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## **Detailed inspection of radioactive contaminated land under Part 2A EPA 1990**

**Guidance for local authorities on visual  
inspection and limited surveys  
B20(b)**

# DETAILED INSPECTION OF RADIOACTIVE CONTAMINATED LAND UNDER PART 2A EPA 1990: GUIDANCE ON VISUAL INSPECTION AND LIMITED SURVEYS

## 1. Introduction

The contaminated land regime (Part 2A of the Environmental Protection Act 1990) has been extended to cover radioactive contaminated land. Local authorities now have a duty to inspect land where there are reasonable grounds for believing that land to be radioactive contaminated land. In doing so, they are required to have regard to the Statutory Guidance for England and that for Wales.

Three forms of detailed inspection are set out in paragraph B.20 of the Statutory Guidance:

- the collation and assessment of documentary information, or other information from other bodies (Paragraph B.20(a));
- a visit to the particular area for the purposes of visual inspection and, in some cases, limited sampling (for example of surface deposits) or survey (for example using hand-held radiation meters) (Paragraph B.20(b)); and
- intrusive investigation of the land (for example by exploratory excavations) (Paragraph B.20(c)).

The Statutory Guidance requires local authorities to have regard to advice issued by the Environment Agency on the manner in which to carry out B.20(a) and B.20(b) inspections. This Guidance Note provides such advice.

The Environment Agency does not intend to provide additional advice beyond the contents of this note. Unfortunately we cannot offer to provide a quality assurance service to local authorities (or other external parties) with respect to B.20(b) type inspection activities.

### **How should this guidance be used?**

This guidance note should be used in conjunction with “Detailed inspection of radioactive contaminated land under Part 2A EPA 1990: Guidance on the collation and assessment of documentary information”, hereafter referred to as the B20a guidance. The B20a guidance contains advice on developing conceptual models, identifying information gaps and the reporting and interpretation of data. All of this is equally applicable to visual inspection or limited survey work.

In particular the conceptual model produced by the desk study should be used to design a suitable visual inspection and survey.

### **Who should undertake B.20(b) site inspections**

Some local authorities may have sufficient in-house expertise to be able to undertake these inspections themselves. Those local authorities that do not have the necessary experience may wish to employ the services of specialist contractors. This guidance note has been divided into two further sections containing advice on procurement of such specialist services, as follows:

## **Section 2 - Selection of Specialist Advisors and Contractors**

- a.) [Demonstration of suitable skills and experience](#)
- b.) [Familiarity with published guidance and regulations](#)
- c.) [Suitably qualified and experienced staff](#)
- d.) [Operation of Quality Management Systems](#)
- e.) [Operation of Health & Safety Systems](#)
- f.) [Adequate Accreditation of testing](#)
- g.) [Adequate public and professional insurances](#)

## **Section 3 - Evaluation of Contractors Preliminary Proposals**

- a.) [Understanding of Objectives](#)
- b.) [Visual Inspection](#)
- c.) [Surveys](#)
- d.) [Limited Sampling](#)
- e.) [Reporting](#)
- f.) [Health and Safety](#)
- g.) [Waste Management](#)

## **2. Selection of specialist advisors and contractors**

A list of consultants that may be suitable for the detailed inspection of potential radioactive contaminated land may be found under the SAFEGROUND Learning Network website at <http://www.safegrounds.com>. Some of these consultants are also part of the associated SAFESPUR Forum set up to promote the sharing of good practice amongst service suppliers (website at <http://www.safespur.com>)

When selecting contractors to undertake B.20(b) site visits, local authorities should consider the following:

### **a) Demonstration of a breadth of suitable skills and experience**

A specialist contractor should provide examples of their previous experience of visual inspection or limited sampling work as required by the local authority. You should establish the extent of the contractor's experience and consult referees who have used the contractor for that type of work in the past, in particular what aspects of the work the contractor performed and what work was subcontracted to other organisations. You should look for similarities (in terms of the radionuclides involved, their distribution, the exposure pathways etc.) between the examples provided by the contractor and the work to be undertaken.

### **b) Familiarity with published guidance and regulation**

A specialist contractor should be able to show an understanding of the requirements of current legislation affecting radioactive contaminated land; including the extended Part 2A regime, the Radioactive Substances Act 1993, The Ionising Radiation Regulations 1999 and The Radioactive Material (Road Transport) (Great Britain) Regulations 1996. They should also be aware of the relevant regulatory and technical guidance published by the Environment Agency and Defra, as well as other organisations such as CIRIA (Safegrounds/Safespur), BSI etc.

