planning and development control, environmental protection or health and safety legislation).

Both are linked to the legal and policy framework on contaminated land and it is essential that consultants keep abreast of key developments. Appendix 2 describes how this can be achieved through reference to the technical literature, attendance at conferences and direct contact with relevant organisations.
TYPICAL REASONS FOR INITIATING SITE-RELATED PROJECTS

- **Development** - to investigate and possibly remediate a site to aid beneficial development.

- **Insurance Purposes** - for example, to quantify the environmental damage following a sudden release of contaminants.

- **Litigation** - for example, to defend a company against allegations of off-site migration of contaminants or attempting to prove that a company is responsible for causing contamination, including provision of expert witness.

- **Policy Development** - to assist organisations in the development of internal policies for the management or disposal of contaminated land.

- **Portfolio Appraisal** - to assess risks at a number of sites and recommend appropriate, and prioritised, actions.

- **Post-Closure Requirement** - to assess the potential impact of a closed waste disposal facility (for example, in relation to the surrender of a Waste Management Licence) or closure of an industrial site.

- **Pre-Disposal Investigation** - to assess the need for, or likely cost of, remedial action prior to offering a site for sale; to define baseline site conditions to inform potential purchasers prior to exchange; to provide information to defend the vendor against future claims.

- **Pre-Planning Investigation** - as part of a planning application to determine whether a site is suitable for a proposed use and to provide an initial remediation design, if necessary.

- **Pre-Purchase Investigation** - to provide some degree of assurance to a purchaser regarding liability and costs for carrying out site remediation.

- **Remediation Design** - to investigate or interpret available data, possibly involving ongoing monitoring, for the purposes of defining a comprehensive remediation strategy.

- **Research and Review** - to review or research policy, technical development, legislation or other issues associated with contaminated land.

- **Risk Management** - to use the risk assessment of actual or potential effects on human health or the environment to develop management plans and procedures for dealing with contamination.

- **Satisfaction of a Planning Condition or Agreement** - to undertake a further site investigation, where an initial survey has been inadequate, or to fulfil groundwater sampling or other monitoring required by a statutory authority.

- **Validation** - to confirm that a remediation strategy has met specified objectives.

- **Valuation Appraisal** - to provide information on the extent of contamination at a site which may then be used by a surveyor when carrying out land/property valuations.

- **Verification or Independent Assessment** - to review previous site reports for their adequacy to meet specified objectives.
2.1.3 Development of the Project Brief

The two extremes for development of a project brief are:

1) The client prepares a set of objectives and invites consultants to submit proposals on how the objectives are to be achieved. The client organisation may identify the objectives internally or in consultation with advisors (e.g. solicitors, surveyors, architects, accountants). In this case, the consultant effectively prepares the project brief in consultation with the client.

2) The client (with or without assistance) prepares a detailed scope of work or Bill of Quantities against which consultants are invited to submit quotations.

A client may seek guidance from a consultant to develop a brief. In so doing a consultant must encourage a client to ensure that the:

- objectives of a project are clearly understood;
- scope of the project is clearly defined;
- expected output of the project is described.

Table 2.1.1 lists the typical objectives, scope, outputs and key issues associated with common types of site-related work. Other generic and research oriented advice is less easy to categorise and consultants therefore have an obligation to be very clear to the client about their methodology and outputs.

Consultants should use their professional experience and judgement to ensure that project briefs reflect the technical demands of the work in hand. However consultants will also be aware that an increasing amount of technical guidance has been published on contaminated land over recent years (see Appendix 1), and that technical standards and specifications are becoming increasingly available for certain elements of the work. Consultants should refer to this material when developing, or responding to, project briefs both as a means of standardising approaches to the work and improving client confidence that work is undertaken according to an accepted standard.
# TABLE 2.1.1: TYPICAL CONTENT OF SITE-RELATED CONTAMINATED LAND PROJECTS

<table>
<thead>
<tr>
<th>TYPE OF PROJECT</th>
<th>PROJECT OBJECTIVES</th>
<th>METHODOLOGY</th>
<th>OUTPUT</th>
<th>KEY ISSUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desk Review &amp; Site Inspection</td>
<td>To identify potential hazards</td>
<td>• Research of publicly available &amp; client held information</td>
<td>• Assessment of environmental setting &amp; site sensitivity</td>
<td>Cannot usually assess actual contamination or need for remediation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interviews with site owners/operators</td>
<td>• Assessment of potential for contamination</td>
<td>Essential pre-requisite of intrusive investigation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Visual observations</td>
<td>• Photographic record</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Information to assist the design of intrusive investigations</td>
<td></td>
</tr>
<tr>
<td>Site Investigation</td>
<td>To provide the data needed to characterise &amp; assess hazards &amp; estimate risks</td>
<td>• Sampling of soil, water, soil gas, vegetation, or other site materials by trial pits, boreholes, grab samples or other methods</td>
<td>• Description of nature, degree and extent of contamination</td>
<td>Vary in nature &amp; level of detail depending on specific objectives</td>
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<td></td>
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<td></td>
<td>May be limited due to access/time constraints</td>
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<td>Staged approach usually essential</td>
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<td></td>
<td></td>
<td>On-going monitoring may be required</td>
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<tr>
<td>Risk Assessment</td>
<td>To identify &amp; assess hazards &amp; risks &amp; establish whether remedial or other management actions are required</td>
<td>• Comparison of observed levels of contamination with published guidelines &amp; standards</td>
<td>• Assessment of the nature, degree &amp; significance of risks</td>
<td>Requires relevant &amp; reliable data</td>
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<tr>
<td></td>
<td></td>
<td>• Use of models to estimate risk</td>
<td>• Evaluation of need for, &amp; possible type of, remedial action</td>
<td>Requires careful selection &amp; use of appropriate guidelines &amp; standards</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Requires full description &amp; evaluation of technical uncertainty</td>
</tr>
<tr>
<td>Selection &amp; Design of Remedial Measures</td>
<td>To select, evaluate &amp; design an appropriate remedial strategy</td>
<td>• Reference to published guidance &amp; previous remediation projects</td>
<td>• Identification of site specific remediation objectives</td>
<td>Requires clear project objectives (to allow safe redevelopment for a specific use; to meet specific requirements of the authorities or future purchasers; to provide maximum flexibility in the use of the site; etc)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Liaison with statutory authorities</td>
<td>• Evaluation of alternative strategies</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Contaminant treatability studies</td>
<td>• Preparation of method statements, specifications, drawings, Health &amp; Safety Plans etc</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Feasibility/pilot studies</td>
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</table>
In whichever capacity a consultant is advising they should ensure the following generic items are included in the project brief:

**ITEMS COMMON TO ANY PROJECT BRIEF**

- Sufficient background information for a full understanding of the context for the project (client's perspective, site location, boundaries, layout, access arrangements etc).
- The objectives that have to be met.
- The proposed approach or methodology.
- The expected form and content of the output (e.g., a report, presentation or workshop).
- Any limitations likely to affect the output or execution of the project.
- The timescale for carrying out the work and submitting a report.
- Contractual issues (see also Section 2.3):
  - who is commissioning the study, and to whom the report is to be addressed/made available;
  - the terms and conditions under which the contract is to be undertaken;
  - assignments or warranties (if any).
- Requirements relating to consultancy experience/track record and accreditation and quality systems.
- The basis for quoting (e.g., lump sum or time and expenses).
- Basis for selection of a consultant (e.g., price, technical competence, quality of submission, follow-up presentation).

Two example briefs are included in Appendix 3.

2.1.4 Responding to a Brief

When responding to the client's brief the consultant should ensure all items in the brief are addressed. Where a client provides insufficient information in the brief, it is the consultant's responsibility to raise this issue with the client and seek clarification.

One area where confusion typically arises is in the use of different terminology to describe a type of project. Two common examples are given below:

- Desk Study (and Site Inspection) can be referred to as "Phase 1 Audit", "Appraisal", "Evaluation", "Stage 1 Review", "Assessment", "Environmental Audit", "Environmental Assessment".
PRE-COMMISSIONING

- Site Investigations may also be termed "Phase 2 Audit", "Intrusive Investigation", "Ground Investigation".

It is the consultant’s responsibility to ensure consistent terminology is used in both developing or responding to a brief and clarifying definitions with the client where these are unclear. Relevant terminology and definitions are provided in the glossary.

Once the objectives, scope, output and terminology for a brief have been clarified the consultant is in a position to effectively respond to the client brief. In so doing the consultant must ensure their response clearly defines work which:

- falls within the scope of the project;
- would be subject to an additional brief;
- would be treated as an extension to the existing brief;
- is being done elsewhere, for example, within the client organisation.

If a consultant is responding to a brief from a new client, the following items should be addressed in the proposal:

ITEMS TO BE INCLUDED IN A PROPOSAL TO A NEW CLIENT

Background information
- Background information about the consultant company.
- Examples of previous relevant experience and projects.

Project-specific information
- An understanding of the client’s objectives.
- Approach to, and methodology for, the project.
- How any third party requirements will be addressed.
- Key staff to be involved in the project and their individual experience.
- Project outputs.
- Limitations which could impact on the consultant’s ability to meet the client’s overall objectives.
- Timescales including response time from instruction and delivery dates for project outputs.
- Costs.
- Terms and conditions of the contract (see Section 2.3).

Where further work is being undertaken for an existing client the provision of background information about the company or relevant experience may not be necessary.
2.1.5 Identifying Limitations

The most common area where misunderstanding or dissatisfaction arises is where the limitations associated with a project are not understood.

Any limitations likely to affect the implementation or output of a project must be clearly identified to the client at the outset. This ensures that clients are able to use the project output for the intended purpose, and their anticipated timescales and budgets are met. It also means that consultants avoid the need to carry out further unplanned and uncosterd work.

These limitations may be technical, administrative or financial. For site-based projects, limitations may relate to:

- physical properties of the site (e.g. restricted access);
- the time available to obtain essential information (e.g. long-term groundwater quality data);
- permissions (e.g. planning permission, abstraction licence).

Financial limitations will apply to all projects, for practical as well as budgetary reasons (e.g. the amount a purchaser is prepared to spend on a site which may never be acquired; the amount a developer can spend remediating a site given the commercial value of the final development). In some cases, the specific requirements of the client may restrict the scope of the works (e.g. where confidentiality requirements prevent direct contact with regulatory authorities thus limiting the consultant's ability to fully assess risks, and potential liabilities). Examples of typical limitations applying to site based work are summarised in Table 2.1.2.

Similar limitations may apply to other types of project. For example, the amount of information or time made available for third party review; the amount of technical or financial data available on the application of novel remediation technologies for research projects; the scope, reliability and availability of documentary material in legal cases, or when preparing evidence as expert witness.
### TABLE 2.1.2: EXAMPLES OF TECHNICAL AND TIME CONSTRAINTS ON SELECTED SITE BASED PROJECTS

<table>
<thead>
<tr>
<th>TYPE OF PROJECT</th>
<th>EXAMPLES OF LIMITATIONS</th>
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</thead>
</table>
| Desk Review & Site Inspection          | - not usually possible to determine (with or without a site inspection) whether contamination is actually present, how severe and widespread it is, or whether it has migrated onto or away from the site (unless the review has been of detailed site investigation reports);  
  - not possible to estimate the need for, extent, or cost of, any remedial action;  
  - not usually possible to include written responses from consultees if review reported within about 10 working days or less. |
| Pre-purchase or Exploratory Site       | - the investigation may take place in parallel with the desk review of published data;  
  - provides an initial assessment of extent of contamination; presence of contamination can be confirmed but absence cannot be demonstrated conclusively;  
  - not possible to obtain accurate estimates of risk;  
  - the views of the regulatory authorities may not be known;  
  - not applicable where comprehensive evaluation of gas or water quality issues is required;  
  - must allow sufficient time for identification of site services and hazardous working conditions. |
| Investigations                         |                                                                                                                                                                                                                         |
| Full or Detailed Site Investigations   | - existence of operational buildings, services etc may restrict access;  
  - time or financial constraints may restrict coverage leading to data gaps or technical uncertainty;  
  - usually require a number of weeks (possibly months where long-term monitoring is required) although fast track analysis or in-situ testing can reduce timescale for some types of investigation. |
KEY REFERENCE SOURCES


National Federation of Housing Associations (NFHA), Contaminated Land: Issues for Housing Associations. NFHA 1995
2.2 SELECTION

2.2.1 Scope

This section:

- briefly describes a quality procedure for selection applicable to both clients and consultants;
- advises consultants on the type of information they should be prepared to offer clients during the selection process.

The selection process prior to appointment is common to clients selecting consultants for contaminated land projects, and to consultants selecting sub-consultants when the consultant is unable to meet all the demands of the project from internal resources. Even when no sub-consultant is needed and the selection of a consultant is the client's perogative, it is in the consultant's interest to understand the process and to respond effectively to the client's requirements for information.

2.2.2 The Selection Process

The key elements of the selection process, and its relationship with other stages of pre-commissioning, are shown as a flow chart in Figure 2.2.1. On large and complex projects all the stages of the process may be required but some elements can be combined or eliminated for simpler projects.

For some complex projects, the consultant may be asked to both define the scope of work and manage its implementation. The main project may then be undertaken by this consultant if no competitive bids are required, or by separately appointed consultants, sub-consultants or contractors. When this route is selected, the client should define the key project requirements. The consultant's role will then be to provide a detailed appraisal, scope, methodology, list of deliverables, programme and budget.
FIGURE 2.2.1: THE SELECTION PROCESS

1. Define Project/Client Requirements
2. Recommendations From Other Organisations?
   - Consult Related Professional Bodies
   - Consult Directories
3. Select Initial List Based Upon Key Skills
4. Prepare outline Brief and Requests for Expressions of Interest/Outline Proposal
5. Mid Tender Interview/Consultations
6. Refine Brief and Request Formal Proposal
7. Final Consultations/Interviews
8. Select Consultant
9. Advice Unsuccessful Applicants
   - Yes
     - SECTION 2.3 Appointment
     - Is a Sub-consultant needed?
       - No
         - Proceed with project
Identifying potential consultants or sub-consultants

There are a large number and wide variety of consultants offering contaminated land services in the United Kingdom. Information on available consultancy services is included as Special Topic 1 at the end of the report. Typical characteristics of the main types of consultancies are given in the following box:

- Specialist consultancies with specific skills appropriate to providing contaminated land advice.
- Consultancies with similar expertise to those above but with additional in-house resources for one or more of the following:
  - Site sampling and testing
  - Specialist technology-based investigation
  - Laboratory analysis
  - Monitoring
  - Remediation.
- Broader organisations (such as technology companies, architects, civil engineers) who have developed specialist divisions dealing with contaminated land.

Clients may have no particular preference for any of the above types of consultancy although not all will be able to offer a single source "package". Consultants offering a single source package on the basis of sub-contracting specialist services, should identify all sub-consultants at the outset and satisfy the client of their ability to specify properly and control the sub-contracted elements of the project. For further advice on the use of contractors see Section 3.2.

The selection of consultants can be complex because there are large variations in the competency of companies offering contaminated land services, many of whom offer extensive services on the basis of only limited resources or experience. There is no single directory of specialist consultancies nor any unified registration scheme which validates their competence.

In practice, many clients use referral as a reliable method of selecting a consultant. Alternatively advice may be sought from related property professionals (e.g. lawyers, chartered surveyors or local authorities). Prominent individuals or organisations may be identified from the published literature, government guidance documents and seminars or from specialist sources, e.g. the Confederation of British Industry, Environmental Industries Commission, Environment Business, Environmental News Data Services and the Institute of Environmental Assessment. Contact details of relevant trade and professional bodies are included in Special Topic 1.
Shortlisting

The purpose of shortlisting and the selection process as a whole, is to identify companies having the ability to undertake a particular project of the required quality.

The rigour of the selection process will relate to the size of the project, whether the commission is for single or multiple projects or a contract term period, and the type of services required. Selection criteria should be identified and specified to guide the selection process (see Section 2.2.3 and Table 2.2.2). Consultants should ensure that they are able to demonstrate to the satisfaction of the client that they can meet these criteria, and that in turn sub-consultants have responded appropriately.

Final selection

The process used finally to select the consultant will depend on the nature and complexity of the project and the design of the brief. Mid-tender interviews can be used to refine the brief and assist in the selection of consultants and sub-consultants. Consultants should use any such opportunity to demonstrate to the client that:

- the correct interpretation has been made of the client's needs and the nature of the work required;

- the consultant has a good current awareness of the commercial issues surrounding contaminated land in the current legal framework;

- there is sufficient evidence to show that a technically competent and reliable service will be provided.

Post selection

All consultants should aim to improve the quality of their service in line with client requirements. Consultants who have been unsuccessful in winning a particular project should seek feedback from clients on the factors which influenced their decision, and amend their procedures accordingly.

2.2.3 Selection Criteria

Key technical skills

The type of skills required by the consultant will depend upon the nature of the project and the scope of work the client wishes to procure. A wide range of skills may have to be employed on
a contaminated land project, not all companies can provide them internally. The ability to provide the necessary skills depends on both the management of the organisation and the expertise of the staff employed. Three categories can be identified (see Table 2.2.1):

1. Skills which a consultant should have available as an internal resource;
2. Skills which a consultant may have available as an internal resource, but if not, should have ready access to through an appropriate approved sub-contractor; and
3. Skills which may be required for particular projects and may be resourced internally or externally.

Consultants must not only demonstrate direct or indirect access to key relevant skills, they must also be able to show that these skills are supported by appropriate experience and training (see Special Topic 2 on Professional Development and Training).

Clearly sub-consultants need not have all the Category 1 skills provided they are operating through a main consultant who does.

**TABLE 2.2.1: KEY SKILLS REQUIRED BY A CONTAMINATED LAND CONSULTANT**

<table>
<thead>
<tr>
<th>CATEGORY 1 - Should be available as an internal resource</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experience</strong></td>
</tr>
<tr>
<td><strong>Multi-Discipline</strong></td>
</tr>
<tr>
<td><strong>Project Management</strong></td>
</tr>
<tr>
<td><strong>Communication Skills</strong></td>
</tr>
<tr>
<td><strong>Legal Issues</strong></td>
</tr>
<tr>
<td><strong>Policy Issues</strong></td>
</tr>
<tr>
<td><strong>Risk Assessment</strong></td>
</tr>
<tr>
<td><strong>Site Sampling</strong></td>
</tr>
</tbody>
</table>
### TABLE 2.2.1: KEY SKILLS REQUIRED BY A CONTAMINATED LAND CONSULTANT (CONTINUED)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry/Geology</td>
<td>Employs fully qualified chemists, geologists and hydrogeologists.</td>
</tr>
<tr>
<td>Health and Safety</td>
<td>Employs members of staff fully cogniscent with all occupational hygiene issues and health and safety legislation.</td>
</tr>
<tr>
<td>Civil Engineering/Remediation</td>
<td>Can demonstrate an understanding of the options for controlling or reducing risks but not necessarily the skills for detailed evaluation and design of treatment technologies.</td>
</tr>
<tr>
<td>Quality Control</td>
<td>Has a quality management system in place to achieve quality objectives for all aspects of the project (this may be third party accredited).</td>
</tr>
<tr>
<td>Training Commitment</td>
<td>Can demonstrate that a training commitment is delivered through an internally or externally resourced policy of continuing professional development (see Special Topic 2).</td>
</tr>
</tbody>
</table>

**CATEGORY 2 - Should be available as an internal resource or by direct access to a sub-contractor**

- Geotechnical Engineering
- Hydrology
- Toxicology
- Waste Science and Waste Management
  - Site Sampling *(On site sampling and testing of soil, soil gas, groundwater, surface water, air and biota)*
- Laboratory Analysis

**CATEGORY 3 - Internally or externally resourced skills which may be required on specific projects**

- Remedial Technologies for Soils and Water
  - Skills to fully evaluate options and develop a preferred remediation strategy.
  - Ability to design particular types of remediation methods
  - Experience in supervision of remediation implementation or in delivery of chosen remediation technology.
- Ecological Assessment
Key management skills

In addition to key technical skills described above, the consultant must be able to demonstrate an ability to manage projects to an acceptable standard. Since there are no tailored standards or specifications in the United Kingdom against which the quality of contaminated land consultancy services can be assessed, it is highly desirable that a consultant operates a quality management system, preferably accredited by third party verification. The principles of a good quality management system are contained in BS-EN-ISO-9001: 1994. Most major consultancy organisations are implementing quality management systems on the basis of these standards.

It should be stressed that the introduction of quality management systems into environmental consultancy is relatively recent and certifying organisations have little experience in the performance of such companies. Additional to the management system, the quality of the product is dependent on the technical procedures employed by the consultancy. Although clearly of benefit, third party certification is no overall guarantee of the quality of output or that it meets the client's needs. Section 3.1 gives more detailed guidance on the management of contaminated land projects.

Company experience

Although there are a large number of new entrants into the contaminated land consultancy market, it is up to any consulting company to demonstrate a reasonable track record of successful, relevant and recent projects. Where projects depend on the specialist expertise of an individual or group of individuals, consultants should be able to demonstrate their availability for the project timescale proposed.

Financial probity

Although technical competence is the most important aspect of contaminated land consultancy, the consultant should offer the client some form of indemnity against future liabilities which arise from professional negligence. Even with small projects, such potential liabilities can be large (in excess of £1 million), but equally a consultant who offers large indemnities out of proportion to the project may imply loose internal management of risk. This may have implications for future availability and scope of insurances such as professional indemnity insurance, which is typically written on an aggregate basis, to underpin the indemnities offered. Special Topic 3 offers further detail on the role of insurance in contaminated land consultancy.

It is therefore essential that the consultant provides evidence on the financial security of the organisation and the level and type of professional indemnity insurance available for the
PRE-COMMISSIONING

project. Note that many underwriters are now excluding 'gradual pollution' from professional indemnity insurance cover. This may render the policy irrelevant to certain contaminated land work. See also Section 2.3 on appointment.

TABLE 2.2.2: CHECKLISTS OF INFORMATION REQUIREMENTS

<table>
<thead>
<tr>
<th>CLIENT'S INFORMATION REQUIREMENTS</th>
<th>RELEVANT RESPONSES BY THE CONSULTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. General</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 Background on general company capability.</td>
<td>Demonstrate a reliable pedigree.</td>
</tr>
<tr>
<td>1.2 Numbers and qualifications of technical staff.</td>
<td>Identify members of staff with appropriate skills who are available to work on the project.</td>
</tr>
<tr>
<td>1.3 Curricula Vitae and availability of key staff to be engaged on project.</td>
<td>Appropriate information on staff experience. Indicate location and availability of staff.</td>
</tr>
<tr>
<td>1.4 Details of Quality Management Systems including: Allocation of Responsibilities Project Management Technical Procedures Technical Review Training Assessment of External Suppliers.</td>
<td>Provide details of any quality management system indicating whether accredited by a third party. Identify the technical procedures to be used. Indicate which staff will undertake technical review. Demonstrate how the quality of the sub-contractors is to be ensured.</td>
</tr>
<tr>
<td>1.5 Management of health and safety</td>
<td>Identify health and safety management procedures.</td>
</tr>
<tr>
<td>1.6 Track record on projects of a similar nature.</td>
<td>Demonstrate experience of undertaking similar projects.</td>
</tr>
<tr>
<td>1.7 Client references</td>
<td>Provide on request.</td>
</tr>
<tr>
<td>1.8 Financial status</td>
<td>Demonstrate financial viability (eg Audited Company Accounts)</td>
</tr>
<tr>
<td>1.9 Details of insurance cover - Third Party Liability - Professional Indemnity Cover (and scope of cover).</td>
<td>Identify insurance carried for Third Party Liability and Professional Indemnity. Identify any limitations and exclusions on the insurance cover and the limits of liability being offered for the project.</td>
</tr>
<tr>
<td>1.10 Membership of trade associations.</td>
<td>Supply relevant information.</td>
</tr>
<tr>
<td>1.11 Compliance with relevant codes of practice.</td>
<td>Supply relevant information.</td>
</tr>
<tr>
<td>CLIENT'S INFORMATION REQUIREMENTS</td>
<td>RELEVANT RESPONSES BY THE CONSULTANT</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>2. Project-specific</td>
<td></td>
</tr>
<tr>
<td>2.1 Technical proposal.</td>
<td>Demonstrate a clear understanding of the brief.</td>
</tr>
<tr>
<td>2.2 Project management plan.</td>
<td>Demonstrate clear project management procedures.</td>
</tr>
<tr>
<td>2.3 Details of any sub-consultants or sub-contractors to be employed.</td>
<td>Indicate where sub-consultants or sub-contractors will be used. Provide relevant information on quality control of third party services.</td>
</tr>
<tr>
<td>2.4 Details of technical procedures to be adopted.</td>
<td>Specify the technical procedures and demonstrate that allocated staff have appropriate experience/ training to undertake them.</td>
</tr>
<tr>
<td>2.5 Reporting.</td>
<td>Detail the data, information and types of advice that will be provided at each stage of the project.</td>
</tr>
<tr>
<td>2.6 Programme.</td>
<td>Provide clear evidence of being able to meet the required timescale.</td>
</tr>
<tr>
<td>2.7 Financial proposal.</td>
<td>Provide a fixed fee, fee rates and a ceiling/budget cost; or an open-ended price.</td>
</tr>
<tr>
<td>2.8 Conditions of Engagement.</td>
<td>Define the responsibilities and liabilities acceptable under the contract.</td>
</tr>
</tbody>
</table>
KEY REFERENCE SOURCES


See also Special Topic 1.
2.3 APPOINTMENT

2.3.1 Scope

This section describes:

- the various forms of agreement;
- what should be contained within an appointment agreement;
- the basis of remuneration for a project;
- possible obligations to third parties.

When consultants are commissioned to undertake contaminated land projects, they should agree with the client the terms and conditions under which the required services will be provided.

An appointment agreement is a contract in which the consultant agrees to provide a (defined) service to the client according to agreed terms of payment. The contractual relationship is such that the consultant can be regarded as a contractor who is providing specific professional services. The agreement must contain, or refer to, a description of the work to be carried out (such as the project brief) and define the responsibilities of both parties. The purpose of the agreement is to avoid misunderstandings, and possible disputes, between the two parties on the extent of their obligations, either during the course of a project or on project completion.

- Where a consultant commissions the services of a sub-consultant, the same client/consultant relationship exists and the same appointment procedures apply.

2.3.2 Responsibilities in the Appointment Process

The appointment process is closely linked to the development of the brief and the selection of the consultant, as described in Sections 2.1 and 2.2.

This section deals only with the details of the appointment process. Both the consultant and the client have actions and responsibilities, as shown below and in more detail in Table 2.3.1. If appropriate it is the consultant’s responsibility to inform the client of the necessary obligations to achieve an effective appointment agreement.
<table>
<thead>
<tr>
<th>STAGE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consultant</strong></td>
<td><strong>Client</strong></td>
</tr>
<tr>
<td>A) Defining the brief (see Section 2.1)</td>
<td>A1 Provide information on any general exclusions or constraints in appointment terms which affect the ability to do the job</td>
</tr>
<tr>
<td>B) Selecting a consultant (see Section 2.2)</td>
<td>B1 Familiarise and establish acceptance of client's proposed terms at the time of providing the proposal or response to the client, with the help of legal and insurance advice as appropriate</td>
</tr>
<tr>
<td></td>
<td>B2 Be in a position to discuss and propose contractual terms to the client</td>
</tr>
<tr>
<td>C) Appointment of a consultant</td>
<td>C1 Establish the acceptability and suitability of the terms for the appointment. Resolve any outstanding issues for example copyright or detailed contractual terms</td>
</tr>
<tr>
<td></td>
<td>C2 Ensure all internal procedures are completed to maintain integrity of professional advice, for example notification of professional indemnity insurers of any agreed departures from &quot;normal&quot; contract conditions or terms of work</td>
</tr>
<tr>
<td>D) Initiate Project</td>
<td>D1 Document initiation of project, whether through meeting minutes, correspondence or a countersigned agreement/contract</td>
</tr>
<tr>
<td></td>
<td>D2 Ensure all project changes are documented and remain consistent with terms of appointment and scope of work for which consultant is competent. Acknowledge any amendments issued by the client in writing</td>
</tr>
</tbody>
</table>

* This role applies to consultants when appointing sub-consultants.
A written agreement between the client and consultant binds both parties to discharge their respective duties and responsibilities, one to the other, in accordance with the terms of that agreement.

- The consultant’s responsibility is to carry out the work described in the brief with due care and skill and within such time and other constraints as may be defined.

- The client’s prime responsibility is to provide the consultant with whatever information is appropriate to carry out the work, and to pay the consultant for the work carried out.

2.3.3 Forms of Agreement

Agreements may be generated in a number of different ways. The four most common mechanisms use:

- the standard terms of business of either the client or consultant;
- standard forms of agreement or model contracts (see Appendix 4);
- terms and conditions defined specifically for the project and prepared on behalf of, or by, the client and presented in the tender documents; or
- an exchange of letters confirming an agreement reached by other means.

In its simplest form, an agreement may consist of a letter in which the consultant offers to provide a specified service to the client for a sum of money. Provided the scope of work is clearly defined and supporting documentation is available (as a minimum some standard terms of work drawn up by either the client or consultant, but agreed by both), this arrangement is suitable for many projects, particularly small ones.

For more complex remediation projects, particularly those which have a significant engineering component, it may be appropriate to use one of a number of standard forms of agreement which have evolved principally in the engineering professions. These forms may be used as they stand, or adapted with care to take account of the environmental aspects of the work. The most commonly used forms (described in Appendix 4) are:

- The Association of Consulting Engineers Conditions of Engagement 1981;
- Federation Internationale des Ingeneur - Conseils (FIDIC);
- International General Rules of Agreement between client and consulting engineer;
• The Institution of Civil Engineers Forms 1994;
• The Institution of Chemical Engineers Form of Agreement.

Ultimately, the most appropriate form of agreement for a given project will depend on the complexity and/or size of the contract and the client's procurement policies. However, there are a number of issues which are common to all agreements. Table 2.3.2 lists these and the rest of this section discusses them in more detail. It may not be necessary to provide for each item listed in Table 2.3.2 in all agreements, but consultants should review each item to decide whether it should be included in the agreement for a particular project.

2.3.4 Items to be Considered for Inclusion in an Agreement

Scope of work

The scope of work covered by the agreement should be clearly defined to avoid any confusion. The project brief will often have provided a suitable description for the agreement (see Section 2.1).