### **c) Suitably qualified and experienced staff at a range of levels**

A specialist contractor should put forward a team with an appropriate mix of skills, disciplines, qualifications and experience and provide CVs for all project staff. The extent of the contribution of each individual should be clear. Accreditation or professional membership in a relevant technical discipline should also be demonstrated (e.g. membership of the Society of Radiological Protection).

A specialist contractor must show that the staff that undertook the relevant examples continue to be employed by the contractor and will be made available for this work.

Where the correct skills (e.g. radiation protection) are not available from the internal resources of one company, specialists may be drawn together from a number of separate sources. In this situation it should be clear from the proposal how the team will be managed effectively and that a project leader has been nominated to take full responsibility for the performance of the team.

### **d) Operation of a quality management system**

A specialist contractor should use a quality management system to ensure reliable results are obtained. The system should preferably be certified to an appropriate management standard. A specialist contractor should describe how key suppliers, sub-contractors and associates used on the project will be vetted to ensure that they meet the objectives of the quality system.

A local authority may wish to request copies of company procedures such as logging, how to take contamination samples, the calibration of equipment and the selection of laboratories to use for radiochemical testing, for review purposes.

**e) Operation of a health & safety system with proven track record**

A specialist contractor should use a health and safety management system to ensure the health and safety of its staff, any sub-contract staff and members of the public. It should cover all aspects of the work and establish controls for dealing with radiological as well as conventional hazards, including procedures for recording health and safety related incidents and accidents. Local authorities should consider the contractor's health and safety record over the past five years.

**f) Independent accreditation for testing procedures**

A specialist contractor should be able to demonstrate the use of laboratories with accredited (to BS EN ISO/IEC 17025) analytical test methods for radiochemical contaminants in soils and waters, where available.

**g) Availability of adequate Professional & Public Insurances**

A specialist contractor should be able to provide Professional Indemnity, Public Liability and other insurance certificates to prove that it they have the necessary insurance cover for the work. The local authority should review the Professional Indemnity insurance in order to assess the value of a consultancy's insurance arrangements.

### 3. Evaluation of Contractors' Preliminary Proposals

In general, a local authority should ensure that a proposal for a B.20(b) inspection should be designed to be efficient and safe, and to provide data of a quality and quantity suitable to achieve the authority's objective(s).

#### Evaluating B.20(b) Inspection proposals

##### a) Understanding of Objectives

***Does the proposal show that the contractor has an understanding of the objectives of the inspection work required?***

You should ensure that the extent of the proposed work is sufficient to refine the conceptual model developed during the preceding B.20(a) inspection, in order to be able to determine whether the land is radioactive contaminated land. The B.20(a) report will identify information gaps and uncertainties with existing information that visual inspection / limited survey will need to answer.

However, the proposal should not include work that would be used to collect assessment information for the purpose of designing remediation etc. Legally, this sort of information should only be gathered after the site has been determined as contaminated land.

##### b) Visual Inspection

***Will an on-site checklist and site record sheet be used to record findings and is it appropriate for the objectives of the inspection?***

You should ensure that a contractor's proposal includes the use of checklists and record sheets for identifying and recording observations arising from the site visit. These should be adapted for the site-specific work and should also include issues associated with health and safety, site access, etc. For guidance on these aspects see Contaminated Land Research Report 2 - Guidance on Preliminary Site Inspection of Contaminated Land, 1994, DoE and sections 2.6 and 2.7 of Environment Agency 2000, Technical Aspects of Site Investigation Volume II (of II) R&D Technical Report P5-065/TR.

##### c) Surveys

Two forms of radiation survey may be undertaken as part of a B.20(b) inspection of a potential radioactively contaminated land site. They focus on the detection of gamma emitting radionuclides and, in some instances, of high-energy beta emitters, at or near the surface of the site. They are generally unsuitable for identifying contamination buried at depth.

1. A "scanning" or "walkover survey" involves the surveyor walking slowly over the site, holding a monitor with a rapid response time a few cm above the ground and recording the location of elevated readings. Walkover surveys may be undertaken to gain a general indication of the relative levels of radioactivity across a site and indicate the surface distribution of contamination. The information gained is used to target areas on a site for further investigation.
2. A "grid" survey involves measurements of radiation for a predefined count time at discrete locations at regularly spaced intervals (where conditions permit) over the area of interest. They may be used to measure the dose rate from external gamma radiation, where it is the major contributor to effective dose, and to

estimate levels of activity concentration of gamma and some high-energy beta emitting radionuclides in soils.