Responsibilities

The consultant should ensure that all responsibilities under the contract are clearly stated. Examples of responsibilities which need to be defined include:

• the content and timing of services to be provided by the consultant to the client;
• the consultant's need for any information to be supplied by the client;
• information to be supplied by the client to the consultant;
• lines of communication, for example with the client or third parties such as regulatory authorities or other consultants (see Section 3.3);
• responsibilities for sub-contracting any elements of the work (see Section 3.2);
• responsibilities for obtaining any necessary consents, approvals, permits or licences, including access to land;
• responsibilities for the health and safety of consultant or client staff while on site;
• responsibilities for locating underground services where intrusive investigation is required.
### TABLE 2.3.2: CHECKLIST OF ITEMS TO BE CONSIDERED FOR INCLUSION IN AN APPOINTMENT AGREEMENT*

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The scope of work</td>
<td>To ensure that both parties understand the scope of work to be covered by the agreement.</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>For clarity of interpretation and for legal and lay understanding of the agreement.</td>
</tr>
<tr>
<td>Responsibilities</td>
<td>To ensure both parties are clear about their responsibilities to each other and to third parties, such as sub-contractors.</td>
</tr>
<tr>
<td>Duration of the Agreement</td>
<td>To define the start date and means for the termination of the agreement prior to its completion.</td>
</tr>
<tr>
<td>Programme and timescales</td>
<td>To ensure the work is completed within the necessary timescale.</td>
</tr>
<tr>
<td>Liability</td>
<td>To ensure the extent of liabilities of both parties is clearly defined and understood (see Special Topic 3).</td>
</tr>
<tr>
<td>Insurance requirements</td>
<td>To ensure that adequate and correct insurance policies are in place and to define the means of verification (see Special Topic 3).</td>
</tr>
<tr>
<td>Disputes</td>
<td>To identify a mutually agreed method of settling disputes should these arise.</td>
</tr>
<tr>
<td>Variations</td>
<td>To allow the effect of changes in the brief made by the client to be recognised by changes in the project programme and the consultant’s remuneration.</td>
</tr>
<tr>
<td>Copyright or Title</td>
<td>To define the ownership of copyright and intellectual property rights during and after the completion of the project.</td>
</tr>
<tr>
<td>Confidentiality</td>
<td>To ensure that the commercial interests of the client are protected.</td>
</tr>
<tr>
<td>Renumeration</td>
<td>To define the terms, means and amount of payments to be made by the client for the work undertaken and expenses incurred by the consultant.</td>
</tr>
<tr>
<td>Other legal responsibilities</td>
<td>To define any other legal responsibilities the client or consultant may wish to include as part of the agreement, such as assignment of a report to other third parties, or responsibilities within a consortium team.</td>
</tr>
</tbody>
</table>

*Note that agreements may also include clauses relating to the specific needs of the project, the site in question, or the nature of the business of the client.
Since 1 April 1995 both clients and consultants have extended responsibilities under the Construction (Design and Management) Regulations. Both parties must ensure that the requirements of these regulations are met. The concept of a "Planning Supervisor" and "Principal Contractor" to be appointed by the client is a new responsibility. Consultants must accept a role in informing clients of their new responsibilities in the period after the introduction of any new regulations.

Programmes and timescales

The project timescale must be clearly defined and the consultant must be able to demonstrate an ability to comply with the client's timescale. This is particularly important where delay may have significant consequences, for example where a site forms part of a property transaction.

The consultant must also agree with the client:

- the circumstances in which agreed timescales may be varied, e.g. in the event that unforeseen circumstances prevent the consultant from proceeding with the work;
- the procedure for agreeing variations;
- any penalties that may be attached to a failure to meet the agreed timescales.

Liability

The appointment agreement should define the extent of liabilities carried by each party. The consultant's liabilities for negligence are normally underpinned by insurance provision, since few consultancies have significant capital assets.

Insurance requirements

Insurance provides financial probity to the obligations carried by the consultant under the terms of the agreement. The consultant must be able to demonstrate that an appropriate level and type of insurance is held.

Consultants typically hold two types of insurance:

- Professional Indemnity - this is insurance which indemnifies consultants for claims made against them for any negligent actions or omissions committed in the undertaking of their services.
• Public Liability - this is insurance which covers the consultant for specified damage or loss caused to third parties as a result of physical actions undertaken by the consultant as part of the project, for example during site investigation or remedial work.

The extent of the cover provided by the insurance must be shown in the terms of the appointment. The role of insurance is discussed further as Special Topic 3.

Dispute resolution mechanisms

The agreement may also include a section, or clauses, which set out a mechanism for the resolution of disputes between the client and consultant should they arise during the course of a project. Such mechanisms generally rely upon the appointment of an independent arbitrator or adjudicator. The arbitrator may be identified at the outset of the project or selected only when required. The arbitrator's decision may or may not be binding. The terms and mechanism for arbitration should be set out in the agreement.

Confidentiality

The consultant should be able to demonstrate an ability to manage confidential information. As part of the agreement, the consultant will usually undertake not to divulge or disclose any information relating to the contract which is regarded as confidential without the agreement of the client. This may be addressed by separate signed confidentiality agreements, in some cases the client will require personal signatures from all members of the project team.

In some cases information which forms part of a contract is already in the public domain; it is the consultant's responsibility to make the client aware of this.

Consultants should also advise clients of any circumstances in which the content of their reports may have to be disclosed in court in any subsequent legal proceedings. In these cases, both client and consultant should have regard to the language used in the report. Where necessary, lawyers should be instructed to discuss and approve the form and wording of the report before it is finalised.

Copyright

This clause is generally necessary to ensure that any report produced by the consultant cannot be misused or taken out of context. It is therefore common to agree that any reports arising from a contract can be used only by the client or other agreed third parties and only
for the intention for which they were prepared. Copyright generally remains with the consultant, who may grant unrestricted reproduction rights to the client.

There may be occasions where a new technique or method is developed during the course of a project which could be commercially exploited outside the work defined in the agreement. In such cases the ownership of intellectual property rights should be specified in a manner similar to that for copyright, to the satisfaction of both parties.

Basis of remuneration

Several different types of arrangement may be agreed for payment of the consultant. These distribute the financial risk associated with the project between the parties in different ways. The most common options are described in Table 2.3.3.

For complex projects, it may be necessary to combine different methods of payment for different phases of the work. For example, a specified number of sites may be subject to a desk study for a lump sum but any site investigation work identified and subsequently carried out may be treated on a time charged or cost plus basis.

Other methods of payment may be agreed which are variations on, or combinations of, these common types. As part of any method of payment it is important the mechanisms for payment of disbursements and sub-contractor costs are clearly defined. The most appropriate method should be selected using criteria agreed by both parties.

Other legal responsibilities

Health and Safety
Both the client and consultant are responsible for the health and safety of their workforce as defined by the Health and Safety at Work Etc Act 1974 and associated regulations. A clause to this effect may be included in the terms of work to ensure both parties comply with their statutory obligations.

The introduction of the Construction (Design and Management) Regulations in April 1995 changed responsibilities for health and safety issues. Under these regulations the client has specific statutory responsibilities. These regulations will apply to some environmental projects - notably where sites believed to be contaminated are to be investigated. The consultant (Designer) has a duty to inform clients of their duties under the regulations.
### TABLE 2.3.3: BASIS OF REMUNERATION

<table>
<thead>
<tr>
<th>BASIS OF REMUNERATION</th>
<th>CONSULTANT</th>
<th>CLIENT*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lump sum</strong> - the consultant undertakes the work for a fixed sum</td>
<td>The responsibility for cost control lies with the consultant</td>
<td>The client knows what the final cost will be</td>
</tr>
<tr>
<td><strong>Suitable for small projects or where the brief is well defined</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time based</strong> - consultant is paid by the hour at rates defined at the tender stage</td>
<td>The consultant has a responsibility to clearly identify and justify the rate of expenditure to the client</td>
<td>The risk lies with the client although by defining budget limits and monitoring expenditure on a regular basis costs can be controlled</td>
</tr>
<tr>
<td><strong>Suitable for phased projects or where it is not possible to define the brief fully at the outset of the project.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fees scale</strong> - generally used in the construction industry where the consultant's fee is a percentage of the value of the construction cost of a project</td>
<td>The consultant has responsibility for cost control</td>
<td>The financial risk is shared by the client and contractor; if construction costs vary from those tendered, clients gain or lose, if consultant’s time increases due to unforeseen circumstances the consultant bears extra costs.</td>
</tr>
<tr>
<td><strong>Not generally appropriate to contaminated land projects. May be relevant for some capital intensive remediation schemes.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost plus basis</strong> - consultant is paid the cost of the work plus a percentage to cover overheads and profit</td>
<td>The way in which the cost is defined will determine how the risk is shared between the two parties</td>
<td>The way in which the cost is defined will determine how the risk is shared between the two parties</td>
</tr>
<tr>
<td><strong>Suitable for longer term projects but often raises difficulties in allocating costs to the work or overheads.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Target cost</strong> - the fee is related to a pre-defined target cost for the project</td>
<td>This method of remuneration puts pressure on the consultant to control costs</td>
<td>The client knows what the final cost will be.</td>
</tr>
<tr>
<td><strong>Not generally suitable for contaminated land projects because objectives are land quality or technical rather than cost driven.</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* This role applies to consultants when appointing sub-consultants.

**Consortium Teams**

Larger projects may be carried out by a consortium team consisting of more than one consultancy organisation and representing a range of different disciplines. In these cases,
the division of responsibility and allocation of liability between the members of the consortium should be clearly defined in the appointment agreement.

The agreement should identify the principal individuals of each member company who are to be allocated to the project, their respective roles and lines of communication. From the client's point of view, it is the consultant's responsibility to organise the consortium so that it can operate in the same way as a single company appointment.

**Assignment of Reports to Third Parties**

In general a consultant's work is provided for the sole use and benefit of the client, and statements to this effect are often included in reports and in other documents produced by consultants. This is to ensure compliance with, and hence applicability of, insurance requirements and to ensure the consultant's liability is restricted to the client alone and does not extend to any third party.

In contaminated land projects involving the purchase or sale of land, either before or after redevelopment and/or remediation, clients may wish to transfer the consultant's liability with the title of the land. Such an extended liability has implications for the consultant's responsibilities and associated insurance provision. The consultant should make these implications clear to the client and identify any associated increase in project costs.

**Warranties**

A warranty is a legal document agreed between the consultant and the client which is additional to the normal terms of a contract. It normally requires the consultant to make a specific commitment or carry a particular responsibility (e.g. over a fixed time period or relating to the use of the consultant's advice). Preferably consultants should ensure that all such undertakings are included in the agreed project terms, but clients may request a warranty where an advantage is perceived from its standing as a separate legal document. All these issues should be addressed and agreed prior to commencement of the project.

Collateral warranties create a specific legal relationship between parties who are not signatories to the principal contract. For example, a sub-consultant in a project has no legal relationship with the client. However, a client can seek to alter this by arranging for all parties to sign a common collateral warranty.

A collateral warranty is only of value, if it has to be called on, if backed by appropriate insurance. In this case, the consultant must demonstrate to the client that appropriate insurance is held which can accommodate the terms of the collateral warranty. If collateral
warranties are proposed it is advisable to use standard published forms, for example those of the British Property Federation, as these are most familiar to insurers and more likely to be insurable. It is important both the client and consultant remain aware of the possible pitfalls of unrealistically onerous warranties and seek specialist advice in their formulation, where appropriate, to ensure the terms of the warranty can be met.

KEY REFERENCE SOURCES


Association of Consulting Engineers. ACE Conditions of Engagement. ACE 1981.


The Construction Industry Research and Information Association (CIRIA). Procedures for the Sale and Transfer of Land which may be affected by Contamination. CIRIA. SP99 1996.
3. POST-COMMISSIONING

3.1 PROJECT MANAGEMENT

3.1.1 Scope

This section:

- describes the purpose, scope and content of a Quality Management Plan as applied to typical contaminated land projects;

- highlights the relationship between the various requirements of the Quality Management Plan and the technical and non-technical outputs of the project.

In the post-commissioning phase, the consultant's responsibility is to manage the project so that it achieves its objectives and produces the required outputs, all in accordance with the agreed terms and conditions.

The broad framework for implementing the project will have been established through the pre-commissioning phases of defining the brief, and the selection and appointment of the consultant. During implementation, the consultant must be prepared to monitor and evaluate progress, and respond effectively to any changes in scope which occur during the course of the project.

Formal Quality Management Plans can assist consultants to control both the technical and management elements of a project during the implementation phase. The material included is designed for incorporation into the management system employed by the consultant to provide quality assurance to the client.

3.1.2 The Quality Management Plan

The Quality Management Plan (QMP) effectively identifies all the technical and management issues which have to be addressed to complete the project to a required standard. It should therefore contain, or make reference to, all the information, instructions and procedures needed to produce:

- the technical outputs of the project (e.g. reports, successful supervision of remediation);
- an auditable record of the progress and outcome of the project (e.g. a set of unique project files).
Four key stages of the project should be addressed:

- project initiation;
- project implementation;
- project review; and
- project completion.

The QMP should be designed to be compatible with the client's quality procedures

3.1.3 Project Initiation

The following issues should be addressed at the project initiation:

- resolve any outstanding contractual issues or ambiguities;
- ensure that appropriate resources are available for implementation;
- check there is full internal understanding of project requirements and working arrangements.

The consultant should confirm the identity of the project manager at this stage. The project manager should be the main point of contact with the client, and with any third parties, and will usually carry the day-to-day responsibility for both the technical and management elements of the project.

The QMP should address the issues listed in Table 3.1.1 at the project initiation stage.

3.1.4 Project Implementation

During implementation, the consultant's objectives should be to ensure that the project is carried out according to known and agreed standards, and that any additions or variations to the terms of reference are identified, approved, documented and incorporated into the project. The QMP should contain or refer to the procedures which the consultant will follow to achieve these objectives.

Standard Operating Procedures

The various tasks to be completed during the course of the project will normally be subject to some form of procedural control, such as a Standard Operating Procedure (SOP) or technical instruction. The typical content of a SOP is set out below.


<table>
<thead>
<tr>
<th>ISSUES</th>
<th>ITEMS TO CHECK</th>
</tr>
</thead>
</table>
| Contractual issues | • The project brief.  
| | • The appointment agreement(s) client/consultant; consultant/sub-consultant; consultant/contractor).  |
| Project resources | • In-house staff.  
| | • External consultants and contractors.  
| | • Equipment (e.g. in-situ gas monitoring, sampling, well construction materials).  
| | • Project timing and programming.  
| | • Technical instructions and supporting documentation (see Section 3.1.4).  |
| Project aims and outputs | • Confirmation of project manager.  
| | • Briefing arrangements for project team.  
| | • Items and outputs subject to review, including checking of calculations and technical review procedures.  |
| Project requirements and working arrangements | • Internal lines of communication(project manager/project team).  
| | • External lines of communication (consultant/client, consultant/sub-consultant and contractors, consultant/third parties).  
| | • Any necessary staff training or support.  
| | • Any confidentiality requirements.  
| | • Third party requirements (e.g. licences, permits).  
| | • Health and safety issues.  
| | • Environmental protection issues.  |
| Management arrangements | • Creation of unique project file.  
| | • Confirmation of key client and other contacts.  
| | • Confidentiality controls.  
| | • Invoicing and similar arrangements.  |
TYPICAL CONTENT OF A STANDARD OPERATING PROCEDURE

- The aim of the procedure.
- Published guidance or similar material used to develop the procedure.
- Action to be undertaken.
- Equipment and materials to be used.
- Personnel responsible for carrying out the procedure.
- Record keeping requirements.
- Methodology for checking.

The SOP is the preferred approach because it ensures:

- particular tasks or activities are carried out to a consistent and known standard;

- transparency in the conduct and output of the work;

- a link exists between the way in which a task is accomplished (e.g. installation of a monitoring well and associated sampling and analysis) and the outcome of that task (the concentration of an organic contaminant in water at known depth). This information is important not only to the consultant, for data interpretation purposes, but also to any subsequent third party analysis of findings.

SOPs can be established for a wide range of activities such as:

For desk-based work:  - review of documentary information;
- data analysis and interpretation;
- design calculations;
- preparation of reports.
For site-based work:
- the development of sampling and analysis strategies;
- calibration of on-site test equipment;
- the design and construction of exploratory excavations and monitoring wells;
- development of health and safety and environmental protection plans;
- the design and construction of remedial works.

SOPs may relate to management aspects, for example:

- management of project files;
- documentation of contact with external parties, e.g. progress meetings, telephone contact;
- control and management of technical outputs e.g. reports, drawings, correspondence.

Management SOPs are likely to fit closely with any company quality management system, reflecting the internal management structure of the consultant’s organisation.

Wherever possible, technical SOPs should make direct use of the technical standards or specifications issued by such bodies as the British Standards Institution, International Standards Organisation, professional institutions and similar bodies. Examples of some relevant standards are listed below.

**EXAMPLES OF STANDARDS RELEVANT TO CONTAMINATED LAND PROJECTS**

- BS 6068 (Various dates) Water Quality, Parts 2, 4, 5 and 6.
- BS 7755 (Various dates) Soil Quality, Parts 1 - 5.

Where directly applicable standards or specifications are not available, consultants should use published guidance on contaminated land to develop a suitable SOP. Appendix 1 lists some of the technical guidance published by a range of authoritative bodies such as the Department of the Environment, Environment Agency and Health and Safety Executive.
Table 3.1.2 lists examples of relevant technical guidance and their applicability in the development of different types of SOP by a consultant.

**TABLE 3.1.2: EXAMPLES OF RELEVANT INFORMATION SOURCES FOR DEVELOPMENT OF STANDARD OPERATING PROCEDURES (SOPs)**

<table>
<thead>
<tr>
<th>ACTIVITIES COVERED BY SOP</th>
<th>SOURCES OF TECHNICAL GUIDANCE</th>
</tr>
</thead>
</table>
| Design and implementation of site investigation projects | - Sampling strategies for contaminated land (DoE, CLR4)  
- Guidance on preliminary site inspection of contaminated land (DoE, CLR2)  
- Documentary research on industrial sites (DoE, CLR3)  
- Framework for assessing the impact of contaminated land on groundwater and surface water (DoE, CLR1)  
- Documentary research on industrial sites (DoE, CLR3)  
- Landfill gas (DoE, Waste Management Papers and CIRIA special publications)  
- Investigation of contaminated land (Scottish Enterprise and Welsh Development Agency)  
- Guidance on health and safety (British Drilling Association and Health and Safety Executive)  
- Site Investigation (CIRIA special publications)  
- Contaminated Land Guideline Values (DoE)  
- Contaminated Land Guidance (ICRCL)  
- Landfill gas (DoE, Waste Management Papers, Building Research Establishment Special Publications Series and CIRIA special publications)  
- Redevelopment (ICE, CIRIA special publications)  
- Guidance on remedial techniques for contaminated land (CIRIA special publications, Building Research Establishment)  
- Landfill gas remediation (Waste Management Papers, Building Research Establishment)  |
| Data Assessment                         |                                                                                                                                                                  |
| Development of technical specification for remediation projects |                                                                                                                                                                  |
| Monitoring                              |                                                                                                                                                                  |
| Health & safety                         |                                                                                                                                                                  |

Note: Full references and details of issuing organisations of general guidance is provided in Appendix 1, and specialist services are described in Appendix 5.
Particular care is required in the development of SOPs for assessing actual or potential health and environmental risks. Special Topic 4 identifies guidelines and standards relevant to soil quality and describes how they should be used for assessment purposes.

It is important to be aware that the technical guidance on contaminated land is being updated on a continuous basis. Consultants should refer to Appendix 2 for advice on keeping abreast of technical developments on contaminated land, and ensure that internal reference and supporting documentation is regularly reviewed and up-dated in line with such developments. Consultants are likely to need a technical library of reference material, with important references controlled under a quality management system to ensure access to the latest version is guaranteed.

All SOPs should be fully documented. Consultants should take particular care to ensure that any SOP based on in-house experience, or proprietary techniques and materials, is described in sufficient detail to satisfy the client, and any potential third party reviewers, of its technical validity.

**Dealing with additions and variations**

Consultants should have identified all reasonably foreseeable additions or variations to the project at the time of defining the brief (see Section 2.1). However, given the complexity of many site-based contaminated land projects, the need for further work may become apparent at any stage during implementation. For example:

- unexpected, more extensive or a different type of contamination may be encountered;

- a remedial system may not perform as well as anticipated;

- the client may instruct the consultant to bring forward, revise or otherwise amend the scope of the work (for example, where a different layout or method of construction is required for reasons unrelated to the contamination);

- project review (see Section 3.1.5 below) may indicate that the project is not progressing as expected.
Consultants must ensure that quality management procedures are available to deal with such eventualities. These should address:

- identifying, justifying and communicating the need for additions and variations (e.g. project review procedures, regular progress meetings with client);

- responsibilities for issuing and approving additions and variations (e.g. at senior management level, at site level);

- means of documenting additions and variations (e.g. correspondence with client, written instructions on site);

- means of recording changes in the project documentation (e.g. amendments to designs, drawings, reports).

It is important that in managing variations any cost implications are made clear to the client, both in the fee sum and in response to cash flow changes.

3.1.5 Project review

The overall purpose of a project review is to check that the project is progressing as expected and whether it will achieve its technical objectives within the agreed terms and conditions. This requires that:

- checks are made to ensure the technical content of the work meets the required standard;

- any output which does not comply with project objectives is identified and removed, revised or repeated;

- the reasons for any non-complying work are identified, and measures are implemented to ensure non-compliance is avoided in the future;

- projects proceed in a timely manner and within an agreed budget.

A major objective of quality management as a whole is to reduce the scope for technical or management defects. However project review should ensure that any such defects are identified internally, before drawing them to the attention of the client or resolving them. Where defects are identified by the client, the consultant has an obligation to respond
effectively and to take whatever measures are necessary to rectify the situation. It is good practice for the consultant to record formally within a quality management system any client identified defects to demonstrate commitment to improving client satisfaction and quality of output.

Consultants may employ a variety of different techniques to monitor and evaluate technical quality and progress depending on the scope and complexity of the project. However quality management procedures should allow for:

- regular internal review of the technical output (e.g. reports, correspondence, drawings, calculations) before they are issued to a client;

- regular internal review of project programme and budget;

- identifying revisions or amendments (e.g. use of draft numbers and dates for reports, drawings);

- identifying, tracking and removing non-conforming work;

- rectifying any internal deficiencies, for example through the use of increased supervision, training and staff support or improved management procedures.

3.1.6 Project completion

At project completion, the consultant should have met all objectives agreed with the client and delivered the services, advice, reports and other outputs required. To demonstrate completion the consultant will have two sets of documentation:

- all documented output of the project;

- project management documentation.

The consultant’s technical output is likely to consist of one or a series of reports, although other types of output may have been specified such as information technology based systems, visual or audiovisual presentation material, e.g. a formal presentation, chairmanship of a meeting, or informal discussions or consultations. Reporting is covered in more detail in Section 3.4.
Project management documentation consists of the material generated by the consultant to demonstrate that the project has been completed to a defined and agreed standard. Project management documentation typically includes:

- the project brief and appointment agreement(s);
- the Quality Management Plan, including reference to all Standard Operating Procedures used;
- all correspondence, minutes of meetings and records of key conversations;
- contemporary work records such as site notebooks, supervision reports or notes in support of expert witness statements where not supplied to the client;
- records of all information supplied by the client or third parties during the project;
- records describing any additions or variations to the work;
- records describing the outcome of internal reviews and checks;
- financial and related information.

The technical reports and project management documentation should provide a comprehensive record of the conduct of the project from initiation to completion. They should be collated and archived in such a way that they are readily identifiable and accessible in the event of any future enquiry.
3.2 PROCUREMENT OF CONTRACTORS

3.2.1 Scope

This section:

- highlights key issues in the selection and appointment of contractors;
- addresses key contractual issues, including the relationship between the consultant's own appointment and that of the contractor;
- identifies typical quality management requirements for contracted services;
- highlights important health and safety requirements.

Consultants may need to procure the services of contractors to complete some types of contaminated land project, such as exploratory or detailed site investigation, remediation contracts, or long-term monitoring. Typical examples (see Appendix 5) include drilling, laboratory analysis, plant hire, waste disposal and land surveying services. For large-scale or complex remediation projects, consultants may be asked by clients to advise on the procurement of civil engineering or specialist remediation contractors, and to supervise their work. In some cases European Community or client based requirements will dictate the methodology used for procurement.

When procuring contractors in the conventional way using a detailed technical specification, the consultant effectively takes the role of the client. Consultants should be aware that for some projects other types of client/consultant/contractor relationships exist, as shown below.

![TYPICAL CLIENT/CONTRACTOR RELATIONSHIPS](image_url)
For the purposes of this section the following definitions apply:

- the consultant is defined as an individual or organisation providing information, advice, design, supervision or management services (see also Special Topic 1);
- the contractor is defined as an individual or organisation providing materials, labour, equipment, testing or implementation to a pre-determined specification (see also Appendix 5).

In practice the distinction between the two is not always clear-cut.

The selection and appointment of contractors follow similar principles to the selection and appointment of consultants (see Sections 2.2 and 2.3).

### 3.2.2 Selecting a Contractor

Potential contractors can be identified through relevant trade associations and professional bodies, or by referral.

Consultants should develop internal criteria to assist in the selection and approval of appropriate contractors and develop systems for reviewing and approving those companies which consistently provide a good quality, technically competent and reliable service.

Selection of a contractor must address any client or third party requirements, eg some investors or insurers may have "approved lists" of contractors or specific criteria a contractor must meet. The size and nature of the contract may be subject to specific procedures such as those set by the European Community for public sector clients.

Suggested criteria for the selection of contractors are given in the following box.
COMMON CRITERIA FOR THE SELECTION OF CONTRACTORS

- Ability to provide appropriately qualified and experienced staff (e.g. as evidenced by CVs, track records, personal recommendation, membership of appropriate trade associations and professional bodies) in the appropriate disciplines, e.g. environmental science; civil, process, structural and geotechnical engineering; drilling; laboratory analysis; land surveying.

- Ability to devote named staff over entire period of contracted service.

- Ability to provide the necessary plant and materials to meet the requirements of the project.

- Experience of similar work and familiarity with, and access to, relevant legislation and Codes of Practice, particularly on health and safety, environmental protection and waste disposal.

- If sub-contractors may be employed, a procedure for demonstrating requisite levels of experience, knowledge and skills in the contaminated land field for sub-contractors.

- Use of appropriate quality management systems and possession of third party accreditation, e.g. for testing procedures.

- Ability to meet timescales (including mobilisation/response time).

- Satisfactory performance in previous commissions for similar work.

- Demonstration of good practice in terms of health and safety, and environmental protection.

- Ability to provide applicable warranties, insurances and other guarantees commensurate with the value and risks of the project, with evidence of payment of premiums and that no exclusion clauses exist that could leave gaps in the cover.

A variety of service specific accreditation and certification schemes apply to potential contaminated land contractors. One important service is that of analytical laboratories, and examples of two schemes relevant to laboratories are described below:

- NAMAS (National Measurements Accreditation Service) accreditation is an important factor in the selection of an analytical laboratory. Consultants should note that NAMAS certifies performance in undertaking published analytical procedures; it does not guarantee that the analytical method used is the most appropriate for a particular application.

- The CONTEST scheme aims to improve the quality of performance at laboratories analysing contaminated soils. This is an inter-laboratory performance testing scheme
for contaminated soils organised by the Laboratory of the Government Chemist (LGC) which aims to improve the reliability of analytical data.

3.2.3 Appointing a Contractor

Before appointing a contractor, the consultant should ensure that all relevant standards, timescales, insurances and other contract requirements specified by the consultant’s appointment agreement with the client can be met by the contractor (see Section 2.3). Particular care should be taken to ensure any warranties/insurances required by the consultant’s contract are not put at risk through a failure to secure similar undertakings from the contractor.

If such arrangements do not appear to be feasible, then the contractor’s appointment may have to be defined separately, for example through direct appointment by the client.

Key issues for the appointment of contractors include:

**CHECKLIST FOR APPOINTMENT OF CONTRACTORS**

- A clear statement of objectives.
- Clear assignment of responsibilities.
- Development of technical specifications and methods for monitoring the quality of the work and rectifying deficiencies.
- Appropriate quality management systems, resources, health and safety provision and insurances.
- Contract documentation with agreed conditions of engagement, basis of payment, procedures for variation and disputes.
- Good communication (both internally and externally).

**Assignment of responsibilities**

Consultants should clearly identify and define their own duties and obligations, and those of the contractor, under the terms of the contract. The following checklist highlights typical issues to be addressed.
EXAMPLES OF CONTRACTUAL ISSUES REQUIRING CLEAR ALLOCATION OF RESPONSIBILITY AND LIABILITY ON CONTAMINATED LAND PROJECTS

- Determining underground service locations.
- Obtaining necessary authorisations and licences.
- The health and safety of all on-site workers.
- Site security and protection of the public, including trespassers.
- Access to all operational areas, e.g. sampling and monitoring locations, excavation and processing areas.
- Waste disposal, effluent discharges and environmental protection.
- Unforeseen conditions (e.g. more contaminated material than expected).
- Re-instatement of trial pits, boreholes, fencing, landscaping and hard cover.
- Vandalism or damage of contractor's plant and installed monitoring equipment.
- Accidental damage to property or injury to third parties.
- Abortive boreholes and non-functioning monitoring and treatment installations.
- Restrictions to site operations - impedance of access and enforced standing time due to client's own operations, limits on equipment that can be used (e.g. intrinsically safe electrical gear and use of petrol engines) and permitted working times.
- Delays - slow provision of approvals, information and payment, project over-runs due to bad weather, plant breakdowns and late delivery.
- Causing spread of contamination during disturbance of contaminated soils, water or sludges, including installation of boreholes.

Work Specification

The consultant should specify all appropriate standards, procedures and any supporting technical guidance which the contractor is expected to follow as part of the contract. Examples include standard laboratory test methods, sampling methods or the operation of remedial plant and equipment. Examples of relevant technical guidance is given in Appendix 1.

Consultants should take particular care in the development, or approval, of specifications for innovative or proprietary remedial techniques. Given the current lack of dedicated technical
specifications for contaminated land work, appropriate clauses may have to be drafted by experienced personnel on a site-specific basis. In this case, technical performance, operational needs and safety requirements should be specified to allow the contractor to implement the work to the required standard. Consultants should also specify any acceptable variations in performance (linked for example to the known or expected variability of feedstocks or ground conditions) and the test methods (e.g. in-situ testing, laboratory analysis) to be used to demonstrate compliance with the specification.

Consultants should set out the action to be taken in the event that specified requirements are not met, for example, where a remedial technique fails to meet specified targets, or boundary air monitoring indicates that dust suppression measures are not effective in reducing ambient dust concentrations to acceptable levels.

Quality management procedures

In appointing a contractor the consultant must ensure that all work undertaken by the contractor accords with appropriate quality management procedures. The quality management procedures must ensure:

- division of responsibilities and lines of communication between the consultant and contractor are clearly defined;
- the project achieves its specified objectives;
- appropriate materials and methods are used;
- monitoring and evaluation of the quality of work is undertaken;
- project progress is adequately recorded;
- appropriate liaison with third parties.

The quality management procedures must ensure the teams of people working on the project are issued with:

- clear statements of authority;
- detailed progress of work;
- reference to method statements;
- relevant Standard Operating Procedures;
- sources of information;
- specifications;
- lines of communication.
Quality management procedures can be collated into a Working Plan used by all the parties involved in the project to deliver a project-based quality system.

Examples of issues to be addressed in quality management procedures for contract work are present in the following box.

### EXAMPLES OF ISSUES TO BE ADDRESSED IN QUALITY MANAGEMENT PROCEDURES FOR CONTRACT WORK

**For Site Investigation Projects**

- Accuracy and calibration of field testing equipment (e.g. gas and water quality monitoring instruments, cone penetrometers, water level dip meters)
- Sampling pattern and density (where not specified by the consultant)
- Adequate recording of field observations (e.g. logging of ground conditions to BS 5930, descriptions of visible contamination, odours and reliability of measurements taken).
- Accurate location and recording of sampling points, measurement of sample depths and ground elevations.
- Adequate measures to prevent cross-contamination of samples.
- Precise labelling of samples, proper preservation, transport and storage.
- Recognised quality assurance procedures for laboratory testing.
- Sample preparation and analytical techniques (e.g. not air drying samples for volatile determinants).
- Applicability of laboratory testing (such as limits of detection appropriate to the data quality objectives for the project).

**For Remediation Projects**

- Methods of working for each component of the work programme (e.g. excavation, processing, health and safety and environmental monitoring)
- Standards to be achieved in each of the activities (e.g. ground bearing capacities, residual chemical concentrations).
- Adequate measures to prevent off-site impacts such as management of groundwater accumulation and control of dust
- Adequate monitoring of off-site impacts to satisfy the regulators and other relevant third parties
- Adequate documentation to fulfil the needs of third parties
**Examples of Issues to be Addressed in Quality Management Procedures for Contract Work (continued)**

**For Site Investigation Projects**

- Adequate measures to monitor and evaluate the quality of work undertaken
- Measures to ensure appropriate materials and methods are used
- Measures to ensure field testing equipment is appropriately calibrated
- Measures to ensure appropriate sampling, preservation and analysis of samples
- Certification that sites have been remediated to an agreed standard
- Methodology for measuring work.
- Methodology for approving work (e.g. validation).
- Methodology for dealing with variations.

**Standard Forms of Contract**

The Institute of Civil Engineers (ICE) Conditions of Contract for Ground Investigation (1983) and the ICE Conditions of Contract 6th Edition (1991) are the most commonly used Standard Forms of Contract for contaminated land projects involving site investigation and remediation, although they have not been prepared specifically for these purposes. Some consultants and clients also have standard terms and conditions of business which are used regularly. If standard forms or terms are used, the consultant should review and modify where necessary all standard clauses to ensure adequate provision for items such as health and safety, environmental protection and waste disposal.

**Remuneration**

The most common form of payment for contracting services is by measurement of the work done against a Bill of Quantities of agreed rates. The Bill of Quantities is only an estimate of the amount of work required and it is essential therefore to have clearly defined procedures for measuring progress, for example metres of ground drilled or volume of material excavated.
Different payment arrangements may apply where contracting services have been procured against a performance specification (e.g. where the outcome itself, rather than the detailed means of achieving it, forms the basis of the contract).

Disputes

The contract documentation should include appropriate procedures for resolving disputes in the event that the work does not proceed to the mutual satisfaction of the parties involved. The ICE conditions of contract contain arbitration procedures which can be invoked if a dispute arises. Once an arbitrator has been appointed, various options for resolving the dispute are available, ranging from meetings and submission of documents to formal hearings in which evidence is given and experts are called by each side.

Insurance/Warranties

Insurance, warranties and risk allocation often involve extensive negotiations. It may be necessary to seek guarantees that the appropriate premiums will continue to be paid and that no exclusion clauses are present that could leave the client exposed (see also Special Topic 3 on insurance).

3.2.4 Health and Safety Issues

Contractors should be supplied with as much information as possible on potential hazards to the health and safety of their workforce at the pricing stage so that appropriate equipment, methods and protective measures can be costed.

Consultants should refer contractors to appropriate sources of guidance on safe working practices for contaminated land, such as:

- guidelines for the safe investigation of landfills and contaminated land produced by the Site Investigation Steering Group of the ICE;

- Health and Safety Executive guidance on the protection of workers and the general public during development of contaminated land. This provides a summary of the potential risks associated with contaminated sites and describes appropriate precautions;

- the guide to safe working practices for contaminated sites currently being prepared by CIRIA.
A contractor may need to engage an occupational hygienist to advise on health risks, work systems, and to assist in training and monitoring. Typical requirements include clear definition of contaminated areas, good standards of hygiene, and provision of appropriate protective clothing, hygiene and first-aid facilities. Control should be exercised over working arrangements in confined spaces, for dust and other emissions, and for the removal of wastes from site. For some sites, health surveillance of workers may be necessary.

Consultants should ensure that contract documents recognise the statutory and contractual responsibilities for health and safety. Thus although responsibility for health and safety passes to the contractor during the construction phase, the consultant carries responsibilities earlier on in the lifecycle of a project to ensure health and safety issues are taken into account.

For construction-related projects, including those involving contaminated land, these general good practice principles are laid down in the Construction (Design and Management) Regulations. The purpose of the Regulations is to ensure that health and safety issues are taken into account throughout the lifetime of a building or construction project starting from conceptual design, through construction, during maintenance and finally to demolition. The Regulations have placed new duties on the Client, Designers, Planning Supervisors, Principal Contractors and Sub-contractors. For the first time construction clients have mandatory actions regarding safety management of their construction projects. This includes the provision of all relevant safety information to the design team and responsibility for appointing a competent Planning Supervisor and Principal Contractor. This function encompasses co-ordination of design activities and the preparation of a health and safety management plan for the project. The Designer is required to ensure that he has given adequate regard to the need to avoid foreseeable risks to health and safety at all stages in the life of the project. This includes hazards during construction, maintenance, operational use and demolition. During the construction phase, responsibility for health and safety on-site passes to the Principal Contractor appointed by the client. The Principal Contractor’s duties include responsibility for the management of health and safety on-site, covering co-ordination of all sub-contractors, site rules, provision of safety training of on-site personnel.

Prior to the start of work, the contractor must be able to provide:

- a written safety plan which defines the various hazards associated with the site and all routine and emergency procedures which are necessary to counter them;

- evidence that all personnel have received appropriate training, equipment and safety instructions;
• evidence that the work will be carried out according to defined health and safety standards and with proper supervision;

• procedures for up-dating the safety plan, for example as information becomes available, or as site conditions change, or incorporating changes in legislation.

The consultant must be aware of all these responsibilities of the contractor and be able to demonstrate to the client that the contractor is fulfilling all obligations.
KEY REFERENCE SOURCES


3.3 THIRD PARTIES

3.3.1 Scope

This section:

- introduces the principal third party organisations and their main areas of involvement;
- advises on the management of third party requirements in the context of typical contaminated land projects.

A number of organisations outside the main client/consultant relationship may have an interest in the conduct and outcome of a contaminated land project. Examples of “third party” organisations include regulatory bodies, financiers, insurers, other professional advisors and the local community. For site-based projects, liaison with third parties may be discretionary, or relate to specific legal permissions or approvals. Even projects which are not site-based may oblige the consultant to take third party views into account, for example where the consultant’s work is to be subject to peer review.

Consultants should have identified the possible involvement and requirements of third parties during the pre-commissioning phase of the project. Failure to anticipate and accommodate third party requirements can lead to a number of undesirable consequences including:

- non-compliance with statutory or other requirements leading to delays, additional unplanned work or more severe legal penalties;
- inability to obtain finance or insurance because the specific requirements of funding bodies or insurers have not been taken into account;
- local opposition to a scheme (which, in turn, may influence the response of a local authority) because inadequate or inappropriate information has been issued.

3.3.2 Who are the Third Parties and How Do They Interact?

Figure 3.3.1 shows the principal parties likely to be involved in contaminated land projects. The following box summarises their roles.
MAIN PARTIES

Site Owner and/or Developer

Typically the "client" for site-based projects involving investigation, assessment and/or remediation for the purposes of:

- redevelopment;
- divestment;
- reviewing/limiting potential environmental liabilities; and/or
- responding to regulatory pressures.

Consultant

Organisation providing advice to the client on contaminated land issues. Note that the consultant may have a counterpart in one or more of the third party organisations, e.g. a consultant acting on behalf of a potential purchaser, funding body or the regulatory authority.

THIRD PARTIES

Regulatory Authorities

The overall responsibility of the regulatory authorities is to ensure that all relevant statutory requirements are met and that potential risks to public health and the environment are reduced to acceptable levels.

Investor

The investor may be financing all or part of the project, e.g. investigation or remediation works, or future redevelopment or purchase. The investor will be looking for a return on investment, for example through successful redevelopment or sale of a site. In the case of acquisition, the investor's interest will be to ensure that there are no residual liabilities which have not been accounted for in the offer of investment, or in the site valuation, which could impact on the collateral/security value of the site.

Insurer

Insurers may be involved by virtue of the policies held by any of the parties involved in the project, including the consultant or contractor. Alternatively insurance may be related directly to the site, for example environmental impairment insurance. In the case of the former the insurer is interested in ensuring that the consultant or client does not enter into contractual obligations which cannot be honoured by the insurance held. In the case of the latter the insurer's intent is to ensure potential liabilities are properly defined, quantified and minimised so that appropriate policies can be written and premium set.

Further detail on the role of insurance is provided as Special Topic 3.
Legal Advisor

Legal advisors may act on behalf of the client or third parties. The lawyer’s remit is to serve client’s interests by defining legal responsibilities and rights, and identifying potential liabilities. Lawyers may be involved at a number of stages in a contaminated land project, including:

- assisting site owners to establish the likelihood that potential liabilities will be realised;
- drawing up contract documentation between a client and their consultants or contractors;
- formulation of documentation for a contract, legal agreement or sale connected with a land transaction, development agreement, planning permission or joint venture;
- litigation against a third party.

Purchaser

Purchasers are increasingly being advised by their legal advisors or financiers to assess all potential environmental liabilities that may be associated with a site before completing an acquisition.

Local Community

Members of the local community may have a personal and financial interest in the conduct and outcome of a contaminated land project in terms of possible impacts on their health and property. Consultation with the local community may be of overall positive benefit to a project when handled with care, especially where a site is in a particularly sensitive location or is contentious for other reasons.
FIGURE 3.3.1: THIRD PARTIES

REGULATORY AUTHORITIES

CONSULTANT

*Site Owner

Developer

Investor

Insurer

Legal Advisor

* This may include tenants or leaseholders

Acquirer

Legal Advisor

Investor

Insurer

LOCAL COMMUNITY

Contractors

Investor

Insurer

Legal Advisor
The procedures used by consultants to ensure appropriate consultation with third parties will vary depending on the nature, scale and complexity of the project. With the exception of the regulatory authorities, where there may be a statutory obligation to meet specific requirements, it may not be possible to satisfy fully all third party concerns at all times. However, the consultant should demonstrate that reasonable concerns have been identified and that appropriate action has been taken to address such concerns. In some cases, this may be achieved simply by improving third party understanding of the issues involved, and the objectives and scope of a particular project. In the case of regulatory requirements, consultants should maintain a detailed record of the consultation process and resulting conclusions and agreements.

In all cases the consultant should reach agreement with the client on the role and profile that the consultant should have in the consultation process, to ensure consistency and clarity in the relationship with consultees.

3.3.3 Regulatory Authorities

The need for consultation

Figure 3.3.2 shows the main circumstances during the investigation and remediation of a contaminated site in which consultation with the regulatory authorities may be required. The principal responsibilities of the main relevant regulatory authorities are summarised in Appendix 6. Note that the Environment Act 1995 created two unified Environment Agencies in England and Wales, and in Scotland. These Agencies play the most significant role with respect to environmental regulation.

The flow chart and supporting information is intended to prompt formal consultation with the relevant regulatory authority where this is likely to be necessary. It is the responsibility of the consultant to identify to the client circumstances where consultation is a statutory obligation to ensure that neither the client nor consultant commit a criminal offence. Where statutory obligations are less clear, and for projects of any significant scale or duration, consultants should liaise informally with the regulatory authorities. This gives the authorities an opportunity to comment on proposals if they so wish, and ensures that any potential statutory requirements are not overlooked.
FIGURE 3.3.2: WHEN TO CONSULT REGULATORY AUTHORITIES IN ENGLAND AND WALES

Stage | Activity | Regulatory Authority
--- | --- | ---
Desk Study | Background information for the site should be obtained from all relevant regulatory authorities | Consult the Environment Agency
Site Investigation | Undertaking the site investigation could impact on ground or surface water quality | Consult the Environmental Health Department
Site investigation will last longer than 28 days or is in a sensitive location | Consult Planning Authority
Development of Remediation Strategy | There will be a potential for discharge to ground or surface water | Advise the Environment Agency and if needed negotiate discharge consent
Activities may threaten the quality of ground or surface waters | Consult the Environment Agency
Remediation will involve treatment, storage or disposal of controlled waste | Consult Environment Agency
Activities will impact on the general public through increased generation of traffic, noise, dust or visual intrusion | Consult the Environmental Health Department and Planning Authority
There are special requirements for worker health and safety | Consult Health & Safety Executive
Activities will involve a change of material use of the site | Consult the Planning Authority and obtain any necessary permissions
The remediation method is process-based and may therefore be subject to operational consents | Consult the Environment Agency and the Local Authority
Implementation of Remediation scheme | During implementation of the remediation scheme it must be ensured that all the requirements of the above third parties are met where appropriate. Consideration should be given as to whether an independent audit of activities should be undertaken |  
Post Remediation | There may be requirements to supply monitoring data to some authorities. All authorities involved should be informed of the completion of on-site activities.

*In Scotland, the Scottish Environmental Protection Agency should be consulted, as appropriate, as should the Department of the Environment (NI) in Northern Ireland.
Quality Management Procedures for Consultation with Regulatory Authorities

Consultants should develop and implement quality management procedures for any contaminated land projects involving the regulatory authorities to ensure:

- any potential administrative (e.g. formal application for approval) and technical (e.g. monitoring) requirements are identified at an early stage;
- the client can demonstrate to the satisfaction of interested third parties, such as financiers or developers, that the project was conducted in accordance with the requirements of the regulatory authorities.

The main elements of such procedures are listed below.

QUALITY PROCEDURE FOR CONSULTATION WITH REGULATORY AUTHORITIES

- Identify the relevant regulatory authorities to be consulted at each stage of the project.
- Obtain the client’s agreement that the regulatory authorities can be contacted, and establish the lines of communication to be used.
- Contact the regulatory authorities as early in the project as is practical.
- Where necessary make formal applications for approval.
- Provide details of proposals to the regulatory authorities in writing.
- Wherever possible, obtain a written response from the relevant regulatory authority.
- Keep detailed records of all consultations, including meeting notes and telephone conversations.
- Record and keep the conclusions and agreements from the consultation process.
- Where requested, supply the appropriate regulatory authority with copies of monitoring data or analytical results.
- Inform the relevant authority without delay where unforeseen changes in circumstances occur during a project.
- Ensure that on completion of a project obligations to the regulatory authorities, such as collection or supply of on-going monitoring data, continue to be met, particularly in instances where site ownership may change.
- Inform the regulatory authority when on-site activities are complete.

The work undertaken in a client-consultant relationship is confidential to that contract. Disclosure of information to third parties must therefore be agreed as part of the contract.
3.3.4 Other third parties

The need for consultation with key third party professionals

Key third party professions likely to have an interest in site-based contaminated land projects include financiers, insurers, developers and lawyers. They may be appointed by the client to provide complementary advice to that of the consultant, or be subsequent users of the output of the project through, for example, assignment of reports. These parties may perceive the risk associated with contaminated land primarily in commercial, financial or legal terms. Although each may have slightly different specific needs, they are all ultimately interested in minimising the potential health and environmental risks associated with a site and fully understanding the extent of any associated residual liabilities.

In general, the requirements of these groups will be met where a consultant provides reliable, good quality information and can demonstrate that the project has been carried out according to current technical and quality management standards.

WHAT ARE KEY THIRD PARTY PROFESSIONALS LOOKING FOR?

- Minimal residual health and environmental risks.
- Evidence that all reasonable measures have been taken to identify and manage contamination-related risks.
- Evidence that work has been completed to the necessary professional, technical and quality standards.
- Evidence that work has satisfied the requirements of the relevant regulatory authorities and meets current regulatory standards.
- Clear documentation in support of the above.

The need for consultation with the local community

The appropriate level of local community involvement will vary depending on site-specific circumstances. Circumstances where local community consultation may be appropriate include:

- where the nature of the contamination (e.g. asbestos) is likely to give rise to particular concerns;
- where the level of community awareness of the issues is particularly high; or
where contamination could have significant financial, as well as personal, implications, eg gas migrating towards houses.

There are no legal requirements to inform the community of site-based works unless they are subject to a planning application. In these cases, the proposed works will be made public without the control of the applicant and it may be considered appropriate to plan for this in anticipation of likely public reaction.

Beyond this, any liaison with the community will be undertaken by site owners at their discretion. It is important to recognise, however, that where clear information on potential risks is effectively communicated, there is less likely to be fear and resistance from the local community. Examples of how the public might be informed include:

- public meetings;
- leaflets or letters to immediate neighbours;
- closed meetings with representatives of the local community, such as the Parish Council;
- exhibition; or
- conducted site visits.

If environmental interest groups have taken an active interest in a site it may be appropriate to involve them in the consultation exercise.

With the exception of major schemes, a simple leaflet or letter to the immediate local residents may be sufficient. However, consultants should determine the most appropriate approach on a site-specific basis, and be prepared to review and revise this approach as necessary. The reaction of the public will usually be of particular concern to the local Environmental Health Department, which should be consulted to gauge the likely nature and degree of public interest.

Consultants should not communicate with the media unless this has been agreed and/or requested by the client.

**Quality management procedures for consultation with other third parties**

Consultants should develop and adopt quality management procedures for consultation with other third parties to ensure:

- any specific requirements are identified at the earliest possible opportunity - specific requirements may include:
  - use of special quality procedures
- independent reviews on completion or during the course of the project
- involvement of only approved individual consultants
- specific requirements for reporting or project documentation

• other key parties have confidence in the technical and management measures used to deal with contamination.

In some cases, key third parties will be identified at the start, or during the project, in which case they will be available for consultation. In other cases, third parties will only become involved in a project at a later date, for example, as funders or insurers. In these cases they will often subject a project to independent review.

The quality management procedures for consultation with other third parties should provide for the following main elements:

QUALITY PROCEDURES FOR FULFILLING THE NEEDS OF OTHER THIRD PARTIES

In consultation with the client, identify all known or anticipated third parties with an actual or potential interest in the project.

Agree with the client, the addressee or beneficiary of the work to be carried out where third parties, such as financiers, have a particular interest in a site.

Agree with the client, which and when third parties may be consulted, and the level of information disclosure.

Consult third parties which can be identified at the start of a project and determine any special requirements.

Agree a policy for how identified third parties will be kept informed throughout the project.

Ensure that clear lines of communication are agreed to avoid confusion or misunderstandings.

Agree the format of documentation to be supplied to third parties.

Present information for non-technical audiences in a readily accessible form with clear definition of the key issues supported by a non-technical executive summary.

Agree the level and type of community involvement at an early stage.

Ensure all project members are clearly briefed as to how to respond to queries from the local community for example during execution of site work.

Document and undertake all projects to a standard which will allow independent scrutiny.

The work undertaken in a client-consultant relationship is confidential to that contract. Disclosure of information to third parties must therefore be agreed as part of the contract.
KEY REFERENCE SOURCES

Department of the Environment (DoE) Planning Policy Guidance: Planning and Pollution Control PPG23. HMSO 1994.


Construction Industry Research and Information Association (CIRIA). Procedures for the Sale and Transfer of Land which may be affected by Contamination. CIRIA SP99 1996.

3.4 REPORTING

3.4.1 Scope

This section:

- identifies the type of project reports and related documentation produced by consultants during or on completion of contaminated land projects;
- describes the key features of good quality reports;
- discusses the use and retention of project reports.

Project reports and related documentation consist of the written material produced by the consultant during contaminated land projects or on their completion. Project reports are distinguished from the internal project management documentation generated by the consultant to manage and record the progress of a project (see Section 3.1). However, they may be produced as a direct consequence of such documentation, for example where a Standard Operating Procedure requires the preparation of a health and safety or environmental protection plan.

Project reports are critically important because they:

- usually contain the main output of the consultant’s work, e.g. consultancy advice in the form of project findings, conclusions, recommendations;

- record the work carried out and the methods, data, calculations, interpretations and judgements used by the consultant to arrive at project conclusions and recommendations;

- provide a mechanism for demonstrating to third parties, such as regulators or potential purchasers, that work is to an agreed and acceptable standard;

- provide a historical record of the work that can be independently assessed at any time in the future.

The main benefits of good quality project reporting to the consultant are listed below.
**BENEFITS OF GOOD QUALITY REPORTING**

- Facilitates effective management of all technical aspects of the project.
- Provides an auditable record of all procedures, calculations, communications, results, data and supervisory work.
- Provides evidence of compliance with regulatory requirements including those covering health and safety and environmental protection.
- Facilitates internal and external peer review of work.

Project reports may be the only material output of a project to which the client, and potential third parties, may have direct access. Therefore consultants must ensure that project reports are clear, relevant to the project objectives, technically sound and capable of independent scrutiny. Equally the consultant must keep focused on all the objectives of a project, and not just on production of a good report. For example, the success of site remediation may lie in diligent supervision and timely advice, not in the description of work carried out.

### 3.4.2 Documents Relating to Statutory Requirements or Obligations

**The health and safety plan**

All parties (the consultant, client and contractor) involved in site-based contaminated land projects must ensure that appropriate health and safety procedures are followed during the execution of work.

Health and safety requirements are specified under a number of statutes, principally:

- The Health and Safety at Work etc. Act, 1974;
- The Management of Health and Safety at Work Regulations, 1992;
- The Control of Substances Hazardous to Health Regulations, 1994;

To meet these requirements, a health and safety plan must be prepared which identifies the health and safety co-ordinator, provides details of the potential hazards (activities and substances) which may be encountered on a site, the procedures to be followed to protect employees and others potentially at risk, and the responsibilities of individuals.
TYPICAL CONTENTS OF A HEALTH AND SAFETY PLAN

- Who has responsibility to follow the requirements of the plan.
- Hazard details including hazardous activities and substances.
- Procedures to monitor hazards.
- Procedures to be employed to minimise the hazards.
- Protective equipment for work procedures with any residual hazard.
- Details of training to be undertaken.
- Responsibilities for documentation (usually the Health and Safety Co-ordinator).
- Emergency response procedures.

The environmental protection plan

Where site-based projects could adversely affect the environment, the consultant must ensure that appropriate measures are in place to mitigate and/or monitor the hazards. Typical measures include:

- the control of contaminant migration, e.g. surface water drainage, controls over groundwater movements, temporary covering systems;
- odour and dust minimisation and monitoring;
- controlled handling, storage and disposal of waste arisings.

Control measures must be established prior to site works and effectively communicated to the project team. This may be achieved by drawing up an environmental protection plan.

Licences and permits

Consultants must obtain all licences or permits necessary to complete specific types of site-based project. It is the consultant's responsibility to:

- ensure any requirements for licences or permits are identified;
- establish who should apply for the relevant licence or permit;
- where a client is responsible for a licence or permit, explain any implications, such as continuing monitoring obligations particularly on the release or sale of the land.
Examples of key documents, permits and licences which may need to be obtained as part of site-based contaminated land projects are listed in the box below.

<table>
<thead>
<tr>
<th>Permit/Licence</th>
<th>Controlling Regulation</th>
<th>Issuing Authority*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permission to enter</td>
<td>Varies</td>
<td>Site owner</td>
</tr>
<tr>
<td>Permit to work</td>
<td>Company policy</td>
<td>Site owner or occupier</td>
</tr>
<tr>
<td>Service clearance</td>
<td>Company policy</td>
<td>Utility, owner or occupier</td>
</tr>
<tr>
<td>Discharge consent to discharge red list substances to sewer</td>
<td>The Water Industry Act (1991)</td>
<td>Sewerage undertake/Environment Agency</td>
</tr>
<tr>
<td>Waste carrier registration certificates</td>
<td>Environmental Protection (Duty of Care) Regulations (1992)</td>
<td>Environmental Agency</td>
</tr>
<tr>
<td>Planning permission, for example a waste management operation which may require an environmental statement</td>
<td>Special Waste Regulations (1996)</td>
<td>Planning Authority following appropriate consultation</td>
</tr>
<tr>
<td>A waste management licence for some forms of on-site treatment</td>
<td>Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations 1991</td>
<td></td>
</tr>
<tr>
<td>Licensed asbestos removal contractor records</td>
<td>Town and Country Planning Act (1990)</td>
<td></td>
</tr>
<tr>
<td>Authorisation of a Part A process (on-site thermal treatment only)</td>
<td>Town and Country Planning (Assessment of Environmental Effects) Regulations 1988</td>
<td></td>
</tr>
<tr>
<td>Water abstraction licence</td>
<td>Environmental Protection Act (1990)</td>
<td>Environment Agency (also requires valid planning permission)</td>
</tr>
<tr>
<td></td>
<td>Waste Management Licensing Regulations (1994)</td>
<td>Health and Safety Executive</td>
</tr>
<tr>
<td></td>
<td>Asbestos Regulations (1983)</td>
<td>Environment Agency</td>
</tr>
<tr>
<td></td>
<td>Environmental Protection Act (1990)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water Resources Act 1991</td>
<td>Environment Agency</td>
</tr>
</tbody>
</table>

Note: *Legislation and the issuing authority may differ in Scotland and Northern Ireland.
3.4.3 Project Reports

Project reports contain the written output of the consultant's work. The number and type of reports produced by the consultant may vary depending on the scope and purpose of the project. These include expert witness statements, policy advice, training material and public information, as well as conventional project reports. Figure 3.4.1 describes the range of reports which may be produced during the course of a typical site-based contaminated land project.

The report content may be interpretative (where the consultant uses professional judgement to draw conclusions from the results of the work and provides advice) or factual (where the reader is left to interpret the data). Clients may require reports containing only factual information for submission to third parties, such as potential buyers or regulatory authorities.

However, all project reports should contain or refer to:

- the terms of reference for the project;
- all relevant background or contextual information;
- the general approach adopted for specific types or parts of the work;
- the actual methods used to complete particular activities or tasks.

Much of this information should already be available in the form of the project brief, and relevant Standard Operating Procedures or technical instructions.

The rationale for the project and the basis of any decisions or judgements made by the consultant should be easily understood from any project reports. Project reports should therefore:

- address the client's specific objectives and concerns;
- succinctly explain the decision-making process;
- identify any uncertainty or limitations associated with the report content;
- identify the need for any further work;
- justify all conclusions and recommendations.

The style of a report should also be appropriate to the anticipated readership. In preparing the report the consultant should consider the background, experience, perspective and, where appropriate, nationality of the intended readership. The written style should be clear, concise and free from jargon.
# FIGURE 3.4.1: REPORTING DURING SITE AND BASED PROJECTS

<table>
<thead>
<tr>
<th>PROJECT STAGE</th>
<th>TYPICAL REPORTS/ DOCUMENTS</th>
<th>CONTENT CHECKLIST FOR KEY REPORTS</th>
</tr>
</thead>
</table>
| PROJECT INITIATION | • Consultants Brief  
• Quality Management Plan | Preliminary Investigation Reports  
• Purpose and aims of investigation  
• Description of site setting - topography, geology, hydrogeology, hydrology  
• Historical review  
• Sources of information  
• Assessment of hazards and liabilities  
• Conclusions and recommendations for site investigation |
| PRELIMINARY INVESTIGATION/ DESK STUDY | • Preliminary Investigation Report | Site Investigation/Risk Assessment/Remedial Option Reports  
• Purpose and aims  
• Summary of available site information  
• Site investigation methodology  
• Works completed  
• Results/findings of work - geology, hydrogeology, soil contamination, groundwater contamination, surface water contamination  
• Hazard assessment  
• Risk evaluation - human health, plants, animals, aquatic species, financial, commercial, regulatory, social  
• Technical and financial appraisal of remedial options  
• Identification and financial appraisal of options  
• Identification of need for additional investigation  
• Detailed appraisal of recommended remedial approach |
| SITE INVESTIGATION | • Investigation Tenders Such as Drilling Laboratories  
• Factual Site Investigation Report  
• Health & Safety Plan  
• Environmental Protection Plan | Tender for Remedial Work  
• Scheme description and objectives  
• Contamination assessment  
• General and specific contract conditions - regulatory requirements, health and safety  
• Bills of quantities  
• Design drawings  
• Detailed specifications |
| RISK ASSESSMENT | • Risk Assessment Report | Contract Progress Reports  
• Progress over period against schedule  
• Expenditure over period against budget  
• Results of environmental monitoring against environmental standards and interpretation as a measure of remediation progress  
• Identification of potential delays/problems  
• Identification of financial, regulatory and social risks  
• Identification of requirement to modify remediation works |
| ASSESSMENT OF REMEDIAL OPTIONS | • Remedial Options Report | Post Remediation Report  
• Description of works actually undertaken  
• Documentation of deviation from initially proposed scope of works  
• Description of actual programme and methodology  
• Results of environmental monitoring  
• Legislative compliance during works, problems and issues  
• Validation sampling to confirm satisfactory completion of remedial works  
• Health and safety issues arising during the site work |
| REMEDIAL DESIGN | • Tender Documentation  
• Design Drawings  
• Health & Safety Plan  
• Environmental Protection Plan | Environmental Monitoring Reports  
• Purpose, aims and results of ongoing monitoring  
• Interpretation of results  
• Assessment of compliance  
• Requirement for further monitoring/remedial works |
| REMEDIATION | • Quality Management Plan  
• Progress Reports  
• Environmental Monitoring Reports | |
| REMEDIATION COMPLETED | • Post Remediation Report | |
| ONGOING ENVIRONMENTAL MONITORING | • Environmental Monitoring Reports | |
Project reports should also include a concise, non-technical summary of the report content which highlights key issues, findings, conclusions and recommendations. Any limitations should be identified. However a proper balance needs to be struck between caution and uncertainty. If something is uncertain it should be clearly stated why it is uncertain. Reports should not be evasive.