***Will the type of radiological survey being proposed, develop and refine the understanding of the site in question?***

You should understand how a radiological walkover survey will enable the conceptual model to be refined. It may be necessary to include a walkover survey for additional reasons such as the health and safety of the project work force or to identify other potential pollutant linkages not identified in the B.20(a) inspection.

***Has the selection of radiation monitoring equipment been based upon an understanding of the radionuclides likely to be present and their expected distribution on the site, as identified in the conceptual model?***

You should ask contractors to include a justification for their choice of monitoring equipment. They should be proposing to use monitoring equipment that is appropriate for the radionuclides expected to be present; their likely levels and distribution; the limits of detection required; the potential for interference from background radiations; and its size or weight. Ideally, a Radiation Protection Adviser should have been involved in the selection of the monitoring equipment. In general, when seeking to identify areas with activity levels of penetrating gamma emitters in excess of 1 Bq/g, a simple large volume sodium iodide scintillation detector connected to a ratemeter will be adequate. For further guidance on the choice of monitoring equipment see "Guidance on the characterisation and remediation of radioactively contaminated land" (Environment Agency 2002) which is available on our web site.

***Is the proposed survey area and survey grid appropriate?***

You should ask contractors to include in their proposals a plan and justification for the proposed monitoring locations. For example, local authorities should be satisfied that the number and distribution of locations is appropriate for the site or area of interest and the likely distribution of the contamination. The survey grid should ensure that features of interest are unlikely to be missed (the scale of the grid may vary to allow for focused surveying in the areas of interest). The justification should consider the proposed monitoring technique, the size of the area(s) to be surveyed, the anticipated size of areas of gross non-uniformity (hot spots), time and cost, and the collection of a reliable and representative data set.

***Does the proposal include a statement on the calibration of the radiological survey equipment and checks to be carried out before its use on site?***

You should ensure that contractors' quality procedures include the routine calibration of equipment in accordance with the manufacturer's instructions and that before its use, the calibration date of the monitoring equipment is checked and a function test is performed using a source of known activity. The quality procedures should ensure that the results of these checks are recorded along with the results of the survey.

***Have suitable location(s) been identified for the measurement of background radiation in the area?***

You should ensure that the contractor is able to justify the selection of the location and in particular, that it will be free of contamination and representative of background levels of radiation of the site under investigation.

#### **d) Limited Sampling**

Limited sampling of surface deposits might be necessary to obtain samples to provide a more accurate measure of the activity concentration of gamma emitting radionuclides (using gamma spectroscopy) or to measure levels of alpha or beta emitting radionuclides (using gross alpha or gross beta analysis or radiochemical analysis). Measurements of activity concentrations in soil are relevant to estimations of exposures resulting from the inhalation and ingestion of radionuclides.

##### ***Will the proposed sampling and analysis provide information necessary to develop and refine the local authority's understanding of the site in question?***

You should understand how limited surface sampling proposed by a contractor would provide the information required to update the conceptual model.

##### ***Are the proposed analytical techniques likely to provide the necessary information?***

You should be satisfied that the analytical techniques proposed by contractors would provide the suitable data for the update of the conceptual model. For example, gross alpha analysis will only provide a measure of the total activity of alpha emitting radionuclides in the sample, but it will not provide a breakdown of the levels of different alpha emitting radionuclides present. It provides a screening technique that allows a distinction to be made between uncontaminated and contaminated samples, which may be sufficient for a B20(b) inspection.

##### ***Is the proposed number and location of samples likely to be sufficient to provide the necessary information?***

A contractor's justification for sampling should include a consideration of the distribution of the contamination, the number of samples required to provide a good measure of the average activity concentration over the area(s) of interest, the need to detect discrete areas of high activity etc. Extensive sampling of a site is unlikely to be appropriate as part of a B.20(b) inspection.

##### ***Does the proposal include suitable controls for preventing the cross contamination between sample locations?***

You should be satisfied that the contractor's proposed controls to prevent cross contamination are appropriate for the contaminants of concern. As a minimum, this should include a procedure for monitoring, decontaminating and re-monitoring investigation equipment between each sample location.