3.4.4 Key Features of a Good Quality Report

When preparing project reports, consultants should maintain a consistent structure and report style in terms of paragraph/table/figure numbering, use of abbreviations and references. It is preferable to exclude large data tables from the report text. These together with other supporting data should form separate appendices. However summaries of data are often helpful in the report text.

A checklist of key features of a good quality report is detailed in the box below.
### GUIDANCE ON REPORTING

<table>
<thead>
<tr>
<th>Item</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary</td>
<td>A concise non-technical summary of the report and its conclusions is highly desirable.</td>
</tr>
<tr>
<td>Contents Page</td>
<td>An index of the report contents is helpful.</td>
</tr>
<tr>
<td>Terms of Reference</td>
<td>Client terms of reference should clearly be stated.</td>
</tr>
<tr>
<td>Objectives</td>
<td>Should clearly be stated and linked to the terms of reference.</td>
</tr>
<tr>
<td>Structure</td>
<td>Consistent use of paragraph, table and figure numbering should be maintained, with a clear layout.</td>
</tr>
<tr>
<td>Methods/Results/Interpretation</td>
<td>Methods, results and interpretation should clearly be stated and identifiable. Opinions should be justified drawing on published information and guidance where possible.</td>
</tr>
<tr>
<td>Conclusions</td>
<td>Should be clear, derived from the previous text, and relevant to the original objectives.</td>
</tr>
<tr>
<td>Recommendations</td>
<td>Should be clear (and often costed, timetabled) and justified in relation to the client’s overall, and agreed, project objectives.</td>
</tr>
<tr>
<td>Abbreviations</td>
<td>Should be applied consistently, always introduced, and where widely used a separate list of abbreviations included in the report.</td>
</tr>
<tr>
<td>Charts/Graphs/Diagrams</td>
<td>Should be used to support text where they assist in understanding results. However too many graphs with information not directly relevant to the text can be confusing.</td>
</tr>
<tr>
<td>Cross references</td>
<td>Should be checked for accuracy and consistency.</td>
</tr>
<tr>
<td>References</td>
<td>The work of other parties reported or used in the interpretation must be referenced and a separate reference list provided.</td>
</tr>
<tr>
<td>Appendices</td>
<td>Supporting data should be held in appendices and identified in the report text.</td>
</tr>
</tbody>
</table>

#### 3.4.5 Use and Retention of Project Reports

Arrangements for confidentiality, distribution, storage and retention of project reports should have been agreed between the consultant and client as part of the appointment agreement (see Section 2.3). The client will normally define confidentiality and external distribution of the report. However, both parties may have independent requirements regarding retention.
of documentation. In making a decision on how long to retain documentation both consultant and client should take into account statutory limitations defined under the Limitations Act 1980. Under the Act there is a statutory limitation of six years within which action may be taken for breach of contract. For contracts under seal the period is extended to twelve years.

Both consultants and clients should take account of the possible need to disclose reports, for example, as part of a Public Inquiry or legal proceedings, and of obligations under the Public Access to Environmental Information Act. In the future it will also be necessary to consider that at some sites information relating to remediation of the site will be held on a public register according to the requirements of the Environment Act. The consultant should ensure that the report content and presentation is appropriate. Additionally consultants should make clients aware of any intention to refer to their client’s report or to publish material derived from project work, such as in scientific papers, whether or not this is explicitly covered in confidentiality or other agreements between the consultant and client.
KEY REFERENCE SOURCES


SPECIAL TOPIC 1

AVAILABLE CONSULTANCY SERVICES

1. INTRODUCTION ST1.1
2. KEY REFERENCE DOCUMENTS ST1.1
3. RANGE AND SCOPE OF SERVICES PROVIDED/REQUIRED ST1.2
4. THE CONSULTANCY INDUSTRY ST1.6
5. TRADE BODIES ST1.8
6. PROFESSIONAL BODIES AND LEARNED SOCIETIES ST1.9
7. BODIES PROVIDING GUIDANCE ST1.11
SPECIAL TOPIC 1: AVAILABLE CONSULTANCY SERVICES

1. INTRODUCTION

This Special Topic provides information on:

- the range of contaminated land services available and the bodies offering such services;
- relevant trade and professional bodies.

2. KEY REFERENCE DOCUMENTS

2.1 Contaminated Land Services

The Environmental Consultants Group of the Environmental Industries Commission has adopted the former Association of Environmental Consultancies (AEC) published Code of Practice setting out the range of services offered by its members and good practice for their provision. The Association of Geotechnical and Geoenvironmental Specialists (AGS) also has guidance available on their members practising in contaminated land.

In addition, Environmental Data Services (ENDS) has published a Directory of Environmental Consultancies which includes a listing of the services provide, including those relating to contaminated land. Such listings can provide an entry point but should be viewed with caution since the information is self-reported. The identification of potential consultants and specialist contractors is dealt with in detail in Sections 2.2 and 3.2.

2.2 Glossary

A glossary of terms is provided at the end of this document. The definitions provided are largely based on the terminology employed in recent guidance on contaminated land published by the Welsh Development Agency (WDA) and the Construction Industry Research and Information Association (CIRIA), and on definitions published by the ISO Technical Committee on Soil Quality (TC 190) or under development by that committee. The relevant references are provided at the end of the document.
3. RANGE AND SCOPE OF SERVICES PROVIDED/REQUIRED

3.1 General Range of Contaminated Land Services

Services typically cover:

- research into the potential for contamination;
- assessing the nature, degree and extent of contamination;
- interpreting its significance in relation to human health, the environment (including natural resources) and building materials;
- designing, managing, verifying and costing appropriate measures to mitigate its effects; and
- advising on its site-specific, strategic, commercial and development-related implications.

3.2 Specific Services Provided

Contamination-related services provided by consultants, sub-consultants and others include:

- identification of land that may be contaminated from activities associated with past or present land uses;
- identification of land which may be naturally hazardous (such land should not be regarded as contaminated);
- desk-based assessments of:
  - the potential for ground contamination and for contamination of the water environment
  - the likely nature and distribution of contamination
  - the geological, hydrological and hydrogeological setting of the site
  - the relevance of any site-specific sensitivities
  - potential migration pathways and vulnerable targets;
- design of soil, water, soil-gas and other sampling and analytical strategies for a range of purposes;
- preparation of specifications for physical investigations and managing investigations carried out by others;
- physical investigations of the nature, degree and extent of contamination or the presence of naturally-occurring hazardous substances in the ground or associated media, by one or more of the following:
  - employing non-intrusive assessment techniques
AVAILABLE CONSULTANCY SERVICES

- installing systems for soil, water and soil gas sampling and monitoring
- acquiring samples of soils, waters, soil gases, flora and fauna
- analysing the acquired samples by means of on-site techniques or using an off-site laboratory
- undertaking on-going monitoring of contamination of soils, waters and soil gas;

- investigation to obtain geological, hydrological, geotechnical and all other information relevant to the assessment of contaminated sites;

- interpretation of the results of site investigations, in terms of:
  - identification of migration pathways and potential targets
  - assessment of potential or actual damage to human health, the environment, building materials and natural resources
  - quantified estimates of risks to human and other targets
  - provision of opinions on the likelihood of remediation being enforced by the regulatory authorities
  - evaluation of the need for and the type of remedial action to be taken
  - estimation of the costs associated with site remediation
  - occupational health and safety standards to be applied before, during and after completion of the remediation activities
  - requirements for disposal and treatment of contaminated materials (including soils, wastes, ground and surface water, process effluents, drainage, leachate)
  - waste management issues and Duty of Care requirements
  - public health and environmental protection implications of the remedial stage
  - community relations aspects of the results of assessment and remediation activities;

- conduct of human health and environmental risk assessments based on contaminated land investigations, using computer-based or other techniques;

- evaluation of remediation techniques/feasibility studies;

- design of remedial strategies and setting of remediation objectives;

- management of remediation projects, including:
  - preparation of contract specifications and method statements
  - selection of suitable contractors
  - supervision of the works
  - monitoring of the progress
  - confirmation that the works has been properly carried out and that remediation objectives have been met (validation)
  - certification that sites have been remediated to an agreed standard;
and other related activities including:

- provision of advice on corporate contaminated land policy and interpretation of relevant legislation;
- assessment of the effects of potential or actual ground contamination on land and property values;
- provision of advice on the toxicity of contaminants;
- technical review of investigations and reports prepared by others;
- conduct of independent audits of site investigations, monitoring programmes and remedial works;
- presentation of evidence at public inquiries and in other public fora;
- investigations etc., related to legal proceeding arising from contamination;
- provision of training;
- research and development in the field of contaminated land work (i.e. technical, policy, economic and social aspects).

3.3 Role of Different Disciplines

To deal properly with contaminated land requires inputs from a number of separate disciplines. It is unlikely that a single individual would ever have all the detailed knowledge, professional expertise and technical skills to be able to deal with the more complex situations that can arise regarding contaminated sites. However, a good appreciation of the concerns of other specialists/professionals will usually be required, and is of increasing importance as individuals assume greater responsibility for project definition and management.

It is important that an understanding of the concerns regarding contamination (awareness) is not taken to imply ability to undertake work of other disciplines; engineers should no more do the environmental chemist's job than chemists should design civil engineering works.

3.4 Interaction with other "Land-based" Consultancy Services

A typical development project will require the application of many different disciplines. It is important for reasons of economy, protection of health and safety, environmental protection and for the achievement of overall project objectives, that a team approach is adopted from as early a stage as possible so that each member of the team has an appreciation of the technical concerns and objectives of other team members.
Those having an interest in the "land" may include:

- geotechnical specialists;
- engineers concerned with the design of foundations and structures;
- landscape specialists;
- ecologists;
- environmental health specialists;
- health and safety experts;
- planning experts.

In addition, the architect or other designer will have an interest, since design options may be constrained by, or have to take account of, environmental protection or safety measures, for example, measures to control gas entry into buildings.

There are opportunities for integration of investigations for and related to contamination with those intended to obtain engineering information (ground investigations). However, it is essential that the objectives of the contamination-related investigation is not compromised in any way, such as by taking the wrong type of samples in the wrong places. Geotechnical investigations should not be carried out until it has been shown that this can be done without risk to human health or the environment.

The person developing the remediation strategy for a contaminated development site needs to have as much information as possible about the development planned for the site and associated engineering objectives (e.g., that bearing capacity needs to be increased, foul and surface drainage requirements), landscaping objectives (e.g., minimum depths of vegetation sustaining soil required, intended uses of any surface water bodies), and management arrangements for the site. The choice of ground improvement method and/or the design of foundations may be constrained by the presence of contamination and the need not to compromise any remedial works (e.g., a cover system). These issues are discussed in recent CIRIA guidance.

In the case of an operating site, the person developing the remediation strategy must be made fully aware of any constraints in terms of site access, normal operational activities, hazards and other such issues.
4. THE CONSULTANCY INDUSTRY

Environmental consultancies range from single-person organisations to organisations having hundreds of employees. Some offer one or more specialist service (eg ecological assessments); others may offer a range of environmental services. Some are fully multi-disciplinary offering a range of engineering, environmental, planning, economic appraisal and other services.

Some environmental consultancies offer only consultancy services. Others may combine consultancy with provision of laboratory services and investigations using specialist (sometimes proprietary) techniques. Recently, a number of environmental consultancies have formed links with vendors of particular remediation technologies. Some specialist geotechnical organisations are also able to carry out contamination-related investigations.

Choosing from this range of consultancies is dealt with in Section 2.2 of the main text. The latest directories, databases and handbooks can be obtained from the list of organisations below:
DIRECTORIES OF ENVIRONMENTAL CONSULTANTS

The latest directories, databases and handbooks can be obtained from:
The Association of Geotechnical and Geoenvironmental Specialists
39 Upper Elmers End Road
Beckenham
Kent BR3 3QY
Tel: 0181 658 8212
Fax: 0181 6630949

(AEC now superseded by):
Environmental Consultants Group (ECG)
The Environmental Industries Commission
6 Donaldson Road
London
NW6 6NB
Tel: 0171 624 2728
Fax: 0171 328 5910

Environmental Contacts: A Guide for Business
DTI Environmental Publications
ADMAIL 528
LONDON
SW1 W8YT
Tel: 0171 510 0174

Environmental Information: A Guide to Sources by Nigel Lees and Helen Woolston
Turpin Distribution Services Ltd
(British Library Section)
Blackhorse Road
Letchworth
Herts SG6 1HN
Tel: 01462 672 555

ISWA/James and James Science Publishers
Waterside House
47 Kentish Town Road
London NW1 8NZ
Tel: 0171 284 3833
Fax: 0171 284 3737

Environment Business
Information for Industry Ltd
18-20 Ridgeway
London SW19 4QN
Tel: 0181 944 2930

Croner’s Environmental Management
Croner Publications Ltd
Croner House
London Road
Kingston-upon-Thames
Surrey KT2 6SR
Tel: 0181 547 3333
Fax: 0181 547 2637

Environmental Data Services (ENDS)
Unit 133 Finsbury Business Centre
40 Bowling Green Lane
London EC1R 1NE
Tel: 0171 278 4745

Chartered Institution of Water and Environmental Management
CIWEM 1996 Year Book
BIL Publications
66 Bracondale
Norwich NR1 2BE
Tel: 01603 787 842
Fax: 01603 666 238

Environment Industry Yearbook 1996
Macmillan Press
25 Eccleston Place
London SW1W 9NF
Tel: 0171 881 8000

Institute of Environmental Assessment
Welton House
Limekiln Way
Lincoln LN2 4US
Tel: 01522 540069

Note: Data contained in many of these registers submitted directly by the consultant organisations and is not validated by the registering organisation.

Many environmental consultancies belong to one or more trade body (see Section 7) which may be able to provide information on the range of services offered by their members including those related to contaminated land. Individual staff may belong to professional bodies - some of whom maintain specialist registers.

ST1.7
5. TRADE BODIES

Trade bodies whose members may provide specialist contaminated land services are given below:

<table>
<thead>
<tr>
<th>TRADE ASSOCIATIONS AND BUSINESS AFFILIATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos Removal Contractors Association</td>
</tr>
<tr>
<td>Friars House</td>
</tr>
<tr>
<td>6 Parkway</td>
</tr>
<tr>
<td>Chelmsford CM2 ONF</td>
</tr>
<tr>
<td>Tel: 01245 259744</td>
</tr>
<tr>
<td>The Association of Consulting Engineers</td>
</tr>
<tr>
<td>Alliance House</td>
</tr>
<tr>
<td>12 Caxton Street</td>
</tr>
<tr>
<td>Westminster</td>
</tr>
<tr>
<td>London SE1H 0QL</td>
</tr>
<tr>
<td>Tel: 0171 222 6557</td>
</tr>
<tr>
<td>The Association of Consulting Scientists Ltd</td>
</tr>
<tr>
<td>39-41 Romsey Road</td>
</tr>
<tr>
<td>Winchester</td>
</tr>
<tr>
<td>Hampshire SO22 5BE</td>
</tr>
<tr>
<td>Tel: 0181 991 4883</td>
</tr>
<tr>
<td>The Association of Geotechnical and</td>
</tr>
<tr>
<td>Geoenvironmental Specialists</td>
</tr>
<tr>
<td>39 Upper Elmers End Road</td>
</tr>
<tr>
<td>Beckenham Kent BR3 3QY</td>
</tr>
<tr>
<td>Tel: 0181 658812</td>
</tr>
<tr>
<td>The Association of Public Analysts</td>
</tr>
<tr>
<td>c/o Dr Peter Clare</td>
</tr>
<tr>
<td>A H Allen &amp; Partners</td>
</tr>
<tr>
<td>342 C oleford Road</td>
</tr>
<tr>
<td>Sheffield S9 5PH</td>
</tr>
<tr>
<td>Tel: 0114 243 1016</td>
</tr>
<tr>
<td>British Association of Landscape Industries</td>
</tr>
<tr>
<td>Landscape House</td>
</tr>
<tr>
<td>Henry Street</td>
</tr>
<tr>
<td>Keighley West Yorkshire BD21 3DR</td>
</tr>
<tr>
<td>Tel: 01535 606139</td>
</tr>
<tr>
<td>British Drilling Association</td>
</tr>
<tr>
<td>P O Box 113</td>
</tr>
<tr>
<td>Brentwood</td>
</tr>
<tr>
<td>Essex CM15 9DS</td>
</tr>
<tr>
<td>Tel: 01277 373456</td>
</tr>
<tr>
<td>British Water</td>
</tr>
<tr>
<td>1 Queen Anne's Gate</td>
</tr>
<tr>
<td>London SW1H 9BT</td>
</tr>
<tr>
<td>Tel: 0171 957 4554</td>
</tr>
</tbody>
</table>

ST1.8
6. PROFESSIONAL BODIES AND LEARNED SOCIETIES

6.1 General

These days, professional bodies tend to be both qualifying bodies and learned societies, whilst separate learned societies still exist.

6.2 Professional Bodies

It is inherent in the wide range of disciplines involved in the assessment of contaminated land that the individuals involved belong to a range of professional bodies. At present there is no professional institution that can properly lay claim to contaminated land as its special sphere of interest over and above that of other institutions.

However, a number have provided written guidance including the Chartered Institute of Environmental Health (CIHE - formerly the Institute of Environmental Health Officers), the Institution of Civil Engineers (ICE), and the Institute of Petroleum (InP). A number of others have organised specialist seminars or provided specialist training courses or materials for their members (eg the Chartered Institution of Water and Environmental Management (CIWEM) and the Institution of Chemical Engineers (IChemE)).

The Forum on Contamination in Land (FOCIL) was formed in 1994 and comprises six professional institutions with the support of others. FOCIL’s mission statement is “to enhance the understanding of and facilitate improved co-ordination between professionals dealing with contaminated land, thus benefitting the process of assessing and managing risks associated with contamination, both commercially and environmentally”. It aims to strengthen links between professional advisors in contaminated land and is active in identifying, disseminating and encouraging use of best practice.

6.3 Learned Societies

Some learned Societies have paid particular attention to contaminated land problems. These include the Society of Chemical Industry (SCI) and the UK Environmental Law Association (UKELA) and can consequently be a good information source. Addresses of these and similar bodies are listed below:
### LEARNED AND PROFESSIONAL BODIES

<table>
<thead>
<tr>
<th>Organization</th>
<th>Address</th>
<th>Tel:</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Ecological Society</td>
<td>26 Blades Court, Decodar Road, Putney, London SW15 2NU</td>
<td>0181 871 9797</td>
</tr>
<tr>
<td>Chartered Institute of Environmental Health</td>
<td>Chadwick House, Rushworth Street, London SE1 0QT</td>
<td>0171 928 6006</td>
</tr>
<tr>
<td>Construction Industry Research and Information Association</td>
<td>6 Storey’s Gate, London SW1P 3AU</td>
<td>0171 222 8891</td>
</tr>
<tr>
<td>Geological Society</td>
<td>Burlington House, Piccadilly, London W1V 0JU</td>
<td>0171 434 9944</td>
</tr>
<tr>
<td>Institute of Environmental Assessment</td>
<td>Welton House, Limekiln Way, Lincoln LN4 2US</td>
<td>01522 540069</td>
</tr>
<tr>
<td>Institution of Chemical Engineers</td>
<td>165-189 Railway Terrace, Rugby, CV21 3HQ</td>
<td>01788 578214</td>
</tr>
<tr>
<td>Chartered Institution of Water and Environmental Management</td>
<td>15 John Street, London, WC1N 2EB</td>
<td>0171 831 3110</td>
</tr>
<tr>
<td>Institute of Biology</td>
<td>20-22 Queensberry Place, London SW7 2DZ</td>
<td>0171 581 8333</td>
</tr>
<tr>
<td>Royal Institute of British Architects</td>
<td>66 Portland Place, London W1N 4AD</td>
<td>0171 580 5533</td>
</tr>
<tr>
<td>Royal Institution of Chartered Surveyors</td>
<td>12 Great George Street, Parliament Square, London SW1P 3AD</td>
<td>0171 222 7000</td>
</tr>
<tr>
<td>Royal Society of Chemistry</td>
<td>Burlington House, Piccadilly, London W1V 0BN</td>
<td>0171 437 8656</td>
</tr>
<tr>
<td>Royal Town Planning Institute</td>
<td>26 Portland Place, London W1N 4BE</td>
<td>0171 636 9107</td>
</tr>
<tr>
<td>Society of Chemical Industry</td>
<td>14/15 Belgrave Square, London SW1X 8PS</td>
<td>0171 235 3681</td>
</tr>
<tr>
<td>Learned and Professional Bodies (Continued)</td>
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<tr>
<td><strong>Institution of Civil Engineers</strong></td>
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<tr>
<td>1-7 Great George Street</td>
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<tr>
<td>London</td>
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<tr>
<td>SW1P 3AA</td>
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<tr>
<td>Tel: 0171 222 7722</td>
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<tr>
<td><strong>The Law Society</strong></td>
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<tr>
<td>Law Society's Hall</td>
<td></td>
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<tr>
<td>113 Chancery Lane</td>
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<tr>
<td>WC2A 1PL</td>
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<tr>
<td>Tel: 0171 242 1222</td>
<td></td>
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<tr>
<td><strong>Institution of Structural Engineers</strong></td>
<td></td>
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<tr>
<td>11 Upper Belgrave Street</td>
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<tr>
<td>SW1X 8BH</td>
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<tr>
<td>Tel: 0171 235 4535</td>
<td></td>
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</tr>
<tr>
<td><strong>UK Environmental Law Association</strong></td>
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<tr>
<td>c/o Malcolm Forster</td>
<td></td>
<td></td>
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<tr>
<td>65 Fleet Street</td>
<td></td>
<td></td>
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<tr>
<td>London EC4Y 1HS</td>
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<tr>
<td>Tel: 0171 936 4000</td>
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<tr>
<td><strong>The Forum on Contamination in Land (FOCIL)</strong></td>
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<td>c/o Royal Institute of Chartered Surveyors</td>
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<td>12 Great George Street</td>
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<td>Parliament Square</td>
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<tr>
<td>SW1P 3AD</td>
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<tr>
<td>Tel: 0171 334 3869</td>
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</tbody>
</table>

7. **Bodies Providing Guidance**

UK organisations that have provided written guidance on contaminated land include:

- Association of Geotechnical and Geoenvironmental Specialists
- British Drilling Association
- British Standards Institution
- Chemical Industries Association
- Confederation of British Industry
- Construction Industry Research and Information Association
- Department of the Environment
- Friends of the Earth
- Institution of Chemical Engineers
- Institution of Civil Engineers
- Institution of Petroleum Engineers
- Loss Prevention Council
- National Federation of Housing Associations
- Scottish Enterprise
- Welsh Development Agency

Publications from these bodies are listed in Appendix 1.
SPECIAL TOPIC 2

PROFESSIONAL DEVELOPMENT AND TRAINING

1. INTRODUCTION
2. TYPES OF TRAINING REQUIRED
3. PROCEDURES FOR PROFESSIONAL DEVELOPMENT AND TRAINING
4. TRAINING PROVIDERS
SPECIAL TOPIC 2: PROFESSIONAL DEVELOPMENT AND TRAINING

1. INTRODUCTION

At present, no professional institution can properly lay claim to contaminated land as its special sphere of interest. Good consultancy in contaminated land requires inputs from a number of separate disciplines. It is unlikely that a single individual consultant would ever have all the detailed professional knowledge, expertise and technical skills to be able to deal with the more complex situations that can arise regarding contaminated sites. However, a good appreciation of the concerns of other specialists/professionals will usually be required, and is of increasing importance as consultants assume greater responsibility for project specification and management. Some of the knowledge and skills required are also relevant to related areas of environmental work (e.g. environmental auditing and environmental impact assessment). Others, such as report writing skills and general awareness of safety issues, are essential basic professional skills required in most areas of work.

Historically, consultants dealing with contaminated land have come from a range of disciplines and backgrounds. This is likely to remain the case, and should be welcomed because of the multidisciplinary and complex nature of the problems that may be encountered. Previously, an individual’s involvement may have arisen only after a number of years experience in other areas of work (e.g. geotechnical engineering, geology, analytical chemistry, waste disposal). Such professional development will continue to feature in contaminated land consultancy. However, an increasing number of recent graduates are becoming involved in contaminated land work early in their careers, often while gaining practical skills in other subject areas such as environmental monitoring. Thus in many cases, contaminated land will be only one subject area in which young recruits to environmental consultancies will be required to gain awareness and practical experience.

Some recent graduates may have had some formal instruction on contaminated land as part of their degree courses. However, contaminated land is unlikely to be a major element even of environmental science courses, and relatively little attention to risk assessment may have been given. Postgraduate courses are likely to enhance technical skills, for example in hydrogeology or environmental technologies, but will still leave a great deal of practical training to the responsibility of subsequent employers.

Many graduates involved in this area of work will not be covered by any formal requirements for continuing education/professional development towards a formal professional qualification such as chartered status. Graduates who are covered, for example a graduate civil engineer taking a special interest in contaminated land, are unlikely to have access to a wide range of “approved” training courses or “seminars” on contaminated land or related...
topics that will earn points for attendance. Consultants have an important role in encouraging such an approach from professional institutions, particularly now that the Chartered Institute of Water and Environmental Management can offer a route to chartered status for environmental scientists previously outside other chartered status jurisdictions.

2. TYPES OF TRAINING REQUIRED

General awareness training should be directed at:

- technicians;
- recent graduates;
- otherwise experienced individuals becoming involved in contaminated land for the first time;
- more senior staff at management level.

Such courses should aim to give a general level of appreciation across the whole subject including policy issues, legal aspects, safety, practical aspects such as site investigation, waste disposal, general approaches to risk assessment, and general approaches to remediation. All staff involved in contaminated land work should be expected to demonstrate attendance at such a course. Although such training can be provided in-house, participation in external courses is preferable because a wider and more "independent" view is likely to be presented.

The ever changing policy and legislative background suggests that all involved should be required/endeavour to keep up to date either through attendance at suitable formal training course (say 1 or 2 days per year) or through attendance at appropriate seminars and conferences.

Specialist training is required for:

- legal aspects;
- general site investigation;
- hydrological/hydrogeological aspects;
- gas and other site monitoring;
- safety - general aspects, COSHH assessments and related risk assessments;
- specialist safety skills such as use of breathing apparatus and emergency response;
- waste management;
- risk assessment;
- development of remediation strategies;
- specific remediation methods;
• project management;
• decommissioning, decontamination and demolition.

It is to be expected that even well experienced professionals will need to attend appropriate specialist courses from time to time to gain knowledge of the latest developments in their own field or to broaden their knowledge base so that they are better able to deal with specialists in other disciplines.

3. PROCEDURES FOR PROFESSIONAL DEVELOPMENT AND TRAINING

Consultancies providing services in contaminated land clearly have a responsibility to treat the training and professional development of their consultants seriously. This is best demonstrated by setting up an internal management system for identifying, tracking and recording training received for each individual. This system should focus on all forms of training and professional development including those provided internally or obtained by direct work experience.

Commitments and policies towards training will on occasion be of interest to clients. Consultants should therefore be prepared to declare and describe training and professional development activities to clients. Such information demonstrates the mechanisms for maintaining awareness of legal and technical developments and hence improving quality of service to clients. Whilst the consultant’s own management system can provide the basis for record-keeping and planning of training needs and achievements, training commitment will be visible at two levels:

• company level
  - existence of a general training policy, e.g. 5 days allocated for specific activities to all staff;
  - existence of a contaminated land training policy, e.g. all site investigation staff fulfil a specified training programme before commencing client work;
  - measurement of training attendance against planned targets;
  - provision of planned training courses for internal or external attendance.

• individual level
  - maintenance of individual training or continuing professional development (CPD) records;
  - membership of individual schemes, courses for qualifications or professional institutions requiring a continued commitment to CPD;
  - linkage of job title or grade to training achievements.
Consultants can promote awareness, development and confidence in training provision by making clear to clients and other interested third parties the training achievements of their staff and company. This is best provided in company literature or information, for example when responding to a brief, or through reference to training commitments and achievements in staff CVs. Support for external courses and professional initiatives also demonstrates publicly a commitment to professional development and training which will benefit consultant and client alike.

4. TRAINING PROVIDERS

External training is often to be preferred. Reliance on internal training alone can lead to the reinforcement of bad practice and misunderstandings of policy issues and legal requirements.

Training courses are typically provided by:

- academic institutions,
- research institutions,
- consultancy groups,
- and professional bodies;

working alone or in combination.

Academic institutions, such as the Centre for Hazard and Risk Management at Loughborough University which has been running contaminated land courses for over five years, typically use a combination of internal and external lecturers, the latter drawn from government, regulatory bodies, consultancies and industry.

Consultancy based courses also tend to use internal and external expertise. Doubts are sometimes expressed whether the organisers of such courses will wish to fully disclose all aspects of best practice when training people from rival consultancies. Courses with a good mix of external material are therefore to be preferred.

The Institution of Chemical Engineers has produced a training pack for use by instructors. The Institute of Wastes Management run regular one day courses on contaminated land, groundwater monitoring and landfill gas monitoring (basic or advanced).

Consultants will need to keep aware of a wide range of training providers to achieve the best opportunities for delivering training requirements. It is the consultant's responsibility to ensure external courses are identified and utilised, and through professional and trade associations to ensure development of training courses meets and matches the demands of consultants.
SPECIAL TOPIC 3

THE ROLE OF INSURANCE

1. INTRODUCTION
   ST3.1
2. RELEVANCE
   ST3.1
3. BACKGROUND
   ST3.1
4. THE FUNCTION OF INSURANCE
   ST3.4
5. ENVIRONMENTAL INSURANCE APPLICATION
   ST3.4
6. POLLUTION LIABILITY PRODUCTS
   ST3.8
7. THE CONSULTANT - CLIENT RELATIONSHIP
   ST3.8
ROLE OF INSURANCE

SPECIAL TOPIC 3: ROLE OF INSURANCE

1. INTRODUCTION

This Special Topic outlines the role of insurance in environmental consultancy and:

- explores why and when insurance is relevant;
- outlines the various environmental insurance products available on the UK market;
- provides guidance to the consultant when considering insurance issues, including insurance products which are available to clients.

2. RELEVANCE

Purchasers of environmental consultancy have increasingly high product and service expectations. Consultants frequently undertake work with significant financial implications - and clients expect adequate 'duty of care'. Insurance, particularly Professional Indemnity Insurance (PII) covers the possibility that 'duty of care' fails and negligence is proven, leading to compensation for client losses.

Generally, environmental insurance in the UK is a young business, with insurers very cautious given adverse 1980s US experience. There are signs, however, that the market is taking shape and more business is being written for the holders of liabilities and consultants/contractors offering advice and solutions.

Figure ST3.1 indicates where insurance issues fit with respect to the phasing of a typical consultancy input to a contaminated land project.

3. BACKGROUND

3.1 Insurance Products

Before considering the role of insurance in the management process, it is helpful to summarise the categories of environmental insurance products that are available. Generally, there are four areas of relevance:
ROLE OF INSURANCE

FIGURE ST3.1: WHERE INSURANCE ISSUES FIT PROJECT PHASING

1. Expects competence, with responsible attitude to potential errors/omissions.
2. May have risk management procedures relevant to employment of consultant and/or contractor.
3. May want to assign benefits of work to a third party.

1. Owes a 'duty of care' to client, backed by ability to sustain a claim resulting from proven negligence.
2. Possible third party or public liability cover in place already?
3. Seeks to ensure equitable allocation of project risks and liability through Terms and Conditions of Engagement and project management procedures.

1. Conduct of work may introduce enhanced risks.
2. Clear definition of client - consultant - contractor relationship: who is responsible? who is liable?
• Third party liability - provides general cover relating to environmental damage to third parties.

• Environmental Impairment Liability (EIL) - provides protection where operations may cause 'latent defects' type pollution events on-site and off-site, e.g. chemical plant, oil refinery, landfill; and the closely related Environmental Remediation Insurance (ERI), where historic contamination may become an issue requiring corrective action.

• Directors' and Officers' Liability (D&O), - protects those administering companies with environmental exposure.

• Professional Indemnity Insurance (PII) and Contractors' Pollution Liability (CPL) - protects suppliers of technical services, from consultants through to remediation contractors.

Fuller definitions and comments on the functions of the above products are discussed below.

3.2 Insurers' Views

Insurers do not wish to be viewed as a 'deep pocket' for the funding of clean-up costs. This concern emanates from US insurers' adverse experience in the 1980s. Strict, retroactive and joint and several liability had meant insurers, banks and other parties had all been targets for recovery of substantial clean-up costs, even when they have had no direct involvement in the business.

The UK Government has rejected the imposition of any 'deep pocket' liabilities for lenders or other financial institutions. Whatever the shape and scope of the European approach, insurers are defensive. Consequently, limitations in cover for pollution are normal; capacity is limited; and underwriting is becoming more sophisticated.

Insurers have also limited their exposure by restricting the scope of Public Liability cover. In the past, those owning or operating potentially contaminative land and/or facilities, may have been partly covered for pollution liabilities under their more general insurances, particularly that for public liability. This is seldom the case now - as evidenced by the growth in specialist environmental insurance products. Whilst this trend is aside from the consultant-client relationship, with PII the main issue, it is relevant, as the general lack of pollution cover can potentially add to the exposure of consultants.
3.3 Consultants' Exposure

Environmental consultants work in situations requiring significant professional judgements. Often the fee value will be very modest relative to the financial magnitude of the overall project. Judgements are based on interpretation of, sometimes limited, available information. By its nature, environmental consultancy always seeks to balance adequate scope and extent of investigation with constraints of time and cost. A view is taken, based on available facts, considered in the light of guidance and prevailing experience:

- the consultant must be satisfied that a sound, professional view, backed by necessary risk management procedures and insurance can be given;
- the client must be satisfied that within the constraints of the job time and the consultant is providing an appropriate 'duty of care' for the project.

4. THE FUNCTION OF INSURANCE

Figure ST3.2 sets out the functions of the four main types of insurance products. There are two overall insurance-related issues to be resolved when shaping a sound client-consultant relationship:

- Are the client and consultant parties properly defining and paying for their respective exposures, and putting in place the necessary insurances covering 'duty of care' and third-party liabilities?
- Is it clear that the client is not unreasonably looking to the consultant's insurances to cover the client's own obligations, which may require other environmental insurance products?

5. ENVIRONMENTAL INSURANCE APPLICATION

Section 3.1 identified four areas of environmental insurance application. In addition some more specialist environmental insurance business has been written recently. This has, however, been mirrored by greater caution on the part of the insurers and a tendency to
### FIGURE ST3.2: FUNCTION OF INSURANCE PRODUCTS

<table>
<thead>
<tr>
<th>Product</th>
<th>Purpose and application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who for?</td>
<td>Protection of parties indirectly related to consultant/client eg utility company has on-site plant damaged by site investigation; off-site interests damaged by pollution spill during remediation.</td>
</tr>
<tr>
<td>Third Party liabilities</td>
<td></td>
</tr>
<tr>
<td>For clients and consultants</td>
<td>Covers the possibility of damage from sudden or gradual pollution. Application depends on whether source of pollution is ongoing or historic activity.</td>
</tr>
<tr>
<td>Latent Defects liabilities</td>
<td></td>
</tr>
<tr>
<td>For clients</td>
<td></td>
</tr>
<tr>
<td>Company administrators</td>
<td>Protects nominated individuals in a company with environmental exposure against claims based on mis-management leading to financial losses.</td>
</tr>
<tr>
<td>For clients</td>
<td></td>
</tr>
<tr>
<td>Suppliers of Technical Services</td>
<td>Protects consultants (as PII) and contractors (as CPL) in event of proven negligence claim on basis of failure of 'duty of care'.</td>
</tr>
<tr>
<td>For consultants and contractors</td>
<td></td>
</tr>
</tbody>
</table>
exclude certain risks from policies. It is very necessary to confirm that exclusions and limitations do not unreasonably restrict the purpose of the insurance, both by confirming the scope of the cover and checking the contractual relationship between consultant and client.

5.1 Professional Indemnity Insurance (PII)

Also known as Errors and Omissions Insurance, this product provides cover for professionals and their employees in relation to claims against them for damages (including pollution damage) caused to their clients.

In the last few years the market for PII has hardened against environmental consultants, with more insurers seeking pollution liability exclusions and/or low limits on PII cover. This has been driven by increased exposure as consultants have undertaken commercially-oriented work, for example property transfers, frequently with high value investment decisions being based, in part, on their advice. It appears that consultants are moving in two directions as a response:

- Some are removing or limiting their exposure through withdrawing all or part of their services from the marketplace;
- Others are reviewing their risk management procedures, and taking a cautious view in conjunction with carefully specified PII, Terms and Conditions of Engagement and project-specific contracts - ie. limiting liability in contract procedures.

PII does not provide a warranty on the cleanliness of a site or the technical adequacy of the service provided by the consultant. The policy is in place primarily for the benefit of the policyholder, the consultant. For a successful claim, users of consultants have to prove that the consultant was negligent and that the damages occasioned were as a result of the negligence. Consultants should be aware that where claims arrive a period of time after the work has been completed they are only covered by the extent of the policy available at the time of the claim.

PII is likely to improve the quality and consistency of services as insurers scrutinise consultants' capabilities at the time of proposal or policy renewal ever more rigorously. Insurers will pay close regard to attributes such as experience, size, depth of staffing, clarity of contract conditions and acceptance of limitations, ie. specialisation. The result of this scrutiny will be reflected in both the availability, level and cost of the cover offered.
ROLE OF INSURANCE

The issue of special assignments or warranties usually figures in the consideration of PII. Note should be made of the occasional and increasing need by clients to assign the benefits of consultants' work to third parties. For example, acquisition of land may be in part based on a review of environmental liabilities. The purchaser may sell-on the land for development, and further ownership by occupiers and/or financial institutions. The value of the work passes on, and the subsequent owners require the 'duty of care' to pass with it. Usually this means the consultant is required to formally agree to assignments and to sustain PII cover for a fixed term, say six years. There are constraints on PII availability, so 'project specific' PII for the particular warranted work may be necessary. However, this is rarely cost-effective and attracts high premiums from the insurance market.

5.2 Contractor's Pollution Liability (CPL)

The restrictions on consultant's Public Liability policies (see 3.2) also apply to contractors seeking such cover. Long-established forms of contract, for example ICE, place liability for pollution events firmly with the contractor, however caused.

Insurers have marketed the CPL product on the basis of engineering and site investigation contractors needing specialist insurance backing for their potential liabilities. In part, too, this is a reaction to the limitations of Professional Indemnity Insurance (PII), assuming that if consultants manage their exposure, targeting by clients of the contractor is a likely move. The scope of CPL cover is quite broad, ranging from on-site remediation to industrial maintenance. Sudden and gradual events are covered for third party liability. Environmental consultants who manage or directly undertake contracting, eg site investigations, may consider this type of cover in tandem with PII. There are also combined products for contractors who engage in consultancy.

5.3 Directors' and Officers' Liability (D&O)

This is purchased to protect a company's directors and officers from claims brought for mismanagement which results in financial losses for the company. Insurers have recognised a trend to hold senior management personally responsible for the environmental management of their companies, as signalled by Section 157 of the Environmental Protection Act 1990. Traditional D&O cover has excluded pollution, hence the emergence of specific environmental D&O cover. Cover excludes first party liability and clean-up costs, but applies to all sites, including USA/Canada. One pre-requisite of this form of cover is that the insured must have environmental management systems in place.
ROLE OF INSURANCE

6. POLLUTION LIABILITY PRODUCTS

6.1 Environmental Impairment Liability (EIL)

This applies to production and process facility operators, e.g. wastewater treatment, chemicals manufacture. Cover is for damage caused by sudden or gradual pollution, including unknown historic contamination, emanating from the insured site. Indemnity is provided for off-site third-party liability, but not first party liability and on-site third-party liability. Several insurance majors offer this cover in the UK. In order to obtain EIL insurance a commitment to good environmental compliance and risk management is desirable. This will be confirmed by a site audit on behalf of the insurer. Once established, the insurer/insured relationship can be extended, subject to periodic reviews of performance.

6.2 Environmental Remediation Insurance (ERI)

This product applies to property interests where the unexpected discovery of contamination on a site may reduce values, or raise the possibility of a clean-up instructed by regulators. In the basic form of cover indemnity is provided for first party, on-site clean-up costs. It may be possible to add indemnity for certain off-site third-party liabilities. Insurers require detailed site surveys by approved consultants. This product is of particular relevance to the consultant who conducted the initial survey. From the insured's point of view considerations are the likelihood of proving negligence in a climate of incomplete and shifting technical standards, and the increasing limitations of consultants' Professional Indemnity Insurance (PII).

7. THE CONSULTANT - CLIENT RELATIONSHIP

7.1 Risk Management

In order to ensure that both the client and consultant are completely clear about their contractual responsibilities and the extent of insurance held by each party, insurance related issues should be discussed at the outset of the relationship when issuing and responding to the project brief. It is the consultant's responsibility to prompt an understanding by both client and consultant on the role of insurance for a given project.

It must also be ensured that the levels and types of insurance cover are appropriate to all aspects of the contractual relationship such as collateral warranties. A collateral warranty is only of value, for example if it is called upon, if backed by appropriate insurance.

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ROLE OF INSURANCE

- Clients - should ensure that the consultant has in place appropriate PII and should be clear about its limits. Appropriate wordings should be used in Contract Terms and Conditions of Engagement.

- Consultants - should ensure their contractual position to the client and any other third parties involved in the contract is fully understood and that appropriate Terms and Conditions are in place.

Figure ST3.3 identifies the insurance related issues that need to be considered throughout and beyond a consultancy project.
FIGURE ST3.3: ACTIONS CHECKLIST

ACTIONS DURING PRE-COMMISSIONING
1. Client to seek information on consultant's track record, third party certification
2. Client to check out basis of consultant's duty of care through consideration of PII
3. Has either party a standard form of agreement referencing PII position?
4. Consider possible client need to assign benefit of work
5. Acceptance of costs by clients, reflecting sensible risk management by both parties

ACTIONS DURING POST-COMMISSIONING
1. Need for formal exchange/record of significantly modified scope of services, programme, costs
2. Consultant may need to confirm increased exposure acceptable to PII insurer
3. Consultant to formalise sub-contract obligations and confirm suppliers' standards prior to appointment or approval (if retained direct by client)
4. Ensure client and consultant understand all aspects of on-site conduct of works

COMPLETION REPORT(S)

CONTRACT OBLIGATIONS TO MAINTAIN INSURANCE SUCH AS PII

NOTIFICATION OF ANY RELEVANT CHANGE IN CIRCUMSTANCES
SPECIAL TOPIC 4

THE APPLICATION OF GUIDELINES & STANDARDS

1. INTRODUCTION

2. CONCEPTS AND DEFINITIONS

3. THE DERIVATION AND ROLE OF GUIDELINES AND STANDARDS

4. FACTORS TO CONSIDER WHEN SELECTING AND APPLYING GUIDELINES AND STANDARDS

5. COMMONLY USED GUIDELINES AND STANDARDS

6. INAPPROPRIATE USE OF GUIDELINES AND STANDARDS

KEY REFERENCE SOURCES
THE APPLICATION OF GUIDELINES AND STANDARDS

SPECIAL TOPIC 4: THE APPLICATION OF GUIDELINES AND STANDARDS

1 INTRODUCTION

This Special Topic is intended to assist consultants in the selection and application of numerical guidelines and standards for the assessment of contaminated land. It discusses the role and derivation of numerical guidelines and standards, and the need for care when using such values as part of the risk assessment process.

It is essential that consultants are thoroughly conversant with available guidelines and standards, understand and make appropriate allowance for any limitations on their use, and are able to justify selection decisions. Early agreement with clients and regulators on the application of guidelines and standards will usually help to define the scope of a risk assessment project, and the type of data required.

This Special Topic:

- explains the concept of numerical guidelines and standards and provides some key definitions;
- describes the role and derivation of guidelines and standards;
- lists the factors to be considered when selecting and applying guidelines and standards;
- provides a summary description of some commonly used guidelines and standards.

Sources of further information and guidance are also provided.

2. CONCEPTS AND DEFINITIONS

2.1 Different Types Of Guidelines And Standards

A wide variety of different types of technical guidance and standards may apply to contaminated land projects, as described in Section 3 of this document. They may be used to develop standard technical procedures for certain types of work activity or, as with a British Standard, provide a "ready made" methodology or specification against which the conduct or performance of completed work can be measured.
THE APPLICATION OF GUIDELINES AND STANDARDS

This Special Topic focuses on the numerical guidelines and standards used to assess the actual or potential risks to human health and the environment that may be associated with contaminated land. For the purposes of this Special Topic:

- "Guidelines" are defined as numerical values issued by an authoritative body and intended to assist in the assessment of risks from contaminated land using appropriate professional judgement.

- "Standards" are limits made binding through government legislation which must be applied (within the appropriate regulatory framework) in all cases where they are applicable.

There are two main types:

- **Dedicated** guidelines and standards which have been developed specifically for the purpose of assessing the risks which may be associated with contaminated land;

- **Non-dedicated** guidelines and standards which, although not developed specifically for the purpose, may be useful in deriving generic guidelines values or, as part of a site specific risk assessment, to decide the most appropriate course of action.

Guidelines and standards are generic in that they are designed to apply to a large number of cases. The main advantage of generic values is that they provide a consistent and relatively simple basis for ensuring consistent decision-making, for example within national jurisdictions or in the context of specific legal provisions. Since they are designed to be protective in the majority of cases, generic guidelines and standards can be used for screening purposes: provided there is no evidence that generic values are being exceeded, it can be assumed that the risk of harm is low and there is no need to carry out a more detailed evaluation of local factors.

The main disadvantage of generic values for risk assessment purposes is the sometimes limited scope for consideration of local factors, particularly those which have the effect of reducing the level of risk. Where there is evidence that generic assessment values are being, or are likely to be, exceeded, and despite the extra effort and resources involved, assessors may decide to carry out a more detailed site specific assessment on the basis that it may show a generic value is unnecessarily stringent in the situation being considered.

It is important to be aware that where generic guidelines are available and applicable, they will often form only part of a process in which other factors, such as the nature and
THE APPLICATION OF GUIDELINES AND STANDARDS

magnitude of the risks, technical uncertainties, and the practicality and costs of dealing with the contamination, are also taken into account when deciding the "acceptability" of risk estimates.

Generic values used for assessment purposes should not be confused with "remedial objectives" which are often, but not exclusively, defined in terms of the concentration of a substance considered acceptable in a specified medium following action to reduce or control unacceptable risks. For example, remedial objectives may be expressed in terms of particular physical characteristics of a remedial system, such as the gas or liquid permeability which should not be exceeded in an in-ground barrier if contaminant concentrations at the point of exposure are to be kept within acceptable limits. Since a wide range of site specific technical, practical and financial factors are usually taken into account when setting remedial objectives, this process is unlikely to be amenable to a generic approach.

2.2 The UK Approach

It is important to be aware of the broad policy framework within which values are developed to assist in assessing the human health and environmental risks which may be associated with contaminated land (see Visser 1993 for a description of different national approaches). In the UK, the objective is to ensure that land is suitable for its actual or intended use and environmental setting. Guideline values, rather than standards, have been considered the most appropriate mechanism to achieve this aim. With the exception of specific regulations governing the application of sludge to land, there are no dedicated numerical standards which are directly applicable to soil quality although legally binding limits may apply to other media, or to soil in a related context. For example: in some circumstances drinking water standards may apply to the waters associated with a contaminated site; or occupational exposure standards (OESs) may apply to the concentration of respirable soil particles in air within the breathing zone of a site investigation or remediation worker.

Other non-dedicated numerical guidelines and standards may be used to either derive dedicated generic guideline values (see Section 3) or, as part of a site specific assessment, to estimate actual or potential human health or environmental risks. For example: World Health Organisation Tolerable Daily Intakes (TDIs) may be used as one measure of the "tolerability" of an estimated intake of a substance by a human target over long periods of time; or a (surface) water quality objective may used to assess the likely impact of a liquid discharge which arises from a contaminated site and is expected ultimately to enter a particular water body.
3. THE DERIVATION AND ROLE OF GUIDELINES AND STANDARDS

To estimate the human health and environmental risks that may be associated with contaminated land, a number of factors have to be taken into account including the nature of the substance of concern; its behaviour or characteristics at source, in the environment and at the point of contact; the amount or dose of the substance at the point of contact; and the likely effects once contact has been made.

In the context of contaminated land, the exposure component of this relationship is typically described in terms of "sources", "pathways" and "targets", where key parameters include:

- the nature of the source (e.g. concentration, distribution, solubility of contaminants in soils);

- the means (pathways) by which a target (e.g. a human child) may be exposed to the source;

- the characteristics of the target (e.g. time spent in contact with the source, the body weight or skin area of the child, the status of an aquifer).

Exposure assessments lead to an estimate of the dose of the substance received by the target. The estimated dose can then be compared against an applicable "safe" or "tolerable" dose to obtain an estimate of the risk that a specified type and degree of harm will result under defined conditions of exposure.

In the UK, this process is being used to develop dedicated generic guideline concentration values that can be used to assess the chronic risks to human health which may be associated with contaminated soil (Ferguson and Denner, 1994). Various assumptions on the characteristics of contaminant sources, pathways and targets are used to develop typical lifetime exposure scenarios for particular types of land use. These are related to "Tolerable Daily Soil Intakes (TDSIs). TDSIs take into account the background intake of the substance from ambient sources; the Tolerable Daily Intake of the substance by humans (as established from a review of toxicological information); different types of toxic effects; and practical, social and economic costs and benefits. That concentration of the substance in soil which exactly corresponds to the TDSI under different exposure scenarios is then taken as the UK Guideline Value for soil for that substance. Exceedance of the relevant guideline value may trigger more detailed assessment or remedial action.
UK Guideline Values for soils are expected to replace the existing ICRCL (Interdepartmental Committee for the Redevelopment of Contaminated Land) trigger concentration values as far as chronic risks to human health are concerned. However, it is important to be aware that the values have a specific application in assessing chronic risks to human health. They are not designed to be used in the assessment of risks to the water environment; nor are they applicable to acute risk situations (see Box), or other targets (e.g. the wider ecosystem, and building materials and structures). These types of risks and targets are more properly assessed on a site specific basis although different types of generic guideline values are available and applicable to assist in such assessments. Examples include leachability trigger concentration values, water quality objectives and standards, occupational exposure standards and maximum exposure limits, lower lethal doses, and guideline concentrations for methane, other bulk gases and leachates typically found in association with landfill operations.

EXPOSURE DURATION

In many contaminated land applications, assessors are usually concerned to establish whether long-term (chronic) exposure to the source, or a long-term hazard, is likely to lead to adverse effects. A typical example is a situation involving the redevelopment of a former industrial site for residential purposes, where children are expected to have regular access over long periods of time to a garden soil, and where potential exposure routes can include inhalation, ingestion and dermal contact with contaminated soils and dusts, and the consumption of contaminated foodstuffs. The assumptions used to describe typical exposure scenarios and the baseline toxicological data (e.g. TDIs, Average Daily Intakes) used for comparative purposes are consistent with the expected long-term nature of the exposure.

In some circumstances, assessors may wish to determine the potential for acute risks where short-term exposures or transient hazards may lead to adverse effects. Typical examples include situations involving the “one-off” ingestion of highly contaminated soils, skin contact with highly corrosive liquids or the build-up and ignition of an explosive gas cloud. In this case, the source-pathway-target relationship has different characteristics and different assumptions (e.g. one time soil ingestion rates) and comparative assessment values therefore apply.
THE APPLICATION OF GUIDELINES AND STANDARDS

Other countries have developed generic assessment values for soils and other media (see Section 5). However it is important to be aware that such values are influenced by a number of country specific factors and priorities which may not pertain to the UK. Examples include:

- specific policy or regulatory objectives;
- land and resource management practices;
- typical geological, hydrogeological and hydrological conditions;
- the weight given by expert professional judgement to different toxicological studies, findings or approaches;
- typical background exposures to certain contaminants;
- the weight given to different types of targets or risks, e.g. human health vs ecological targets
- specific sampling and analysis protocols.

Therefore values developed overseas should always be used with care, in full knowledge of the technical basis for their derivation and in situations which are consistent with the underlying assumptions and models used. Full recognition should given to the fact that such values have no statutory basis in the UK.

4. FACTORS TO CONSIDER WHEN SELECTING AND APPLYING GUIDELINES AND STANDARDS

To properly select and apply guidelines and standards, consultants must understand their origins, scope, intended use and any limitations on applicability. Examples of factors to consider when identifying applicable guidelines and standards are listed in the Box below.
FACTORS TO CONSIDER WHEN SELECTING AND USING GUIDELINES AND STANDARDS

- General relevance to the situation being assessed (are dedicated or non-dedicated values being used?)

- Relevance of the sources, pathways and targets of concern, taking into account:

  - the characteristics of the contaminants, e.g. type, speciation, solubility, mobility, volatility, generation rates (for gas)

  - the characteristics of the source medium, e.g. pH value, moisture content, organic matter content for soils; pH value for waters; respirable dust content in air

  - the number and types of pathways involved and their relevance to the existing or future use of the site or environmental setting

  - the characteristics of the pathways e.g. accessibility, permeability, distance

  - the number and types of targets considered potentially at risk, e.g. humans, water bodies, flora and fauna, building materials and services

  - the characteristics of the targets, e.g. sensitivity, body weight, gender, activity patterns, proximity, distribution, background exposure or dose

- Relevance to timescale of concern, e.g. short-term, long-term, transient

- Any specific sampling and analytical requirements

- Country of origin and status in the UK

- Currency of the values (are the most up-to-date values being used?)
5. COMMONLY USED GUIDELINES AND STANDARDS

The following section provides summary descriptions of a range of generic assessment values which are currently in common use, or are likely to become so in the near future. It is important to note that all such values are subject to regular review and revision, and are usually accompanied by detailed explanatory notes. Consultants should always refer to the source documentation and ensure that the most up-to-date editions are being used.

5.1 DoE (2nd Edn 1987): ICRCL Guidance Note 59/83, Guidance on the Assessment and Redevelopment of Contaminated Land

The ICRCL Guideline values are intended to be used in the context of the redevelopment of contaminated sites. The guidelines are advisory and are not, therefore, legally enforceable in themselves although they may be if used in the context of a planning condition or obligation. The guidelines indicate those concentrations of contaminants in soils which may be of concern on the grounds of potential adverse effects on health, plant growth or building materials or structures. They do not address the potential impact of soil contamination on the water environment.

The guidelines are presented in the form of Threshold Trigger Concentration values (TTCs) and, for some substances, as Action Trigger Concentration values (ATCs), for the following general land uses:

- domestic gardens, allotments
- playing fields, open space
- areas where plants are to be grown, landscape areas
- buildings, hardcover.

If the observed concentrations of contaminants are below the TTC, then the site may be treated as though it is uncontaminated as far as the proposed end-use is concerned and development can proceed. Above the TTC, further action may be required which may include additional site investigation to characterise the nature and extent of contamination. Where observed concentrations are above the ATC, then it is likely that remedial action will be required or the form of development changed.

The main limitations of the ICRCL guidelines are:

- they cover only a limited range of contaminants;
THE APPLICATION OF GUIDELINES AND STANDARDS

- there are no TTC or ATC values for organic substances (other than common gasworks contaminants);
- there are no ATC values for metals; and
- the values are not applicable to the assessment of risks to the water environment.

5.2 Environment Agency (EA) and former National Rivers Authority (NRA)

The NRA was established, amongst other things, to protect and enhance water quality within England and Wales. The EA is continuing the work started by the NRA in establishing a groundwater quality monitoring network to monitor baseline groundwater quality standards for individual aquifers, with a view to establishing groundwater quality objectives over the long-term. These values, together with surface water quality objectives and standards provide a basis against which the impact of contaminated sites on the water environment can be assessed. In some cases, UK drinking water standards may provide the most appropriate generic values for assessing the risks to sensitive groundwater resources, although dilution, attenuation and degradation factors may all have a bearing on the concentration of contaminants considered acceptable at the source.

The former NRA produced generic guidelines values (Leachability Trigger Levels) for two water catchments in England which can be used to assess the likely impact of landfill operations and contaminated sites on surface waters within the specified catchment. For example, generic Leachability Trigger Levels have been developed for the Upper Tame Catchment in the West Midlands (NRA, Solihull, undated) where much of the groundwater discharges as baseflow into surface water bodies. The values are intended to indicate the concentrations of contaminants that would be acceptable in a direct discharge to surface waters in the Upper Tame Catchment, based on representative samples of source materials and the NRA recommended leachate test procedure (NRA, 1994).

5.3 BRE (1991) Digest 363, Sulphate and Acid Resistance of Concrete in the Ground

This document identifies concentrations of sulphate and acidity in soils and allocates concrete classes with increasing resistance properties to counteract the aggressive nature of sulphate and acidity in the soil. The resulting assessment of the ground conditions can be used to define materials requirements for proposed construction and development activities.
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5.4 Dutch Ministry of Housing, Spatial Planning and the Environment, Circular on Intervention Values for Soil Remediation, 9th May 1994

On May 9th 1994 the Dutch Ministry of Housing, Spatial Planning and the Environment published a Circular on Intervention Values for Soil Remediation. The purpose of the Circular was to formally announce the replacement of one set of the former generic assessment values (the so-called “C” values) with new “Intervention” (I) values for soils/sediments and groundwaters. The I values indicate the quality of soil at which its full functionality for human, animal or plant life can be considered seriously impaired, although the regulatory framework allows a distinction to be made between the seriousness of the contamination and the urgency of remedial action.

The Circular contains an Annex which lists the new I values and “Target” (T) values. The T values replace the former Dutch A or reference values and were approved by the Lower House of the Dutch Parliament in 1992. The T values indicate the quality of soil required to ensure sustainability, i.e. the full functionality of the soil with regard to human, animal or plant life.

The former “B” values (indicative of the need for further investigation) have been discontinued although a new criterion [(I + T)/2] is available for those contaminants in which both the T and I values have been specified.

The new values are based on an extensive ecotoxicological and human toxicological study undertaken by RIVM (National Institute for Public Health and Environmental Protection) and are designed to support the Dutch policy objective of achieving the full multifunctionality of soils. Both human toxicology and ecotoxicological effects were taken into account in the derivation of the values - where both effects were considered relevant the lower of the two values has been adopted. It should be noted that the T values are not to be regarded as clean-up criteria in the Netherlands - rather they are targeted objectives. Other criteria, including cost and feasibility, are taken into account in deciding the standard of remediation to be achieved in particular cases.

Specific requirements on sampling and analysis apply to the use of the values in the Netherlands. The I values are related to spatial parameters and are considered to have been
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exceeded when the mean soil/sediment concentration of at least one substance in at least 25 m³ of soil volume (i.e. approximately 7 m x 7 m x 0.5 m), or groundwater concentration in at least 100 m³ of soil volume exceeds the I value. Any departure from the official protocols must be fully justified.

5.5 United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, December 1994, Soil Screening Guidance

In December 1994 the USEPA issued draft Soil Screening Guidance which describes a Framework (methodology) for developing Soil Screening Levels (SSLs) for specific contaminants and exposure pathways for sites intended for residential use.