##### ***Does the proposal include a protocol for the storage and transportation of samples?***

You should be satisfied that the protocol for the storage and transportation of samples is appropriate and includes chain of custody documentation.

#### **e) Reporting**

##### ***Does the proposal include a report?***

The contractor's proposal should make provision for a suitable level of reporting following completion of the works. Section 10 of BS 10175:2001 and Appendix A of the Environment Agency's R&D Report P5-065/TR give examples of the layout and content of such reports. Advice on developing conceptual models and assessing the significance of pollutant linkages can be found in our B20a guidance.

## **f) Health and Safety**

***Has the proposal taken account of possible non-radiological hazards that may pose a risk to the health and safety of those involved in the work or the public, which were identified in the B.20(a) inspection?***

You should refer to the relevant health and safety legislation and associated guidance for further information on this issue. Further guidance may be found in section 3 of “Best practice guidance for site characterisation – a report from the SAFEGROUNDS Learning Network” (CIRIA 2000).

***Does the proposal consider the applicability of the Ionising Radiation Regulations 1999 (the IRRs) to the proposed work?***

You should be satisfied that the applicability of the IRRs has been considered by the contractor and that actions necessary to fulfil its requirements are included in the proposal. These requirements might include:

- notification of the HSE of specified work;
- prior risk assessment of the proposed work\*;
- restriction, as far as is reasonably practicable, of exposure of workers\*;
- use of appropriate personal protective equipment (including its maintenance and control)\*;
- measures to comply with limits on doses to workers and others\*;
- contingency planning in instances where risk assessment shows a radiation accident is reasonably foreseeable;
- the engagement of a Radiation Protection Adviser to provide advice on compliance with the IRRs\*;
- the designation of controlled or supervised areas and the establishment of local rules and Radiation Protection Supervisors;
- monitoring of designated areas;
- use of classified personnel for work involving exposures above specified levels;
- dose assessment and recording for classified workers.

\* actions that will be required under all circumstances

You should refer to “Work with ionising radiation - Ionising Radiations Regulations 1999 Approved code of practice and guidance”, HSE Books (2000), L121 for further information. Further guidance is also available in section 3 of “Best practice guidance for site characterisation – a report from the SAFEGROUNDS Learning Network” (CIRIA 2000).

In instances where it is not clear whether certain inspection activities are likely to be required, appropriate hold points should be identified in the proposal so that this decision can be made as further information on the condition of the site becomes available. The hold points should be established by a Radiation Protection Adviser.

## **g) Waste Management**

***Does the proposal include the use of controls to ensure the characterisation and sentencing of radioactive waste arising from the inspection work?***

This should include controls to ensure the characterisation of all waste arising as either radioactive waste, 'exempt radioactive waste' or 'non-radioactive' waste (i.e. controlled waste under the Environmental Protection Act 1990). Further guidance on the characterisation of waste may be found in section 4 "Guidance on the characterisation and remediation of radioactively contaminated land" (Environment Agency 2002)

***Does the proposal include the use of controls to ensure the segregation of radioactive waste from exempt and controlled wastes?***

Segregation of exempt and controlled waste from radioactive waste is a fundamental means of minimising radioactive waste disposals and should be central to the contractors waste management procedures.

***Does the proposal identify responsibility for the disposal of non-radioactive waste arising from the inspection work?***

Further guidance on the disposal of non-radioactive waste may be found in section 4 of "Guidance on the characterisation and remediation of radioactively contaminated land" (Environment Agency 2002) **and** section 7 of "Best practice guidance for site characterisation – a report from the SAFEGROUNDS Learning Network" (CIRIA 2000).

***Does the proposal include making an application for an authorisation to accumulate and/or dispose of radioactive waste arising from the inspection work?***

The proposal should identify who will be responsible for disposing of radioactive wastes arising from the investigation work and in particular who will apply to the Environment Agency for authorisation to dispose of wastes on or from the site. This relates in particular to radioactive wastes removed from the site (e.g. paper clothing, over shoes, tissue paper, drilling fluids, decontamination washings).

***Does the proposal include controls on the movement of radioactive material or waste by road?***

The transport of certain radioactive materials and wastes by road is subject to regulation under The Radioactive Material (Road Transport) (Great Britain) Regulations 1996. Any measures that might be required for compliance with these Regulations should be identified in the proposal. Further guidance on the movement of radioactive materials may be found in section 7 of "Best practice guidance for site characterisation – a report from the SAFEGROUNDS Learning Network" (CIRIA 2000)