The guidance is intended to provide one of a number of tools for streamlining the evaluation and remediation of contaminated sites. Areas in which soil contaminant concentrations are below the SSLs generally would not warrant further study or action under the Comprehensive Environmental Response and Liability Act (CERCLA).

The Framework provides:

1. A simple method for the calculation of site specific SSLs using easily obtainable data and standard exposure (or fate and transport) equations.

2. An option for conducting a more detailed site specific assessment.

3. SSLs for 107 substances obtained using default parameters and standard equations which can be used where site specific values are not available.

The SSLs are available for guidance purposes and their use is not mandatory at sites being addressed under CERCLA. The Framework allows project managers a broad degree of discretion about whether the approach is appropriate and, if so, which options should be used. In the first two of the three options, default values can be replaced with site specific values and the models themselves can be modified provided any changes can be justified.

Use of the SSL Framework and associated generic values requires that specific sampling procedures are followed. Both site specific and prescriptive options are available. The first requires the assessor to develop a site specific sampling strategy that will demonstrate that sampling data are representative of site conditions and can be compared against SSLs. The second prescribes the sampling frequency based on the size (0.5 hectares) of a typical residential plot.
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It is important to note that the scope of the SSL Framework is limited to human exposure via specific pathways: the guidance recommends that sites with other significant exposure pathways, non-residential use, possible ecological concerns or otherwise unusual conditions should be considered on a site specific basis outside the SSL Framework.

6 INAPPROPRIATE USE OF GUIDELINES AND STANDARDS

The selection and use of appropriate guidelines and standards for assessing the health and environmental risks that may be associated with contaminated land require care and vigilance on the part of consultants. Some common mistakes to be avoided include:

- use of guidelines values outside the appropriate source-pathway-target context (e.g. use of ICRCL guideline values for phytotoxic metals, or ecotoxicologically based Dutch Intervention values, in human health risk applications);

- inappropriate use of “borrowed” standards (e.g. direct use of Occupational Exposure Standards to assess human health risks in the population at large; use of drinking water standards to assess impacts on water not intended for human consumption);

- failure to distinguish between different exposure durations (e.g. use of “tolerable” measures of chronic intakes of a substance to assess acute risk situations);

- failure to distinguish between different chemical forms of substances when comparing site data against guideline values or specific toxicological indicators (e.g. total chromium vs chromium VI, total cyanide vs “free” cyanide, total vs speciated polyaromatic hydrocarbons).

Some guidelines are wholly inappropriate for assessing the risks that may be associated with contaminated land. For example, the former Greater London Council (so-called “Kelly”) guidelines were developed as an aid to categorising soils excavated from contaminated redevelopment sites for off-site disposal purposes. The Kelly guidelines were not intended to be used to assess the human health or environmental risks which may be associated with contaminated sites and should not be used for that purpose.
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KEY REFERENCE SOURCES


Building Research Establishment (BRE), Building Regulations; Approved Document C, Site Preparation. Reference RG8.

Construction Industry Research and Information Association (CIRIA), Investigation and Assessment, Volume III of Remedial Treatment of Contaminated Land, SP103, CIRIA 1995.


National Rivers Authority (NRA), Severn Trent Region, Solihull, Guidance on the acceptable leachable values for contaminated material to be deposited in Upper Tame Catchment, undated.

THE APPLICATION OF GUIDELINES AND STANDARDS


Visser, W.J.F., Contaminated land policies in some industrialised countries, Technical Soil Protection Committee Report (TCB R02), The Hague, Netherlands, 1993

Water Research Centre (WRC). Effects of Soil Contaminants on materials used for distribution of water. WRC 1990.

Footnote: Appendix 1 lists a selection of key reference documents in relation to guidelines and standards including guidance on their application. An extended list of references (as prepared by the former Association of Environmental Consultancies) is available from the Environmental Industries Commission at the address given in Section 5 of Special Topic 1.
APPENDIX 1

GUIDANCE PUBLISHED IN THE UNITED KINGDOM
APPENDIX 1: GUIDANCE PUBLISHED IN THE UNITED KINGDOM

Association of Geotechnical and Geoenvironmental Specialists (AGS)

Collateral warranties
AGS 1993

Quality management in geotechnical engineering - a practical approach
AGS 1990

Safety manual for investigation of sites
AGS 1992

Electronic transfer of geotechnical data from ground investigation
AGS 1994

Safety awareness on investigation sites
AGS 1992

Validation and Use of Geotechnical Software
AGS 1994

British Drilling Association (BDA)

Code of safe drilling practice Part 1: surface drilling
BDA (Brentwood), 1981

Guidelines on the drilling of landfill, contaminated land and adjacent areas
BDA (Brentwood), 1991

British Standards Institution

BS DD 175:1988
Code of practice for the identification of potentially contaminated land and for its investigation

BS 5930:1981
Code of practice for site investigations

BS 1377:1990
Methods of test for soils for civil engineering purposes

BS 6068: Water Quality: Part 2: Chemical and biochemical methods

BS 6068: Water Quality: Part 4: Microbiological methods
BS 6068: Water Quality: Part 5: Biological methods

Water Quality: Part 6.1 Sampling: Section 6.1 Guidance on the design of sampling programmes

Water Quality: Part 6 Sampling: Section 6.2 Guidance on sampling techniques

Water Quality: Part 6 Sampling: Section 6.3 Guidance on the preservation and handling of samples

Water Quality: Part 6 Sampling: Section 6.4 Guidance on sampling from lakes, natural and man made

Water Quality: Part 6 Sampling: Section 6.6 Guidance on sampling of rivers and streams

Water Quality: Part 6 Sampling: Section 6.11 Guidance on the sampling of groundwaters

BS 6068: Part 6: Section 6.12:1993 (ISO CD 5667-12)
Water Quality: Part 6 Sampling: Section 6.12 Guidance on sampling of sediments

BS 7755
Soil Quality:
   Part 1 Vocabulary
   Part 2 Sampling
   Part 3 Chemical methods
   Part 4 Biological methods
   Part 5 Physical methods

(Note: ISO soil quality standards will be published in the BS 7755 series).

Building Research Establishment (BRE)

Digest 363
Sulphate and acid resistance of concrete in the ground

IP2/87
Fire and explosion hazards associated with the redevelopment of contaminated land

IP3/89
Subterranean fires in the UK - the problem
D Crowhurst
Measurement of gas emissions from contaminated land

(see also Digests 275, 318, 322, 348, 381, and 383 for guidance on various aspects of geotechnical investigations. BRE has also published guidance on how to deal with naturally occurring radon).

Chemical Industries Association

Contaminated land and land remediation - guidance on the issues and techniques
CIA (London) 1993

Confederation of British Industry

Guidelines for business to deal with contaminated land
CBI (London) 1994

The Construction Research and Information Association (CIRIA)

Harris M R, Herbert S M, Smith M A. Remedial Treatment for Contaminated Land:

Volume I. Executive Summary. CIRIA SP101 (In press).
Volume II. Decommissioning, Decontamination and Demolition. CIRIA SP102 1995.
Volume III. Site Investigation and Assessment. CIRIA SP103 1995.
Volume VI. Containment and Hydraulic Measures. CIRIA SP106 1996.
Volume IX. In-situ Methods of Remediation. CIRIA SP109 1995.
Volume X. Special Situations. CIRIA SP110 1995.
Volume XI. Planning and Management. CIRIA SP111 1995.
Volume XII. Policy and Legislation. CIRIA SP112 (In press).

SP 45, 1986
Recommendations for the procurement of ground investigation
GUIDANCE PUBLISHED IN THE UNITED KINGDOM

SP 73, 1991
Role and responsibility in site investigation

SP 78, 1991
Building on derelict land

SP 79, 1992
Methane and associated hazards to construction: a bibliography

SP 96, 1994
Environmental assessment

SP 99, 1996
Procedures for the sale and transfer of land which may be affected by contamination

Report 113, 1986
Control of groundwater for temporary works

Report 123, 1996
A guide to safety working practices for contaminated sites

Report 124, 1996
Remedial treatment of contaminated land using in-ground barriers, liners and cover systems

Report 130, 1993
Methane: Its occurrence and hazards in construction

Report 131, 1993
The measurement of methane and other gases from the ground

Report 150, 1995
Methane investigation strategies

Report 152, 1995
Risk assessment for methane and other gases in the ground

Report 151, 1995
Interpreting measurements of gas in the ground

Report 149, 1995
Protecting development from methane
Department of the Environment

CLR 1
A framework for assessing the impact of contaminated land on groundwater and surface water (2 vols)

CLR 2
Guidance on the preliminary inspection of contaminated land (2 vols)

CLR 3
Documentary research on industrial sites

CLR 4
Sampling strategies for contaminated land

CLR 5
Information systems for industrial sites

CLR 6
Prioritisation and categorisation procedure for sites which may be contaminated

Waste Management Paper 26A
Landfill completion
HMSO (London) 1994

Waste Management Paper 26B
Landfill Design, Construction and Operation Practice
HMSO (London) 1995

Waste Management Paper No 26D
Landfill Monitoring
(in preparation 1996)

Waste Management Paper No 26E
Landfill Restoration and Post Closure Management
(in preparation 1996)

Waste Management Paper No 26F
Landfill Co-disposal
(in preparation 1996)

Waste Management Paper No 27
Landfill gas
HMSO (London) 1991

A Guide to Risk Assessment and Risk Management for Environmental Protection
HMSO (London) 1995

A1.5
Mineral Planning Guidance 12
Treatment of disused mine openings and availability of information on mined ground
HMSO (London) 1994

Planning Policy Guidance
Planning and Pollution Control PPG23
HMSO (London) 1994

24 June 1996 (Chapter 3 as amended 4 July 1996)

DoE - Interdepartmental Committee on the Redevelopment of Contaminated Land (ICRCL)

ICRCL 17/79
Notes on the development and after-use of landfill sites

ICRCL 18/79
Notes on the redevelopment of gasworks sites

ICRCL 23/79
Notes on the redevelopment of sewage works and farms

ICRCL 42/80
Notes on the redevelopment of scrapyards and similar sites

ICRCL 59/83

ICRCL 61/84
Notes on the fire hazards of contaminated land

ICRCL 64/85
Asbestos on contaminated sites

ICRCL 70/90
Notes on the restoration and aftercare of metalliferous mining sites for pasture and grazing

Friends of the Earth

Buyer beware: a guide to finding out about contaminated land
FOE (London), 1993
Health and Safety Executive

HS(G) 36
Disposal of explosives waste and the decontamination of explosives plant
HMSO (London) 1987

HS(G) 66
Protection of workers and the general public during development of contaminated land
HMSO (London) 1991

Highways Agency

Advice note: Site investigation on contaminated land for highway works
HA (London) - draft 1994

Institute of Petroleum (IP)

Code of Practice for the investigation and mitigation of possible petroleum-based land contamination
IP/Wiley (London) 1993

Institution of Civil Engineers

Site investigation in construction:
   1- Without site investigation ground is a hazard
   2- Planning, procurement and quality management
   3- Specification for ground investigation
   4- guidelines for the safe drilling of landfills and contaminated ground
Thomas Telford (London) 1993

Design guide on contaminated land
Thomas Telford (London) 1994

Institution of Environmental Health Officers

Contaminated land: development of contaminated land - professional guidance
IEHO (London) 1989

Loss Prevention Council (LPC)

Pollutant industries
LPC (London) 1992
National Federation of Housing Associations (NFHA)
Contaminated Land: Issues for Housing Associations. NFHA 1995

Former National Rivers Authority (NRA)

Scottish Enterprise
How to investigate contaminated land
Requirements for contaminated land site investigations
Scottish Enterprise (Glasgow) 1994

How to Approach Contaminated Land
A framework for the assessment of contaminated land and selection of remedial options
Scottish Enterprise (Glasgow) 1994

United Kingdom Environmental Law Association (UKELA)
The concise lexicon of environmental terms. UKELA in association with McKenna &Co. May 1995

Welsh Development Agency (WDA)
Manual on remediation of contaminated land
WDA (Cardiff) 1993
APPENDIX 2

SOURCES OF INFORMATION ON THE LEGAL AND POLICY FRAMEWORK

1. INTRODUCTION A2.1

2. ROLES OF ORGANISATIONS CONCERNED WITH CONTAMINATED LAND A2.1

3. GOVERNMENT ADVICE AND PAPERS ON CONTAMINATED LAND A2.14

4. MAINTAINING AWARENESS OF POLICY ISSUES A2.18

5. LEGISLATION A2.20

6. POLICY AND LEGAL INFORMATION - SPECIFIC ASPECTS A2.23

7. HMSO CATALOGUE SERVICES A2.27

KEY REFERENCE SOURCES A2.28
APPENDIX 2: SOURCES OF INFORMATION ON THE LEGAL AND POLICY FRAMEWORK

1. INTRODUCTION

This appendix provides a summary of sources of information on the legal and policy aspects of contaminated land. It covers:

- the roles of relevant public and private sector organisations;
- Government advice and papers including consultation mechanisms;
- maintaining awareness of policy issues;
- types of legislation, both national and international; and
- specific aspects relevant to housing developments, waste, planning, water, finance.

It describes ways of finding out about the policy and legal framework but does not describe the framework itself.

Detailed information on the legal and policy framework for contaminated land can be found in guidance produced by the Construction Industry Research and Information Association (CIRIA). The CIRIA report considers the current UK policy, administrative and legal framework on contaminated land in terms of planning and development control, public health, occupational health and safety, environmental protection, property transactions and liability issues. EC legislation and overviews of legislation in the Netherlands, Germany, Denmark, USA, Canada, Australia and New Zealand are also provided.

Note that provisions in the Environment Act 1995 alter the existing administrative arrangements for regulating contaminated land, as well as introducing specific regulatory requirements.

2. ROLES OF ORGANISATIONS CONCERNED WITH CONTAMINATED LAND

The key organisations with responsibilities for contaminated land are outlined below. Consultants should ensure that they are familiar with the work of the different organisations according to the following classification.

A Essential to be aware of organisation’s role
B Essential to be aware of organisation’s role in specific circumstances
C Useful to be aware of organisation’s role
The Environment Act 1995 includes a number of important administrative changes for environmental protection at both central and local government levels which are detailed below.

2.1 Class A

Department of the Environment (DoE)
The Contaminated Land and Liabilities (CLL) Division is the focal point within DoE on issues concerned with contaminated land. CLL maintains close liaison with other DoE divisions with related interests (see subsequent sections) and the Environment Agency.

Contaminated Land and Liabilities (CLL) Division
The CLL Division provides support to the UK Government on contaminated land policy and has general responsibility for policy advice on liability for environmental damage. It also manages a small programme of research in support of policy and administers the Supplementary Credit Approvals (SCA) programme (see section on local authorities).

The Division cannot provide specific technical or legal advice to organisations outside Government.

| Contact point: Contaminated Land and Liabilities Division |
| Department of the Environment |
| Romney House |
| 43 Marsham Street |
| LONDON |
| SW1P 3PY |
| Fax: 0171-276-8242 |

General enquiries - (Tel: 0171-276-8077)  
Liability - (Tel: 0171-276-8469)
Waste Management Division
This Division advises on waste management policy, including waste management licensing, industrial policy and implementation of the EC Framework directive. It liaises with Contaminated Land and Liabilities Division on policy matters relating to closed landfill sites.

Chemicals and Biotechnology Division
This Division develops policy and provides advice on chemicals and their effect (including toxicological and ecotoxicological aspects) on the environment. There is close liaison with the Contaminated Land and Liabilities Division regarding toxicological data and exposure pathways to ensure that guidance on contaminated land is consistent with general policy on toxic substances.

Minerals Division
This Division is concerned with all policy aspects of minerals development, e.g., planning issues relevant to mineral development, mineral extraction and land reclamation. The actual operations fall under local authority control.

Development Plans and Policies Division
This Division provides guidance to local planning authorities on their development control functions. Guidance notes (Planning Policy Guidance (PPG)) are available in a variety of areas which set out the Government's policies on different aspects of planning. Appropriate guidance on contaminated land is given in Planning Policy Guidance Note 23. This note provides guidance on the relevance of pollution controls to the planning process and on the implementation of the EC Waste Framework Directive. It contains a section specifically addressing contaminated land.

Water Quality Division
This division is concerned with the implementation of EC Directives, including the EC Groundwater Directive on water quality. Close liaison is maintained with the Contaminated Land and Liabilities Division on the impact of contaminated land on the water environment.

General Enquiries
General enquiries may be directed to the general enquiry point at DoE - 0171-276-3000.
• More specific guidance on information sources within Government departments may be found in 'Environmental contacts - a guide for business', published by DTI (available from Tel. 01443-821877)

• Listings of Government publications on contaminated land can be obtained from The DoE Publications Sales Unit (Tel. 0181 429 5187)

Scottish Office
The Scottish Office has responsibility for the formulation and execution of Government policies in Scotland, which includes Scottish policy on contaminated land. The Office is also a consultee of central Government on information and guidance in this area.

Contact point: Mr Jim Halley (0131-244-0400)

Welsh Office
The Welsh Office has responsibility in Wales for the formulation and execution of Government policies. Of relevance to contaminated land are its responsibilities for policies for environmental protection, agriculture, land use, conservation, health, economic affairs and regional planning.

For contaminated land, Welsh Office in conjunction with DoE, is responsible for all policy aspects including liability, assessment and remediation. Welsh Office funds the Welsh Development Agency which carries out the investigation and remediation of contaminated and derelict land in Wales. Welsh Office also funds research on assessment and remediation techniques relevant to the types of contamination seen in Wales.

Welsh Office does not provide information/guidance to consultants and clients. The Welsh Development Agency has produced a manual on the remediation of contaminated land, which may provide useful information in this area.

Contact point: Dr H J Prosser (01222-823178)

Department of the Environment (Northern Ireland)
The Environment Service of the Department of the Environment for Northern Ireland (DoE (NI)) has responsibility for developing and implementing environmental policy in Northern
Ireland, including the control of pollution of air, water and land, the conservation of the natural environment and the protection of monuments and historic buildings. In the area of contaminated land, the Service mirrors the advisory role of the Contaminated Land and Liabilities Division for Northern Ireland. DoE (NI) is also the planning authority and therefore has involvement with planning issues.

Contact point: Mr Stephen Aston (01232-254754)

Department of Trade and Industry (DTI)
The Department of Trade and Industry (DTI) supports a selection of projects on environmental techniques and technologies. These include:

- The Environmental Technology Best Practice Programme (a joint DTI/DOE initiative to encourage users to adopt best environmental technology and techniques).
  Contact point: Environmental Helpline (0800-585794);

- LINK programme on the biological treatment of soil and water (aimed at promoting collaborative research between industry and universities in this area).
  Contact point: Mrs Carolyn Garcia, Laboratory of the Government Chemist (0181-943-7582);

- EUROENVIRON programme (part of the EUREKA initiative funded by the European Community, this programme supports a broad area of research involving European collaborations);
  Contact point: Mrs L Cheek (0171-215-1056)

- Two further schemes, the Environmental Technology Information Scheme (ETIS) (jointly managed by DTI and DoE to promote research on new technologies), and the Environmental Management Options Scheme (DEMOS) (aims to promote improved environmental performance of UK companies through the demonstration of 'best practice' environmental techniques and technologies) are now closed to new applications but enquiries can be made about approved projects (ETIS) and future demonstration events (DEMOS).
  ETIS contact point: Mr C Regan (0171-215-1051)
  DEMOS contact point: Mr D Johnson (0171-215-1065)
Further information on new initiatives in environmental technology can be obtained by contacting the DTI Environment Division.

In addition, the DTI supports a network of regional offices which aim to publicise DTI polices and provide advice to local firms.

In addition, the DTI supports the Valid Analytical Measurement (VAM) initiative. This is managed by the Laboratory of the Government Chemist and is a major programme of work concerned with the quality of chemical analysis. The VAM initiative promotes the importance of reliable analytical measurements, providing both advice to laboratories on achieving valid measurements and developing tools to improve the quality of these measurements. In addition to the general concept of promoting quality in chemical analysis, the following areas of work are of particular relevance to contaminated land:

- Development of contaminated land reference materials.
- Sampling technologies.
- Promotion of proficiency testing (CONTEST scheme for testing proficiency in contaminated land analysis).

VAM contact point: Dr John Mason (0181-943-7331)

Environment Agency

On 1 April, 1996, Her Majesty’s Inspectorate of Pollution (HMIP), the National Rivers Authority (NRA) and the Waste Regulation Authorities, together with several small units from the DoE, combined to form a new Environment Agency (in England and Wales). The Agency provides a more comprehensive approach to the protection and management of the environment by combining the regulation of land, air and water.

The responsibilities of the Environment Agency for contaminated land are outlined in the Environment Act 1995. These include the management and remediation of contaminated land designated as special sites. The Agency also manages a substantial research programme on contaminated land.

Water

The Environment Agency inherited responsibilities of the former NRA. It has statutory duties and powers under the Water Resources Act 1991 for water resources, pollution control, flood defences, fisheries, recreation, conservation and navigation. This includes additional interests in contaminated land because it may represent a source, or potential
source of water pollution. The Agency is concerned with that proportion of contaminated land which:

- is currently affecting surface water or groundwater quality in England and Wales or which is the sole cause of low river quality classification; and/or
- has the potential to pollute or downgrade controlled waters in the future, possibly as a result of its re-development.

The Agency is a statutory consultee in the preparation of plans under the Town and County Planning (Development Plan) Regulations 1992 and for planning applications that may affect water quality.

**Integrated Pollution Control**

The Agency also has responsibility (under the Environmental Protection Act 1990) in England and Wales for regulating the potentially most polluting industrial processes formerly regulated by HMIP. The Act introduced the system of Integrated Pollution Control (IPC) which requires operators of prescribed processes to seek authorisation from the Agency with regard to discharges to land, water and air, thus preventing contamination by industrial processes.

**Waste**

In addition, the Agency inherits from the former Waste Regulation Authorities (WRAs) the regulation and licensing of waste management activities including:

- Waste management licensing;
- Supervision of the duty of care;
- Supervision of licensed activities;
- Inspection of closed landfills;
- Maintenance of public registers;
- Regulation of special waste;
- Regulation of waste carriers.

It also provides technical advice on aspects of waste management, including advice on matters relating to landfill, and manages research on technical aspects of waste management.

**Contact points**

Information on individual sites or areas is available from the Pollution Control Departments of Environment Agency Area Offices.
Scottish Environmental Protection Agency

The Scottish Environmental Protection Agency (SEPA), like the Environment Agency for England and Wales, was established by the Environment Act and became fully operational on 1 April 1996. It was formed by the amalgamation of Her Majesty’s Industrial Pollution Inspectorate (HMIPi), the river purification authorities and the waste regulation functions of local authorities. In addition, and not in line with the Environment Agency, it assumed the local authority air pollution control responsibilities for the less polluting industrial processes and it also subsumed many of the duties of the Hazardous Waste Inspectorate.

As with the Environment Agency, responsibilities for contaminated land are outlined in the Environment Act 1995. Since the functions of the river purification authorities were narrower than those of the former NRA, SEPA has less wide-ranging duties than the Environment Agency in the areas of water pollution and resources.

Health and Safety Executive (HSE)

The principal role of the HSE is to secure the health, safety and welfare of persons at work and to protect others against risk to their health and safety from work activities. HSE has environmental responsibilities with respect to industrial major accidents, pesticides, genetically modified organisms, new substances, onshore and cross-country pipelines, and polychlorinated biphenyls and triphenyls.

HSE’s role with respect to contaminated land is restricted to those activities that might affect the health, safety and welfare of people at work, or the safety of the general public.

HSE holds information about contaminated land as a result of its other activities and is prepared to make such information available under the provisions of the Environmental Information Provisions Regulations 1992. HSE has published advice on the protection of
workers and the general public during development of contaminated land (HS(G)66, HSE, HMSO (London), 1991).

| Contact points: | Mr John McAlinden | 0151 951 4000 |

HSE is divided into a number of inspectorates, each of which maintains its own information databases.

| Contact points: | Mines Inspectorate | 0151 951 4000 |
|                | Explosives Inspectorate | 0151 951 4000 |
|                | Railway Inspectorate | 0171 717 6000 |
|                | Nuclear Inspectorate | 0171 717 6000 |

Enquiries to factory, agriculture and quarries inspectorates should be addressed to area offices.

**Local Authorities**
The main powers and duties of public authorities with respect to contaminated land are found in statute law, in particular the Environmental Protection Act 1990, the Water Resources Act 1991 and the Environment Act 1995. Local authority responsibilities for contaminated land are derived under a range of different statutes in the fields of land use and development control, building control, public health and environmental protection.

A system of Government approvals (Supplementary Credit Approvals) allows local authorities (counties or districts) to borrow finance for action on specific sites. This applies where the authorities are responsible for investigation of contamination and any remediation measures and where they cannot immediately recover the costs of remedial measures from those responsible.

Local authorities hold a number of relevant sources of information. These include the following:

**Planning Department:**
- Statutory Planning Registers;
- Derelict and Despoiled Land Surveys;
- Surveys of Mineral Workings.
Environmental Health Department:
- Details of licensed waste disposal sites;
- Register of authorisations under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

Local authorities also have a duty to compile information on sites in their areas which require remediation.

In addition, they have two waste management activities: Waste Disposal and Waste Collection. Responsibilities for Waste Regulation lie with the Environment Agency.

Waste Disposal Authorities (WDAs) organise waste disposal - their main functions are:
- Forming waste disposal companies and transferring functions to them;
- Directing Waste Collection Authorities (WCAs) on delivery of collected waste;
- Arranging disposal for waste collected by WCAs;
- Arranging provision for free deposit sites for household waste and transfer/storage sites;
- Waste recycling.

Waste collection is performed by the WCAs whose functions are:
- Arranging for the collection of waste and delivery to places directed by WDAs.
- Drawing up and implementing waste recycling plans.
- Specifying/supplying receptacles for waste.
- Maintain registers of entries in the waste regulation registers of relevance to their area.

2.2 Class B

English Partnerships
English Partnerships (the Urban Regeneration Agency), a non-departmental public body, came into full operation on 1 April 1994. Its objectives are to promote job creation, inward investment and environmental improvement through the reclamation and development of vacant, derelict and underused or contaminated land and buildings. The Agency aims to achieve this by promoting broadly based strategic partnerships with local authorities, the private sector and voluntary bodies.

English Partnerships' Investment Fund finances all aspects of its involvement in regeneration including projects carried out by others, investment in joint ventures, the sharing of risk by the issue of guarantees or other means, or its own direct development. English Partnerships will contribute to the costs of treating contaminated land where such treatment forms part of
a project for the regeneration of a vacant, derelict or underused site and where no party has an enforceable responsibility for dealing with the contamination. Importance is attached to treating sites which pose a significant risk to public health or to the environment.

English Partnerships have taken over two DoE grant regimes relevant to contaminated land. No new applications for the City Grant (payable to private developers to bridge the gap between development costs and market value on completion) have been accepted since March 1995. The Derelict Land Grant (payable to both local authorities and the private sector for land reclamation) falls under the English Partnerships Land Reclamation Programme which forms part of the Investment Fund.

Contact point: Mr Richard Bradley (0171-976-3207)

Scottish Enterprise
Scottish Enterprise is a non-departmental public body whose roles include:

- furthering the development of Scotland's economy;
- promoting Scotland's industrial efficiency and international competitiveness;
- furthering improvement of the environment in Scotland.

It operates through a network of thirteen Local Enterprise Companies. In the area of contaminated land, a priority is to satisfy the needs of business through the provision of development land - a component part of which is vacant, derelict or contaminated. The Scottish Enterprise network can, at its discretion, assist both the public and private sectors with the remediation of contaminated land.

Published guidance is available from the headquarters of Scottish Enterprise (Scottish Enterprise National).

Contact point: Iain Hart (0141-248-2700)

Welsh Development Agency
The Welsh Development Agency is defined as a non-departmental public body, reporting to the Welsh Office. The Agency is charged with regenerating the Welsh economy and is responsible for providing grants for the reclamation of derelict land in Wales. In addition to providing grants, the Agency fulfils an all-Wales coordination role in establishing priorities and agreeing standards of treatment.
2.3 Class C

Department of Health
The Department of Health is responsible for advising Government on the health aspects of exposure to chemicals (and other agents such as radiation and micro-organisms) in the environment. This is carried out through officials working to the Chief Medical Officer (also the Government's Chief Medical Adviser) with the support of expert toxicological committees. In the area of contaminated land, the Department of Health provides advice to DoE on public health aspects.

The Department of Health maintains regular contact with Health Authorities and Local Authorities on environmental matters, including contaminated land, but does not provide advice directly to private consultants or their clients.

Building Research Establishment (BRE)
BRE's main role is to advise and carry out research (principally for the DOE) on technical aspects of buildings and other forms of construction, all aspects of fire, and environmental issues related to buildings. BRE advice is the technical basis for the Buildings Regulations and many British Standards and Codes of Practice. BRE does provide advice to consultants and the construction industry on building on contaminated land.

Advice can be provided on fire and explosion hazards, barrier and protective systems, building materials and contaminated land, and site investigation.

Highways Agency
The Highways Agency is an executive agency of the Department of Transport. Its primary role is the construction and maintenance of motorways and trunk roads in England. Its role in respect of contaminated land is to ensure that any investigation and remedial programme will render the site suitable for use for highway construction.

Advice on design and construction of highways, including information on contaminated land, is available.
Transport Research Laboratory (TRL)
The TRL is an independent and impartial company limited by guarantee. It undertakes research and technical consultancy on a wide range of issues related to transport and the provision of transport infrastructure, for public and private sector clients in the UK and overseas.

TRL has undertaken generic and site specific studies of contaminated land issues, which have been used to advise and inform policy makers in the Department of Transport (DoT) on the technical aspects of highway construction through areas of contaminated land. This is being incorporated into DoT Advice Notes on the design, construction and maintenance of earthworks which address two main aspects. Firstly, the technical requirements for highways which involve the control of gases and leachates whilst maintaining the strength and stability of road foundations and slopes. Secondly, the different types of construction which need to be specified to satisfy different environmental and material handling demands, whilst ensuring material durability. In addition, TRL also provides expert advice on strategic planning of highway construction through areas of contaminated land for consultants and their clients.

ADAS
ADAS is an Executive Agency of the Ministry of Agriculture, Fisheries and Food (MAFF) and the Welsh Office. ADAS provides services to business operating in the food, farming, land and leisure markets and the agencies responsible for agriculture and environmental policies. ADAS operates its business from over 50 offices in England and Wales through seven Consultancy Centres. This is supported by five Research Centres, a Laboratory Centre consisting of microbiology, analytical chemistry and plant diagnostic facilities and three Statutory Centres which deal with the statutory work that ADAS carries out on behalf of MAFF and the Welsh Office. ADAS provides a service to bring derelict and contaminated land into suitable after-use from the initial planning stage through to completion and aftercare.
ADAS can provide commercial consultancy services to clients and other consultants in addition to acting as project leaders.

Contact Point: Chris Stansfield (01623 846742)

Relevant European Institutions
Details of European Environmental organisations, both Governmental and non-Governmental, are detailed in 'A directory of European Environmental Organisations'.

3. GOVERNMENT ADVICE AND PAPERS ON CONTAMINATED LAND

3.1 Government Papers

Details on the main types of Government papers are summarised in Table A2.1. Further information can be obtained from the publication 'Official Publications in Britain'.
TABLE A2.1: EXAMPLES OF GOVERNMENT PAPERS

<table>
<thead>
<tr>
<th>Category &amp; Scope</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>House of Commons Papers</td>
<td>(a) Select Committee papers</td>
</tr>
</tbody>
</table>

Mainly reports and evidence of select committees' or minutes of standing committees' proceedings.

(b) Government responses, eg,
- memoranda published as a House of Commons paper in a special report of the committee;
- a policy statement published as a Command Paper;
- a letter to the chairman;
- a verbal statement to the House.

(c) Standing committee proceedings

Command Papers
Deal with the policies which the Government intends to implement or commitments into which the country will be entering. Policy documents (mainly green and white papers) are an important group of command papers.

(a) Green papers: consultative documents for discussion which contain the preliminary thoughts of the Government but do not commit it to specific actions.

(b) White papers: statements of the policy which the Government will be implementing. May also set out proposals for legislative changes.

1. Select Committees are set up by the House of Commons to investigate and report on various aspects of Government activity, from external matters, such as the work of Government Departments, to internal matters, such as procedures in the House. The Committees generally consist of Members of Parliament supported by Research Assistants and Specialist Advisers. In some instances, there are joint committees of the House of Commons and the House of Lords although these mainly deal with legislative matters. There are also a few select committees of the House of Lords.

2. Standing committees have a variety of functions, the most common being to consider Public Bills. Scottish Grand, Welsh Grand and Northern Ireland Committees tend to debate matters passed to them from the House but also Bills relevant to Scotland, Wales or Northern Ireland respectively. Statutory Instrument Standing Committees are also constituted by the House to deal with particular items of secondary legislation.
Sources of information
Information on Government papers may be obtained from several sources as shown in Table A2.2.

The Public Information Office in the House of Commons (0171-219-4272) is able to provide information on House of Commons papers. It can access the Parliamentary On-Line Information System (POLIS) which covers information sources such as Hansard, House of Commons' debates and questions, Parliamentary papers, Command papers and Select Committee Reports. POLIS also contains details of papers which have been laid before the House of Commons but not published.

There is also a Public Information Office for the House of Lords (0171-219-3107) although this office deals mainly with more general issues such as the operation of the House and who is attending.

TABLE A2.2: INFORMATION ON GOVERNMENT PAPERS

<table>
<thead>
<tr>
<th>Source</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMSO Catalogue Services</td>
<td>HMSO provides information on all titles published by organisations for which HMSO is an agent. Further details may be obtained from Bibliographic Services, HMSO Books (0171-873-8275). Further details are given in Section 7.</td>
</tr>
<tr>
<td>House of Commons Weekly Information Bulletin</td>
<td>This bulletin provides information on the work of the House of Commons each week, on such aspects as Business of the House, Legislation, Bills, Standing Committees, Select Committees, White and Green Papers, EC documents. Available from HMSO publications (0171-873-9090).</td>
</tr>
<tr>
<td>House of Commons Journal</td>
<td>Index contains a full list of House of Commons papers, both published and unpublished.</td>
</tr>
<tr>
<td>Government Press releases</td>
<td></td>
</tr>
<tr>
<td>Trade journals</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Government Advice

The Environment Agency manages a substantial research programme on contaminated land aimed at producing guidance on such aspects as:

- information requirements;
- risk assessment;
- remedial methods and monitoring;
- quality assurance.

In addition, the Contaminated Land and Liabilities Division of the DoE manages a small research programme on contaminated land in support of policy. A research programme is also jointly run by the Contaminated Land and Liabilities Division and the Construction Directorate of the DoE with the Construction Industry Research and Information Association (CIRIA). The CIRIA programme addresses:

- methane and associated gases;
- building on contaminated land.

A list of current research projects and published reports is available from the Contaminated Land and Liabilities Division, Department of the Environment, Romney House, 43 Marsham Street, LONDON, SW1P 3PY. Fax: 0171-276-8403. Government papers are also covered by the former AEC Bibliography on Contaminated Land (available from the Environmental Industries Commission, 6 Donaldson Road, London, NW6 6NB). Details of the new Environment Agency research projects are given in the Environment Agency Research and Development Programme: "Schedule of On-going Projects and Proposed New Starts" which can be obtained from the R & D Programme Officer, Environment Agency, Rio House, Waterside Drive, Aztec West, Bristol, BS12 4UD, Tel: 01454-624400. Details of proposed new DoE research projects are given in the Environmental Protection Group Research Newsletter which can be obtained from Mr Ken Nulty, Department of the Environment, Room A130, Romney House, 43 Marsham Street, LONDON, SW1P 3PY, Tel: 0171-276-8409.

Advice specific to Scotland, Wales and Northern Ireland is dealt with by the Scottish Office, Welsh Office and the Department of the Environment (Northern Ireland) respectively.

*Environmental helpline (01800-585794)*

The Environmental Helpline is a Department of Trade and Industry enquiry service providing up-to-date information to industry on a wide range of environmental issues, legislation and
technology. This Helpline is part of the new Environmental Technology Best Practice Programme.

The Helpline offers up to two hours' free advice on such aspects as technical matters, environmental conferences and seminars, existing legal requirements and new proposals.

*The Department of the Environment (DoE) library*

The DoE library provides telephone advice on environmental publications (0171-276-4401). Access to the library by personal callers is limited but may be permitted, on occasion, by prior appointment.

4. MAINTAINING AWARENESS OF POLICY ISSUES

This section describes the sources of information which consultants can use to keep up to date on policy issues. Sources include Hansard, conference proceedings, journals and other published material.

4.1 Hansard

Hansard is a clear and independent record of all proceedings in the Chamber of the House of Commons, and its standing committees. Though not strictly a verbatim report of all that is spoken by Members, Hansard provides a substantially accurate account without altering or omitting anything which may add to, or illustrate, an argument.

Issues of Hansard are published and distributed by HMSO in daily and weekly parts and in fortnightly volumes. A cumulative index of each session is also produced and is found in the last bound volume of each session. Copies of Hansard are available from HMSO, libraries and through bookshops, whilst Chadwyck Healey Limited produce a series of CD Roms which contain a full version of each Hansard produced during a parliamentary session.

4.2 Press Reports

Press reports and official documents from Governmental agencies are available from the Central Office of Information - the publicity agency for Government departments (Tel. 0171-261-8398). An index to all such releases is available from HMSO. Copies of press releases can be obtained by facsimile from the Central Office of Information via its News Distribution division (Tel. 0171-261-8527). The DoE produces a monthly list of new HMSO releases which are available from the subscriptions department (Tel. 0171-873-8499).
Newspaper and press reports are more difficult to access as no central agency exists for their collation and publication. The most effective method of accessing such information is via private organisations and publications which collate press releases and newspaper articles in the field of environmental management, including contaminated land. Such publications include The ENDS Report - Published by Environmental Data Services Limited (Tel. 0171-278-4745), and many of the periodicals and journals detailed below.

4.3 Environmental Journals and Conferences

Journals and periodicals relevant to contaminated land include:

<table>
<thead>
<tr>
<th>Land Contamination and Reclamation</th>
<th>IWM Wastes Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ENDS Report</td>
<td>NAWDC News</td>
</tr>
<tr>
<td>Journal of Engineering Geology</td>
<td>Environmental Business</td>
</tr>
<tr>
<td>CIRIA News</td>
<td>Industrial Environmental Management</td>
</tr>
<tr>
<td>BURA News</td>
<td>Local Authority Waste and Management</td>
</tr>
<tr>
<td>The Safety and Health Practitioner</td>
<td>Chemistry in Britain</td>
</tr>
<tr>
<td>Environmental Law</td>
<td>The Journal of Environmental Law</td>
</tr>
<tr>
<td>The Journal of Environmental Liability</td>
<td>Environmental Law and Management</td>
</tr>
<tr>
<td>Haz News (International Hazardous Waste Report)</td>
<td>Waste Manager</td>
</tr>
</tbody>
</table>

Benn's Media Directory (United Kingdom Issue) provides information on all forms of UK media including a listing and brief resume of almost all published journals and periodicals - indexed by subject. A similar service covering international media is supplied by Benn's Media Directory (International Issue). These directories are published by Benn Information Services Limited (Tel. 01732-362666).

Conference organisers usually publicise conference events by mail-shot to organisations and periodicals with an interest in the subject matter. Organisations such as BICS International and IBC Technical Services Limited (Industrial Division) (Tel. 0171-637-4383) are experienced UK based conference organisers who maintain extensive mailing lists. Environmental journals also include details of conferences dealing with contaminated land issues.
4.4 European Issues

Information relating to European environmental policy issues can be obtained from a variety of sources, particularly periodicals and journals published within the European Community. Relevant sources include:

<table>
<thead>
<tr>
<th>Official Journal of the EC</th>
<th>Environment Watch Western Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe Environment</td>
<td>European Environmental Law Review</td>
</tr>
<tr>
<td>Environmental Law Reports</td>
<td>The ENDS Report</td>
</tr>
</tbody>
</table>

Further information on European issues is available from Euro-Info Centres which have been set up in many of the UK's major cities (London Centre Tel. 0171-489-1992). Information may also be obtained on-line from the EU database SCAD which contains bibliographical details on EU related documents.

4.5 International Issues

Details of international environmental policy can be obtained from international reviews, periodicals and journals. Sources include:

<table>
<thead>
<tr>
<th>International Environmental Reporter</th>
<th>Environmental Policy and Law</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Hydrogeology</td>
<td>Land Contamination and Reclamation</td>
</tr>
</tbody>
</table>

5. LEGISLATION

This section describes ways of finding out about the various types of legislation relevant to contaminated land.

5.1 Type and Sources of Information on Legislation

Legislation is created by a two-tier mechanism: a primary legislative Act is initially created, and passed by parliament, and from this secondary legislation is created in the form of regulations. Examples include the Environmental Protection Act (1990) and the Environmental Protection (Prescribed Processes and Substances etc) (Amendment) Regulations 1994, SI 1271.
Copies of legislation are available from HMSO Publications Centre (Tel. 0171-873-9090), which produces a regularly updated listing (Environment - Sectional List No.5) of UK and many European and United Nations Environmental publications.

Details of legislation on contaminated land are available from a variety of organisations including the Environment Agency (Tel. 01454-624400). The Department of the Environment, including the Contaminated Land and Liabilities Division (Tel: 0171-276-8103), provide general papers covering legislation.

Further information on new legislation may also be obtained from journals published by the larger UK solicitors firms. These journals give a brief resume of new legislation, and its implications for solicitors and other professionals.

5.2 Current Legislation (UK)


5.3 Draft Legislation (UK)

Journals and periodicals covering contaminated land issues should be studied for references to draft legislation. Details of draft legislation may also be obtained from bulletins produced as part of Garner's Environmental Law (published by Butterworths Tel. 0171-400-2500).

Trade organisations, such as the CBI, are consulted to ascertain their views on draft legislation. However, this information is not usually made available to the general public.
5.4 Forthcoming Legislation (UK)

Details of current parliamentary debates may be obtained from Hansard, whilst journals and periodicals pertinent to contaminated land should also be studied.

Consultation documents covering likely future policy and legislation developments may be obtained from the DoE and other national Governmental organisations. Sections of this appendix provides details of how to maintain awareness of such documents. Private organisations, companies and individuals are encouraged to review these consultation documents and to make their views known to the issuing organisations.

5.5 European Legislation

Information about the general structure, and hierarchies within the EC, can be obtained from the following publications:

- "EC Direct - A Comprehensive Directory of EC Contacts" by Hans Martens (publisher: Blackstone Business, Oxford), which provides a comprehensive guide to the EC system, and is an excellent index to information sources within the EC

- The "Manual of Environmental Policy: The EC and Britain" by Nigel Haigh (published by Longman, London) which should be viewed for details of European legislation

The following organisations and persons can be consulted for details on European legislation:

Commission Directorate General for Environment (DG XI) (Tel. ++32-2-299 23 00)
Commission Directorate General for Science, Research and Development (DG XII) (Tel. ++32-2-296 88 88)
European Commission Representatives in the UK
European Environment Agency (based in Copenhagen) (European Environment Agency Newsletter available)
UK Members of the European Parliament (in particular, members of the Environment Committee)
On-line information can be obtained from the EU database CELEX which contains the main body of EC legislation.

Relevant information may also be obtained from industry associations, or their confederations at European level. Such organisations include:

- Chambers of Commerce;
- European Chemical Industry Council (CEFIC);
- Bureau International de la Recuperation (BIR);
- European organisation of oil companies for environmental and health protection - (CONCAWE).

5.6 International Legislation

International legislation regulates relations between states. However, unlike European legislation, it has no direct effect on domestic law or on individuals. In the main, international environmental law consists of public international law (treaties and conventions agreed by signatory states) and foreign domestic law. Public international law may merely provide guidelines on activities, or lay down specific standards and requirements and, although not part of national law, it often provides the framework for domestic, and European, legislation amongst others.

The most important environmental treaties and conventions, are reproduced in the Encyclopaedia of Environmental Law (published by Sweet and Maxwell) and EC Directives. Legal developments can be followed through the Yearbook of International Law (Oxford University Press). Graham and Trotman also publish a number of comparative texts dealing with domestic environmental legislation in various countries.

Information on legislation relevant to contaminated land in countries outside the UK can be obtained by application to the Governmental departments of the country in question (eg the Department of Natural Resources and the Environmental Protection Agency in the USA). Details of such organisations within foreign nations could be supplied by the British Embassy or Consulate in the country in question, or the relevant Embassy in the UK.

6. POLICY AND LEGAL INFORMATION - SPECIFIC ASPECTS

Users may have differing detailed information needs to those described above. This section considers information sources on specific applications.
6.1 Housing Developments

Organisations which may be able to provide guidance on relevant, legal and policy matters include:

| Institution of Environmental Health Officers UK Environmental Law Association (UKELA) |
| Confederação of British Industry | CIRIA |
| British Drilling Association | British Builders Association |
| Building Research Establishment | National Housing Building Council |

6.2 Waste

Information available from the Environment Agency includes a selection of Waste Management Papers relevant to contaminated land: relevant documents include WMP No 4 (Licensing of Waste Management Facilities), WMP Nos 26A, 26B, 26D, 26E and 26F (Landfilling), and WMP No 27 (Landfill Gas). The DoE also maintains a national database/library of information/publications related to waste. This service is called The Waste Management Information Bureau (WMIB) and is based at the National Environmental Technology Centre (Tel. No. 01235-521840).

Other relevant information sources include Croner's Waste Management (published by Croner Publications Limited) and Wastes Management, the monthly journal of the Institute of Wastes Management, which reports on draft and current legislation relating to contaminated land issues.

6.3 Planning

The DoE have produced Planning Policy Guidance, which advises on the relevance of pollution controls to the planning process and on the implementation of the EC Waste Framework Directive. It contains a section specifically addressing contaminated land.

Information on UK town and country planning is available at a number of levels, from national policy and guidance to Local Authority plans containing detailed proposals for the development and use of land at a local level. Local Planning Authorities are required to consult the Environment Agency in relation to specific types of development proposals, and both organisations can be approached for information relating to contaminated land.
Other sources of information on planning legislation include:

<table>
<thead>
<tr>
<th>Planning Magazine</th>
<th>Encyclopaedia of Planning Law</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ENDS Report</td>
<td>(Sweet and Maxwell)</td>
</tr>
<tr>
<td>Journal of Planning Law</td>
<td>'Planning Law. Practice and Precedents.' S Tromans and R Turrall-Clarke (Sweet and Maxwell)</td>
</tr>
<tr>
<td>Planning Appeal Decisions</td>
<td>Building Research Establishment</td>
</tr>
<tr>
<td>DoE Waste Management Paper No27</td>
<td>Butterworths Planning Law Service</td>
</tr>
</tbody>
</table>

6.4 Water

Information may be obtained from a variety of sources including the Environment Agency.

The Agency’s powers of enforcement arise under a variety of legislation including the Water Resources Act (1991), the Environmental Protection Act (EPA) (1990), Parts II and VIII, and the Town and Country Planning Act (1990).

Details of research reports related to water and contaminated land are available from the Environment Agency. Other relevant sources of information include:

- The Institution of Water and Environmental Management
- Institute of Hydrology
- Journal of Environmental Geology and Water Quality
- Journal of the Institution of Water and Environmental Management
- Journal of Water Law.

6.5 Financial

Financial assistance (subject to specified criteria) for land regeneration activities involving contaminated land may be obtained from English Partnerships, the Welsh Development Agency and Scottish Enterprise. In addition, the Contaminated Land and Liabilities Division of DoE administers the Supplementary Credit Approvals (SCA) programme which allows local authorities to borrow finance to investigate and carry out remedial works on closed landfill sites and other contaminated land for which they are responsible.
The central guidance source on the approach of UK financial institutions to contaminated land is the British Bankers' Association. The Association sets out the policies which banks should apply to contaminated land and advice on steps to be taken to protect the banking industry.

The banks have established mechanisms to protect their interests. A number of the larger banks have set up their own risk-based classifications which are used when considering future financial involvement in different areas of the UK.

One classification system, which is gaining wide acceptance by financial institutions, is the SIC/NACE Environmental Classification list. These relate current and past land usage to the expected levels of environmental risk - and hence the possible future degree of land contamination. The lists, which are updated annually, are published by the European Union and are available from Directorate-General VII-Directorate A of the European Community (Publications and Distribution).

Further information on insurance and liability issues can be found in Special Topic 3.

6.6 Professional

A number of institutions have a professional involvement in the issue of contaminated land. Some organisations have formed a group called FOCIL to co-ordinate their activities on contaminated land. Currently, five key institutions are represented:

- The Royal Institution of Chartered Surveyors
- The Institution of Civil Engineers
- The Royal Society of Chemistry
- The Institution of Water and Environmental Management
- The Geological Society

Together with the Laboratory of the Government Chemist. FOCIL intends to provide guidance on a variety of contaminated land issues. Currently the group is assisting in the development of a Code of Practice to provide guidance on the instruction of laboratories by engineers and environmental consultancies. This is intended to standardise the basis on which laboratories receive instructions and report analytical data to ensure consistency of interpretation of similar data by different consultancies. The FOCIL secretariat currently rests with the Royal Institution of Chartered Surveyors and enquiries about FOCIL should be addressed to the Institution.
7. HMSO CATALOGUE SERVICES

The following information is available from HMSO books:

- HMSO Daily List (all publications published or placed on sale each day, including Parliamentary Publications, Non Parliamentary Publications, Agency Publications, Statutory Rules of Northern Ireland, Statutory Instruments);
- HMSO Monthly Catalogue (all publications issued each month, with the exception of Statutory Instruments and Statutory Rules of Northern Ireland);
- Committee reports published by HMSO indexed by chairman (quarterly list of committee or commission reports);
- HMSO Annual Catalogue (bibliography of all HMSO publications issued each year - exception as for monthly catalogue);
- HMSO Agency Catalogue (annual listing of publications placed on sale by HMSO for all organisations for which it is an agent);
- Catalogue of official UK publications (UKOP) (a quarterly publication with Chadwyck-Healey Ltd on CD-ROM - contains information [from 1980] from HMSO's bibliographic database and Chadwyck-Healey's catalogue);
KEY REFERENCE SOURCES


Department of the Environment (DoE). Planning and Pollution Control, PPG 23. HMSO 1994.


APPENDIX 3

EXAMPLE BRIEFS

EXAMPLE 1

EXAMPLE 2
APPENDIX 3: EXAMPLE BRIEFS

A3.1 Example 1: A Chartered Surveyor’s Brief for a Desk-Based Review of a Former Industrial Site in Yorkshire

3.1.1 The purpose of the brief

XXX are in the process of agreeing a development of the above site for a distribution warehouse premises. We are now seeking quotations from suitably qualified Consultants to carry out an investigation and to make an assessment of contaminated land at the site with a view to allowing its safe redevelopment for industrial purposes. The overall aim of the project is to remediate the site to standard that would satisfy investment funds for the onward disposal of the completed development site, based on:-

(a) A desk top study, site visit and interviews; and, if necessary

(b) Intrusive investigations - ie: soil and/or water and gas sampling and analysis.

The quotations should include a lump sum price for item (a) and indicative costs for item (b), the latter being divided into sampling/analysis; supervision and interpretation/reporting.

3.1.2 Background

This former heavy forge site is located to the North West side of xxxx in parallel with the xxxx motorway and one and a half miles North of Junction xxxx (Northbound). The National Grid Reference for the centre of the site is xxxx.

The site is bounded by fencing to the North with adjacent occupiers xxxx concrete. The land to the West being bounded by xxxx Brook. To the Southern boundary is a fence. Within the site there currently stands approximately 90,000 square feet (8400 m²) of dilapidated buildings. We calculate that the site area is some 7.2 acres (2.9ha).

The ground conditions are not known although we understand clay was predominantly found during excavations for removal of the Forge Hammer beds. xxxx Brook meandered through the site prior to 1917 when the brook was diverted to its present course and XXXX purchased the site and developed it.

A3.1
EXAMPLE BRIEFS

It is thought that the brook has been filled with hard core, typically old grinding wheels, rubble, house bricks, timber and excavation material. It is thought that all the material used was inert.

It is said that the water table is approximately 18 feet below ground level.

We are informed that to the best of our knowledge there have not been any of the following activities on-site:

(i) Mining.

(ii) Metal manufacture of refining (involving molten metal).

(iii) Manufacture of gas, coke or bituminous material from coal.

(iv) Manufacture, refining or recovery of petroleum products.

(v) Manufacture, refining or recovery of chemicals.

(vi) Treatment of household, commercial or industrial waste.

Site plans and information regarding services will be available on request.

3.1.3 Report specification

A Report should be produced by Consultants which will advise us as to the potential consequences of any ground contamination which may have risen as a result of the past activities of the site and in light of:-

(a) The history of the site.

(b) The site setting including surrounding facilities, watercourse.

(c) Geology and Hydrogeology of the area and site.

(d) Former processes/arisings.
(e) Proposed development.

(f) Current and future legal situation and corporate practices.

(g) Regulatory control.

We would suggest that the first stage of the exercise is a desk top study/site visits/interviews to establish the aforementioned factors. The report is to contain an opinion on the need for any such investigation and the likely scope, design and cost. The second stage if necessary is likely to involve soil, water and/or gas sampling at strategic areas to be agreed.

The timescale proposed is as follows:-

(i) Issue of letters to Environmental Consultants inviting quotes - 1st December 1996.

(ii) Receipt of quotes Thursday 15th December 1996.

(iii) Start on site week commencing 2nd January 1997.

(iv) Environmental Report received by 30th January 1997.

(v) Review.

On confirmation of instructions to proceed, a list of contacts, access information, etc., will be provided.

The quotation should include details of:

- the Consultant's Professional Liability cover;

- experience and identity of persons carrying out the exercise;

- experience and general track record of Consultant firm;

- use of quality management systems or codes of practice, including accreditation where appropriate;
EXAMPLE BRIEFS

- any additional work or services which the Consultant considers necessary or desirable to meet the brief

- confidentiality arrangements;

- names of drilling contractors to be used;

- names of laboratory to be used and details of how it was selected;

- sampling and analytical techniques.

3.1.4 Selection of consultant

The quotations will be evaluated, based upon:

- experience and qualifications of the consultant;

- technical merit; and

- cost.

A3.2 Example 2: Standard Brief for Stage 2 Contamination Investigation - Scottish Enterprise

3.2.1 The aim

A Stage 2 Investigation would be carried out when the findings of the Stage 1 Investigation, the Desk Study, indicate that the site should be regarded as potentially contaminated.

The aim of this Stage 2 Investigation is to expeditiously gather the information needed to:

- assess the degree and significance of the contamination on the site;
- compile and submit a report presenting factual data and interpretation thereof with recommendations for appropriate land usage and any necessary remediation measures.
3.2.2 General

Information that SE/LEC should provide

The consultant should expect to receive from SE/LEC the following information

- site name;
- site location - OS six figure grid reference, site plan;
- site area (ha);
- site owner’s name, address, telephone number;
- contract name within SE/LEC;
- proposed end-use of the site;
- identification of the most appropriate standards upon which to appraise the site for example European Legislation, American EPA standards, UK Legislation;
- information gathered during the Stage 1 Investigation.

3.2.3 Design of investigation using available information

The following information is for general guidance only, since the nature of further work required will vary from site to site, and in some cases will vary across the site itself. It is envisaged that the investigatory work could include, but not be limited to, the following procedures:

Bodies of Authority
Inform relevant local and statutory authorities, for example, SEPA, HSE, etc

Site Safety
Provide measures for site safety.
All site work to be environmentally sound and to be conducted in a manner satisfying current Health and Safety Regulations.

Site Preparation
Prepare site prior to investigation works.
Where appropriate, carry out works in accordance with relevant British Standards, Regulations, Guidance Notes, etc.
Sampling Programme
Design the sampling programme to fit the particular site and incorporate all the factors involved, for example trial pitting, boreholes, soil gas probes, searcer bar survey, auger sampling.

3.2.4 Analysis and monitoring

On-site Testing (monitoring/analysis):
Detail on-site monitoring programmes, laboratory testing methods to contain/reduce spread of contamination where applicable

Sampling, Storage and Transportation
Account for method of sampling, storage and transportation of samples.

Analysis of Samples
Define analytical programme.
Use suitably qualified, accredited laboratory with appropriate Quality Assurance status.

Additional Information
Any other factors/information that the consultant deems appropriate should be included in the Stage 2 Investigation.

3.2.5 Reporting

Assessment
Review site activities, results of the investigation and analytical procedures.
Identify potential environmental issues, risks, liabilities and areas of concern.

Further Work
Identify the requirement for further phases of investigation or site remediation programmes.
Present proposed programme and costs of any further work.

3.2.6 Disclaimer

The abofe Brief outlines generally the factors which may influence environmental appraisals of land and property and the structure of such appraisals. It is therefore not intended to be
conclusive or exhaustive and should, depending on site specific circumstances, if appropriate, be extended to include additional information.

3.2.7 Standard Report Format to be used for a Stage 2 Investigation

All reports on Stage 2 Investigation are to follow the general format given below. It is not envisaged that the layout below will cover all Stage 2 Investigations since they can be wide-ranging and, since each report will be site specific, the consultant may wish to add additional relevant information. The format given is not meant to be conclusive or exhaustive and should be added to as deemed appropriate by the consultant.

Front Title Page
To include Quality Assurance, signatures and/or authors, title or project, date, client name, consultant name.

Colour Photograph of Site

Colour 1:50,000 OS Plan giving Location of Site

Contents Page

Executive Summary
To include brief, location of site, extent of study, recommendations for further action (which must include estimates of cost and time for further work).

1.0 Introduction
1.1 Scope of work
1.2 Site description
1.3 Proposed redevelopment/site end-use

2.0 Site Investigation
To detail procedures and methods used

3.0 Analytical Data
To include analytical methods and results
4.0 Assessment of Contamination
4.1 Discussion of results
4.1.1 Field observations
4.1.2 Laboratory results
To include comparison against ICRCL, Dutch and US standards and to be broken down into media and type of contaminant. For example, liquid-heavy metals, or soil-radioactivity.

5.0 Environmental Appraisal
5.1 Health and safety
5.2 Environmental

6.0-x Other (if required)

7.0 Conclusions and Recommendations
7.1 Possible environmental issues and contamination at the site
7.2 Recommendations
7.2.1 Further work
7.2.2 Estimated costs

References

Tables
1. Gas monitoring data
2. Contamination data

Figures
1. Plan giving sampling locations
2. Other

Appendix
1. Plate colour photographs of sampling locations, trial pits etc
2. Trial pit and borehole logs
3. Raw analytical data (if appropriate)
4. Other

Additional information
All reports are to be submitted in triplicate on A4 size paper.
APPENDIX 4

FORMS OF AGREEMENT
APPENDIX 4: FORMS OF AGREEMENT

In Britain, the most commonly used standard forms of agreement between client and consultant are all related to engineering. This is the result of the long period over which the traditional relationships between clients, consultants and contractors in engineering have evolved. The forms of agreement (and other related contract forms) are still evolving and of the four discussed in detail below, two are recent and a third is due to be republished in a revised form.

There are other engineering forms of contract which relate to the procurement of construction works in civil engineering, building, chemical engineering and other areas. These are not, in general, appropriate for the relationship between a client and a consultant, examples include:

Institution of Civil Engineers 5th and 6th Editions
The New Civil Engineering Contract
JCT Building Forms of Contract
Institute of Chemical Engineers Forms

Such forms are not easily adapted to suit the client/consultant relationship and are best avoided. More appropriate standard forms of agreement are examined in the following paragraphs.

THE ASSOCIATION OF CONSULTING ENGINEERS CONDITIONS OF ENGAGEMENT 1981

The ACE has prepared a series of five agreements, each with a specific purpose designed to meet common situations in construction projects and cover works involving civil, structural, mechanical and electrical engineering. The first two of these agreements - Agreement 1 - Conditions of Engagement for Report and Advisory Work, and Agreement 2 - for Civil, Mechanical and Electrical Work are of greatest relevance to contaminated land investigations.

Both the agreements are divided into three sections:
FORMS OF AGREEMENT

1. General Conditions
2. Obligations of the Consulting Engineer
3. Obligations of the Client

Most of the key elements set out in Section 2.3 are dealt with, although there is no specific reference to a programme, and the questions of liability and professional indemnity insurance (PII) are only dealt with in the Memorandum of Agreement rather than in the clauses of the Engagement itself.

The current revision of Agreement 1 includes amendments made in 1989. A new revision of the form is due to be published soon.

Agreement 2 is similar to Agreement 1 but includes clauses relating to the supervision of work on site, and a clause defining the "cost of the works", the figure upon which the consultants' fee is calculated.

Where the project is to include site work and construction, Agreement 2 should be used. If the project is limited to desk studies, site investigation and reporting Agreement 1 is more appropriate.

FEDERATION INTERNATIONALE DES INGENEURS - CONSEILS (FIDIC) INTERNATIONAL GENERAL RULES OF AGREEMENT BETWEEN CLIENT AND CONSULTING ENGINEER.

These agreements have been prepared for use in international projects and this is reflected in their content. The Federation has published three forms:

- for design and supervision of construction of works (1979);
- for pre-investment studies (1979); and
- for project management (1980).

Each of the agreements contains clauses relating to the key elements and has specific clauses defining the language to be used for the project, and the country or state, the law of which is to apply to the Agreement, and with other aspects.
FORMS OF AGREEMENT

The agreements comprise two parts, Part I - Standard Conditions, which are considered to be universally applicable, and Part II - Conditions of Particular Application, which is in effect a schedule of project specific information referred to by Part I.

The introduction to the Project Management form specifically mentions Environmental Impact as well as Engineering and other areas where project management is appropriate. This is the only common form where environmental issues are mentioned. The comment in the introduction however has no effect on the form of agreement, and in general these three forms are all similar to one another.

THE NEW INSTITUTION OF CIVIL ENGINEERS FORMS

This is the most recent of the four, having been published late in 1994. As a result it has not yet been widely used and is relatively untested. It is written in plain English avoiding, as far as possible, legal jargon. It comprises three documents. The first two are entitled Professional Services Contract and subtitled respectively "A New Engineering Contract Document" and "Guidance Notes". The third is called the adjudicator's contract. The first document is the contract itself, the second is main option clauses which deal with methods of remuneration, and thirdly the secondary option clauses which deal with issues such as parent company guarantee, inflation, special conditions and others.

The adjudicator's contract is linked directly to the professional services contracts core clause 9, disputes and termination, which defines the role of the adjudicator in settling disputes. The adjudicator's contract defines the agreement between the adjudicator, client and consultant, the method for the adjudication and the responsibilities and mechanism for payment of the adjudicator.

THE INSTITUTION OF CHEMICAL ENGINEERS FORM OF AGREEMENT

The Institution of Chemical Engineers (I Chem E) publishes two sets of Model Conditions of Contract, together with Model Conditions for Sub-Contracts. Both are for "the design, construction and testing of a process-plant". Process plant in this context means a plant which will process one material into another using chemical, biological, mechanical or other processes.
FORMS OF AGREEMENT

One set of Model Conditions is “Suitable for Lump-Sum Contracts in the UK”, and because of the colour of its cover is known as the "Red Book". The other set is Suitable for Reimbursable Contracts" and is generally known as the "Green Book". The Model conditions of sub-contract comprises two forms of "Back to Back" sub-contract for use with the Red and Green Book. This volume is known as the "Yellow Book".

Both Red and Green books are intended for use in contracts where a “contractor” is responsible for the:

- design;
- manufacture and procurement from Sub-contractors;
- delivery to site;
- construction;
- installation and commissioning; and
- performance guarantees of a sizeable process plant.

Although most contaminated land projects do not match the profile kind of project, the elements of these forms of contract (or agreements) are essentially those required in any contract. The Model Conditions are not intended for civil engineering or construction work, but the Green Book has been successfully used for civil engineering work. Accordingly it should be possible to adapt the Model Conditions to suit, although examples are hard to find of this. Whether the effort required to adapt the forms would result in an agreement which is significantly better than the other available standard forms must be open to question.
APPENDIX 5

SPECIALIST SERVICES
### APPENDIX 5: SPECIALIST SERVICES

**EXAMPLES OF CONTRACTOR OR SPECIALIST CONSULTANT SERVICES FOR CONTAMINATED LAND INVESTIGATIONS**

- Desk study searches of historical records, plans and public registers.
- Site investigations involving logging of ground conditions, taking of field measurements and collection of samples for laboratory analysis.
- Laboratory analysis of soils, waters and gases.
- Interpretation of investigation results including risk assessment of contaminant sources, pathways and targets.
- Plant hire - excavators, concrete breakers, steam washers, site accommodation, generators, decontamination units, washing facilities and lavatories.
- Drilling - rotary and light cable percussion rigs, portable drills, cone penetrometers, field testing, sampling and logging.
- Geotechnical appraisal - field and laboratory testing, geological assessment, slope stability surveys, mining reports, foundation recommendations, compaction requirements.
- Topographical surveying - site plans, trial pit and borehole locations, levelling and volumetric calculations.
- Geophysical surveying - ground penetrating radar, electrical resistivity, ground conductivity, electromagnetic fields, refraction seismology, thermal mapping, borehole geophysics, geophysical cones;
- Specialist materials assessment- coal combustibility and reprocessing potential, slag stability, economic appraisal of potential aggregates (bulk fill, slag, concrete, hardcore) and scrap (metals and refractories), durability of construction materials.
- Structural assessment - condition and stability of retaining walls, buildings and structures.
- Demolition appraisal - economic potential of scrap materials, hazard assessment, recommendations and costs for demolition of redundant buildings, structures, foundations and services.
- Ecological surveys - macroscopic flora and fauna.
- Miscellaneous investigations - eg radioactivity, explosives, soil gas.
- General labour - creation of access to site and sampling locations, breaking out obstructions, hand digging of inspection pits, site security, reinstatement of fencing, hard surfaces, ruts and landscaping areas.
- Civil engineering for reclamation including design of earthworks, ground bearing improvements, final site levels and infrastructure.

### SOURCES OF FURTHER INFORMATION

<table>
<thead>
<tr>
<th>EIC, AGS, IEA</th>
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<tbody>
<tr>
<td>EIC, AGS, CIWEM, Geol Soc</td>
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<tr>
<td>RSC</td>
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<tr>
<td>EIC, AGS, IEA, BES, CIWEM, RSC, CPA</td>
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<td>BDA</td>
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<td>AGS, BGtechS</td>
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<td>AGS, BGtechS, Geol Soc</td>
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<td>BISPA, BRE</td>
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<td>ACE, AGS, ICE, ISE</td>
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<tr>
<td>Nat Fed Demolition Contractors</td>
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<td>IEA, InstBiol, BES</td>
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<td>BALI</td>
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<tr>
<td>ICE, AGS, ACE</td>
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</tbody>
</table>
### Examples of Contractor or Specialist Consultant Services for Contaminated Land Remediation

- Design of engineering based remedial solutions including cut and fill, in ground barriers and clean cover systems.

- Waste disposal for contaminated soils and sludges.

- Earth moving and haulage.

- Monitoring of environmental, health and safety conditions during remedial work.

- Geotechnical and materials testing.

- Coal washing and slag soundness testing.

- Decontamination of plant, buildings and structures.

- Dismantling of plant.

- Demolition of buildings and structures.

- Removal of hazardous materials such as asbestos.

- Landscaping.

- Design of buildings incorporating features to take account of contamination hazards such as ingress of landfill gas.

- Design and implementation of innovative soil treatments - chemical, physical, biological thermal, solidification.

- Modelling of groundwater flow and contaminant mobility.

- Design, implementation and monitoring of groundwater remediation schemes-hydraulic containment, pump and treat, oil skimming, air sparging, vapour extraction.

- Design of effluent and leachate treatment systems for contaminated surface water and groundwater.

- Design, implementation and monitoring of gas management systems - passive venting, cut-off barriers, active gas venting and flaring.

- Legal advice, planning and licensing.

- Project management, quality assurance and independent validation.

### Sources of Further Information

<table>
<thead>
<tr>
<th>ACE, EIC, AGS, ICE</th>
<th>IWM, CIWEM, NAWDC, FCEC</th>
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<tr>
<td>Health and Safety Executive</td>
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<tr>
<td>BISPA</td>
<td>IDE, NFDC</td>
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<td>IDE, NFDC</td>
<td>IDE, NFDC</td>
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<tr>
<td>ARCA</td>
<td>BALI</td>
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<tr>
<td>EIC, ACE, AGS, RIBA</td>
<td>EIC, AGS, RSC, IChemE, Inst Biol</td>
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<tr>
<td>EIC, AGS, CIWEM, Geol Scc</td>
<td>EIC, AGS, CIWEM</td>
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<tr>
<td>British Water</td>
<td>CIWEM, IChemE</td>
</tr>
<tr>
<td>EIC, AGS</td>
<td>Law Society, RTPI, UKELA</td>
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<tr>
<td>ICE, EIC, ACE, IEA</td>
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</tbody>
</table>
The last two groups of services in the checklist are most commonly employed directly by the client as part of a separate commission.

Examples of Relevant Trade Associations and Professional Bodies as Sources of Further Information are given in Special Topic 1.

Asbestos Removal Contractors Association ARCA
Association of Consulting Engineers ACE
Association of Geotechnical and Geoenvironmental Specialists AGS
British Association of Landscape Industries BALI
British Drilling Association BDA
British Ecological Society BES
British Geological Survey BGS
British Geotechnical Society BGtechS
British Iron and Steel Products Association BISPA
British Water CIWEM
Chartered Institute of Water and Environmental Management CBI
Confederation of British Industry CPA
Contractors Plant Association CIRIA
Construction Industry Research and Information Association EIC
Environmental Industries Commission ESA
Environmental Services Association FCEC
Federation of Civil Engineering Contractors
Institute of Arbitrators Inst Biol
Institute of Biology IDE
Institute of Demolition Engineers IEA
Institute of Environmental Assessment IChemE
Institute of Environmental Assessment ICE
Institute of Quantity Surveyors ISE
Institute of Wastes Management NFDC
Institution of Chemical Engineers NHBC
Institution of Civil Engineers RIBA
Institution of Structural Engineers RICS
National Federation of Demolition Contractors RSC
National House Builders Council RTPI
Royal Institute of British Architects
Royal Institution of Chartered Surveyors
Royal Society of Chemistry
Royal Town Planning Institute

A5.3
SPECIALIST SERVICES

The Geological Society  Geol Soc
The Law Society
United Kingdom Environmental Law Association  UKELA
APPENDIX 6

WHEN TO CONSULT KEY REGULATORY AUTHORITIES

1. INTRODUCTION
2. ENVIRONMENT AGENCY
3. LOCAL AUTHORITIES
4. HEALTH AND SAFETY EXECUTIVE
APPENDIX 6: WHEN TO CONSULT KEY REGULATORY AUTHORITIES

1. INTRODUCTION

For any remediation scheme of significant size, and some other site-based contaminated land projects, the principal regulatory authorities listed below should be informed of the proposals and thereby given the option to respond as they consider appropriate.

The principal interests and responsibilities of the regulatory authorities which give rise to a need for consultation are described below, further information on their legislative role is given in Appendix 2:

2. ENVIRONMENT AGENCY

Water
The Environment Agency is the body responsible for ensuring protection of ground and surface waters in England and Wales. The equivalent bodies in Scotland and Northern Ireland are the Scottish Environmental Protection Agency and Department of the Environment (NI) respectively. All potentially polluting discharges to ground or surface waters are subject to consent from the Environment Agency which may issue a discharge consent subject to appropriate conditions. The Agency is also responsible for protecting water resources and setting water quality objectives. It has powers to prosecute in the event that:

- discharges are made without a consent;
- consent conditions are exceeded; or
- an activity, or contamination migrating from a site, is threatening ground or surface water quality.

The Environment Agency must be informed in all these circumstances to ensure that legal obligations are fully met. However, the Agency may also wish to comment on other schemes where the immediate potential threat to water resources is less clear.

The Environment Agency should be consulted at the desk study stage to obtain information such as details of the local ground and surface water regimes, location of abstractions or
groundwater protection and vulnerability zones. Such information is important in assessing potential risks and liabilities and designing appropriate site investigation and remediation schemes.

Waste

The Environment Agency is responsible for the regulation of all licensed waste activities, including registration of waste carriers, mainly through the waste management licensing and special waste legislation. The waste management licensing regulations require that any sites where controlled wastes are deposited, treated or kept are subject to a waste management licence. The Agency is responsible for issuing the licence, enforcing the conditions of the licence and determining whether licences can be surrendered. The Agency is also able to advise on the appropriate categorisation of waste and suitable disposal sites.
WHEN DO YOU CONSULT THE ENVIRONMENT AGENCY?

Water
The Environment Agency must be consulted at any stage in a contaminated land project where:

- there is a need to discharge potentially polluting water to controlled waters,
- activities are such that they may threaten a ground or surface water resource, such as excavations adjacent to a surface water course or installation of boreholes in the vicinity of a sensitive aquifer or groundwater protection zone,
- activities (e.g. pumping) are proposed which may alter the groundwater regime, or
- contamination has occurred which may threaten the quality of ground or surface water.

Waste
Consultants should inform the Agency of any circumstance in which controlled waste, which may include material from a contaminated site, needs to be deposited, treated, kept or disposed of. Examples of situations where consultation is likely to be necessary include:

- where waste materials are to be deposited on site;
- where contaminated materials require classification for disposal off-site;
- where on-site containment facilities for contaminated materials are to be provided;
- where the remediation process involves the storage or treatment of contaminated material;
- where a process-based remediation method is to be used.

The Waste Management Licensing Regulations 1994 require careful interpretation on a site specific basis. It is important that the advice of the Agency is sought in circumstances where responsibilities may be unclear. In some cases an activity may be exempt from the requirements of a waste management licence and may in these instances only require registration with the Agency. A waste management licence can only be granted where appropriate planning or equivalent permission is in force.
3. **LOCAL AUTHORITIES**

**Environmental Health Departments**
Environmental Health Departments are those parts of the local authorities which are responsible for protecting public health. Environmental health officers have a duty to ensure that activities undertaken in the geographical area under their jurisdiction do not give rise to a 'statutory nuisance'. Statutory nuisance includes a broad range of matters such as smoke, noise, odours, dust and 'any accumulation or deposit which is prejudicial to health or a nuisance'. Local authorities have powers to serve a notice requiring the abatement of a nuisance where it is satisfied that a statutory nuisance exists. Section 57 of The Environment Act 1995 introduces additional and specific responsibilities to local authorities relating to identifying, assessing and requiring remediation of contaminated land. This responsibility is likely to be administered through the Environmental Health Departments. The Government is in the process of issuing statutory guidance which will clarify this role.

**Planning Authorities**
Planning authorities are those parts of the local authorities which are responsible for regulating the development and use of land in the public interest. The local planning authority will have a particular interest in a contaminated land project where it involves "development" in need of planning permission or a material change in use.

Local planning authorities have extensive powers to halt or reverse development carried out in the absence of a relevant permission or in contravention of planning conditions. Retrospective discovery of the need for planning permission or failure to comply with planning conditions can lead to costly delays. Where future redevelopment is planned, the views of the planning authority should be established at an early stage to establish any concerns it may have in relation to the intended land-use.

For certain types of development, Planning Authorities are required to consult with other statutory bodies prior to granting planning permission. These include regulatory authorities as well as organisations such as English Nature or the local wildlife trust. Where broader consultation by the planning authority is required it is advisable to commence dialogue with these parties before the planning authority approaches them. Details of the consultation requirements are contained in Department of Environment Circular 22/88.
WHEN DO YOU CONSULT LOCAL AUTHORITIES?

Environmental Health Departments
Most remediation schemes involve activities which could impact on the broader community. Examples include the use of machinery or vehicle movements, excavation and materials handling operations and some process-based remedial techniques. Such operations can give rise to noise, dust or odours, or their emissions from which the public requires protection. The local environmental health officer should be informed of any proposed schemes and given the opportunity to advise or comment.

Monitoring or modelling of noise or dust, and dust control plans may be required to demonstrate that the scheme will have no detrimental impacts on the local community. Situations in which the local environmental health department is likely to have particular concerns include:

- where a project will involve an increase in traffic in the area;
- where additional noise may be generated from machinery;
- where harmful or excessive amounts of dust may be generated;
- where harmful or odorous vapours may be released;
- where stockpiling is required;
- where highly-contaminated materials (such as asbestos) are being treated or removed from site; or
- where a planning application or waste management licence is required.

Planning Authorities
Planning permission is required for certain types of development (e.g. any building, engineering or mining works carried out in, on or over the ground) or where there is a material change in the use of land or buildings. Examples of situations in which planning permission may be required in connection with a contaminated land project include:

- where the on-site waste disposal of controlled waste is proposed;
- where on-site treatment of contaminated material is to be carried out;
- where engineering works are to be carried out as part of remediation;
- where the remediation process is part of a development for which planning permission is required.
- in some circumstances, where extensive site investigation works are to be carried out.
Building Control Department

Once a development has received planning permission building designs must be submitted to the Building Control Department, or alternatively for a housing development to a NHBC approved inspector for approval. Early consultation with the Building Control Department is advisable where developments involving building construction are not prescribed in detail in the Building Regulations 1991 and associated approved documentation. This is particularly important where gas control measures form part of building design or where building design forms part of the remediation works.

4. HEALTH AND SAFETY EXECUTIVE (HSE)

The HSE is responsible for enforcement of the Health & Safety at Work etc Act 1974 and all associated Regulations. The health and safety legislation is designed to protect the health and safety of workers in the workplace, as well as others who may be at risk of harm as a result of workplace activities. The HSE makes routine inspections of premises, investigates accidents and provides guidance on compliance with health and safety legislation. The HSE will wish to be satisfied that the investigation, demolition, remediation or redevelopment of contaminated sites does not endanger the health and safety of the workforce, or the wider public, and that risks are minimised for the duration of the project.

WHEN DO YOU CONSULT THE HSE?

- As the role of the HSE is one of enforcement, rather than licensing or consent, there are no circumstances where consultation with the HSE is obligatory although the need for consultation should be considered and a record kept of the decision-making process;

- Where the HSE is to be consulted, a copy of the project proposals should be provided before any work is undertaken;

- Activities likely to be of particular concern to the HSE include demolition and construction at contaminated sites. Appropriate Health and Safety Plans should be prepared and communicated, and protective measures/procedures/clothing/working methods should be implemented. The HSE should be informed of demolition plans at an early stage and may also visit to inspect the site while demolition or construction work is in progress.
GLOSSARY
## GLOSSARY

<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
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<tbody>
<tr>
<td>Consultancy services</td>
<td>The provision of information, advice, design, supervision or management services by an individual or an organisation. AEC</td>
</tr>
<tr>
<td>Contamination</td>
<td>The presence in the environment of an alien substance or agent, or energy(^1). CIRIA</td>
</tr>
<tr>
<td>Contamination hypothesis</td>
<td>Hypothesis derived from the preliminary investigation about the nature and distribution of contamination and the factors (e.g. geology) governing its distribution. CIRIA, AEC</td>
</tr>
<tr>
<td>Contaminated land</td>
<td>Land where an alien substance or agent is present(^2)</td>
</tr>
<tr>
<td></td>
<td>Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:-</td>
</tr>
<tr>
<td></td>
<td>a) significant harm is being caused or there is a significant possibility of such harm being caused; or</td>
</tr>
<tr>
<td></td>
<td>b) pollution of controlled waters is being, or is likely to be, caused(^3). EA</td>
</tr>
<tr>
<td>Contamination-related objective</td>
<td>Media (soils, groundwater) or area/volume specific goals to be achieved by remedial action. They are based on site investigation and risk assessment findings and typically reflect regulatory requirements, and the current or future use of the site. WDA</td>
</tr>
<tr>
<td>Contaminative potential</td>
<td>An evaluation of the potential for, and likely nature and occurrence of, contamination at a site. WDA</td>
</tr>
</tbody>
</table>

\(^1\) This definition makes no statement about whether the contamination is harmful. This can only be decided following investigation, identification of hazards and potential risks, and an evaluation of the significance of any risks. Note that a naturally occurring high concentration of a substance, for example radon gas in Cornwall, is not contamination according to this definition.

\(^2\) This definition follows from that given above for contamination.

\(^3\) It should be noted that statutory definitions apply only to the Act in which they appear and that it is not unusual for terms to be given a meaning that differs somewhat from common usage and it may therefore be inappropriate to use them in a wider context.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>COSHH assessment</td>
<td>An assessment of workplace hazards carried out in accordance with the Control of Substances Hazardous to Health Regulations. WDA</td>
</tr>
<tr>
<td>Decommissioning</td>
<td>The process by which bulk quantities of hazardous substances are removed from operational facilities following closure and plant and premises are made safe and secure. WDA, CIRIA</td>
</tr>
<tr>
<td>Decontamination (of plant or building)</td>
<td>The process by which dangerous substances associated with items of plant or the building fabric are removed or treated to minimise health or environmental threats. WDA, CIRIA</td>
</tr>
<tr>
<td>Dedicated guidelines and standards</td>
<td>Values derived specifically for the purpose of assessing the risks associated with contaminated land - they may be set for soil, groundwater, surface water or other media. CIRIA</td>
</tr>
<tr>
<td>Detailed assessment</td>
<td>A structured assessment of remedial techniques and strategies against pre-defined criteria. WDA</td>
</tr>
<tr>
<td>Effects assessment</td>
<td>The process of characterising the effect of a hazard to a target. WDA</td>
</tr>
<tr>
<td>Exploratory investigation</td>
<td>Investigation to collect samples for analysis or testing to confirm the contamination hypotheses derived from the preliminary investigation and to provide information to enable design of the main investigation (corresponds to ISO Phase 2 investigation). CIRIA, ISO</td>
</tr>
<tr>
<td>Exposure assessment</td>
<td>The process of characterising the exposure of a target to a hazard. WDA</td>
</tr>
<tr>
<td>Final selection criteria</td>
<td>Criteria used to assess the advantages and disadvantages of a short-list of promising remediation strategies during the detailed assessment of options. WDA</td>
</tr>
<tr>
<td>Ground investigation</td>
<td>The physical investigation, normally by invasive means, of the materials comprising the surface and underlying strata of a site, including geotechnical, geological and hydrogeological assessment. WDA</td>
</tr>
<tr>
<td>Guideline (value)</td>
<td>Numerical value (e.g. concentration of a contaminant in soil in mg/kg) issued by an authoritative body to aid the assessment of contaminated land to be applied with professional judgement (see also soil quality standard). CIRIA</td>
</tr>
<tr>
<td>Hazard</td>
<td>A property (of a substance) or situation that in particular circumstances could lead to harm.</td>
</tr>
</tbody>
</table>
Hazard assessment
Assessment of the degree of hazard associated with a site or group of sites (what type and how much of a hazard could be available and reach a target) through consideration of plausible hazard/pathway/target scenarios. CIRIA

Hazard identification
Identification of the hazards that may be associated with a particular site or group of sites. CIRIA

Health and safety plan
A plan prepared by the contractor for approval by the supervisor providing an assessment of the occupational risks associated with remedial works; the measures to be used to minimise and monitor risks; the point at which corrective action will be taken; and the type of corrective action to be taken. WDA

Initial selection criteria
Criteria used initially to identify and select potentially useful remediation techniques. WDA

Main investigation
Investigation to accurately determine the nature, distribution and concentrations of contaminants, and all other information necessary for identification and assessment of risks and to enable decisions to be made about the need for remedial actions; and also for preliminary decisions about the nature of the works required (corresponds to ISO Phase 3 investigation). CIRIA, ISO

Monitoring plan
A programme of inspection/testing prepared by the contractor and approved by the supervisor for the regular assessment over a period of time of the progress, performance or quality of the remedial work and associated measures. WDA

Non-dedicated guidelines and standards
Values not derived specifically to aid the assessment of contaminated land but which nevertheless may be useful during risk assessment. CIRIA

Pathway
The means by which a hazard comes into contact with a target. WDA

Pollution
The introduction by humans into the environment of substances, agents or energy in sufficient quantity or concentration as to cause hazards to human health, harm to living resources and ecological systems, damage to structure or amenity, or interference with legitimate uses of the environment. CIRIA

Post-treatment management
Measures applied on completion of remedial works, or as an integral part of a containment strategy, to ensure continued effectiveness over the long-term. WDA
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred remediation strategy</td>
<td>That combination of techniques and associated work which achieves, in part or in full, specified contamination related and other objectives, and overcomes constraints. WDA</td>
</tr>
<tr>
<td>Preliminary inspection</td>
<td>The physical examination and cataloguing of features and facilities present within a site, for the purposes of directing subsequent investigation and remediation activities. WDA</td>
</tr>
<tr>
<td></td>
<td>Typically used to describe an early stage of an environmental audit of an operating facility (see also preliminary investigation)</td>
</tr>
<tr>
<td>Preliminary investigation</td>
<td>Desk study and site reconnaissance (corresponds to ISO Phase 1 investigation). CIRIA, DD 175, ISO</td>
</tr>
<tr>
<td></td>
<td>The collection of all documentary (and sometimes anecdotal) information (desk study) and on-site observations (site reconnaissance) relevant to identification of hazards and assessment of risks including information on the past, present and intended uses of the site and neighbouring land; geology and the water environment.</td>
</tr>
<tr>
<td>Preliminary testing</td>
<td>The initial screening of materials within a site to determine their physical and chemical composition, for the purposes of directing subsequent investigation and remediation activities. WDA</td>
</tr>
<tr>
<td>Public health and environmental protection plan</td>
<td>A plan prepared by the contractor and approved by the supervisor providing an assessment of the public health and environmental risks associated with remediation; the measures to be taken to minimise and monitor risks; the point at which corrective action will be taken; and the type of action to be taken. WDA</td>
</tr>
<tr>
<td>Receptor</td>
<td>See Target</td>
</tr>
<tr>
<td>Reclamation</td>
<td>The process by which derelict, despoiled or contaminated land is brought back into a specified beneficial use. WDA</td>
</tr>
<tr>
<td>Record-keeping and reporting plan</td>
<td>A plan prepared by the contractor and approved by the supervisor describing the system of record-keeping and reporting to be used throughout the period of remediation. WDA</td>
</tr>
<tr>
<td>Remedial standards</td>
<td>These are site-specific media (soils/groundwater) or area/volume standards which must be achieved by implementing the preferred remedial strategy. WDA</td>
</tr>
<tr>
<td>Remedial strategy</td>
<td>The remedial techniques and associated work programme that will meet specified remedial standards and other objectives, and overcome restraints. WDA</td>
</tr>
</tbody>
</table>
Remedial technique A technique used to achieve contamination related and other specified objectives. WDA

Remedial objectives A generic term for any objective, including all policy, administrative and technical types, associated with the remediation of a contaminated site. WDA

Remediation The process by which health or environmental risks associated with the presence of contamination are reduced to an acceptable and pre-defined level. WDA

a) the doing of anything for the purpose of assessing the condition of:-
   i. the contaminated land in question;
   ii. any controlled waters affected by that land; or
   iii. any land adjoining or adjacent to that land;

b) the doing of any works, the carrying out of any operations or the taking of any steps in relation to any such land or waters for the purpose:
   i. of preventing or minimising, or remedying or mitigating the effects of, any significant harm, or any pollution of controlled waters, by reason of which the contaminated land is such land; or
   ii. of restoring the land or waters to their former state; or

c) the making of subsequent inspections from time to time for the purpose of keeping under review the condition of the land or waters.¹ EA

Remediation values Indicate the performance to be achieved by remediation - usually defined as contamination related objectives in terms of permitted residual concentrations. CIRIA

Residual contamination That amount or concentration of contaminants remaining in specific media following remedial action. WDA

Risk Combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence. DoE

¹ It should be noted that statutory definitions apply only to the Act in which they appear and that it is not unusual for terms to be given a meaning that differs somewhat from common usage and it may therefore be inappropriate to use them in a wider context.
<table>
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<td>Risk estimation</td>
<td>Concerned with the outcome or consequences of an intention taking account of the probability of occurrence. DoE. Estimation of the likelihood that an adverse effect will result from the exposure to the hazard and the nature of the effect. Risk estimation may focus on human health effects, effects on flora and fauna, the water environment, or other targets such as building materials. CIRIA</td>
</tr>
<tr>
<td>Risk evaluation</td>
<td>Concerned with determining the significance of the estimated risks for those affected: it therefore includes the element of risk perception. DoE. Evaluation of the significance of estimated risks, taking into account available guidelines and standards, the uncertainties associated with the assessment and the costs and benefits of taking action to mitigate risks. CIRIA</td>
</tr>
<tr>
<td>Risk management</td>
<td>The process of implementing decisions about accepting or altering risk. DoE</td>
</tr>
<tr>
<td>Site investigation</td>
<td>The determination of the contamination status of a site and its environs by the systematic collection of data, through a variety of means, including literature searches, personnel interview, remote sensing, ground investigation, physical inspection, sampling and testing. WDA</td>
</tr>
<tr>
<td>Soil quality standards</td>
<td>Limits (e.g. mg/kg of contaminants in soil) made binding through government legislation or regulation which must be applied (within the appropriate regulatory framework) in all cases where they are applicable. CIRIA (see also guideline value)</td>
</tr>
<tr>
<td>Site-specific values</td>
<td>Values (e.g. permitted residual concentrations of contaminants in mg/kg) derived to reflect the specific circumstances of an individual site. CIRIA</td>
</tr>
<tr>
<td>Supplementary investigation</td>
<td>One or more additional phases of investigation providing further data on specific matters. WDA (ISO will define Phase 4 investigation as the collection of such other information as is necessary for the selection and design of remedial works)</td>
</tr>
<tr>
<td>Target</td>
<td>An entity (e.g. human, animal, water, vegetation, building services etc.) vulnerable to the adverse effect(s) of a hazard. WDA</td>
</tr>
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<td></td>
<td>The term receptor is also sometimes employed with a similar meaning.</td>
</tr>
</tbody>
</table>
Validation plan: A programme of inspecting/testing prepared by the contractor and approved by the supervisor for the purposes of confirming the quantity of a piece of work, materials or services forming part of the remedial works. WDA

Verification of site status: The factual corroboration of findings or assumptions through third party consultation or direct observation. WDA

Zone of contamination: A volume or area of a contaminated medium having a contaminant profile which is distinct from other zones within a site. WDA

SOURCES:


ISO Draft standards on sampling of soils - to be published in BS 7755 series

WDA Manual on remediation of contaminated land, Welsh Development Agency (Cardiff) 1993