

Planning advice note 33: Development of contaminated land

This note provides advice on the implications of the contaminated land regime for the planning system.

1. Introduction

1. Land can be contaminated by a variety of substances that pose immediate or long-term risks to human health and the environment. Such contaminants may escape from the site to cause air, land, surface water or groundwater pollution, and in some cases may even damage buildings and underground services, or contaminate the food chain.
2. As part of the Government's commitment to sustainable development, the legacy of contamination has to be dealt with, and additional contamination prevented. Improvements in scientific understanding of the potential harm caused by contaminants, allied to the determination to re-use previously developed land wherever possible, have served to highlight the importance of tackling contaminated land.
3. The planning system has a key part to play in addressing the problem of historical contamination. In pursuing policies to re-use and redevelop sites, developers and planning authorities need to be aware of contamination issues, and the role of the planning system in dealing with them (see paragraphs 24-49).
4. A new contaminated land regime, implementing the provisions of Part IIA of the Environmental Protection Act 1990 (as inserted by section 57 of the Environment Act 1995), came into force on 14 July 2000. Planning authorities should be aware of the provisions of the new regime (see paragraphs 50-56), and ensure that their policies, procedures and decisions are consistent with it.
5. The objectives of this PAN are therefore to provide advice on:
 6. the implications of the new contaminated land regime for the planning system
 7. the development of contaminated land
 8. the approach to contaminated land in development plans
 9. the determination of planning applications when the site is or may be contaminated
 10. where further information and advice can be found

This PAN replaces the previous PAN 33 on the development of contaminated land, issued in 1988, which is now cancelled.

2. What is contaminated land?

Nature of Contamination

1. Land may be contaminated by a wide variety of substances and materials in the form of solids, liquids or gases. Contaminants may be spread across a site, or concentrated in pockets; readily identifiable, or hard to detect. They may be mixed with top-soil, with inert waste materials, or buried beneath clean material.
2. A problem arises when the concentration and environmental availability of a contaminant on site is not compatible with its existing or proposed use, or when it escapes into water, air or onto another site. The scale of the problem will vary according to the contaminant and the use of affected land. In order to have a deleterious effect, there needs to be a pathway enabling the contaminant to reach a receptor at a concentration capable of causing harm (see box below).

Sources, Pathways and Receptors

- Source - a contaminant or potential pollutant (on site or capable of migrating onto site).
- Pathway - the environmental route (direct or indirect) by which contaminants reach receptors i.e. the link between the source and the receptor.
- Receptor - target which could be damaged if contamination is present at a level sufficient to cause harm.
- Contaminated land can represent a potential risk to human health or the environment through:
 - the direct uptake of contaminants into the food chain or ecosystems;
 - direct ingestion or inhalation of, or contact with, contaminants;
 - contamination of water resources;
 - fire and explosion of combustible contaminants; and
 - attack on building materials and services by corrosive contaminants.

Defining Contaminated Land

1. 'Contamination' can be, and is, interpreted in many different ways and as a result a number of definitions exist. The definition of "contaminated land" in Part IIA of the 1990 Act is set out at paragraph 51. For the purposes of this document when this definition of contaminated land is used it will be referred to as "Part IIA contaminated land".
2. It is important to recognise, however that the Part IIA definition reflects the intended role of the contaminated land regime, i.e. to enable the identification and remediation of land from which contamination currently represents an unacceptable risk to human health or the wider environment. Part IIA contaminated land does not necessarily include all land where contaminants are present.

3. With regard to the planning regime, a site containing contaminants may not be likely to cause significant harm in its current use, but if a different use were proposed, then the potential for significant harm may be enhanced. Moreover, the mere presence (or suspected presence) of contaminants may prove an impediment to the successful development of a site. Planning authorities should have regard to the potential blighting effects in these cases. Finally, the presence or level of contamination may simply be unknown, but this should not be taken to mean that potential contamination should be disregarded. The possibility of contamination on a site proposed for development should trigger a response which takes into account the potential risk. Planning authorities, therefore, need to consider 'contaminated land' in its broadest sense.
4. Contaminated sites, for planning purposes, may be regarded as any site where the presence or suspected presence of contaminants is an obstacle to development, regardless as to whether development is proposed.

3. Distribution and Scale of the Problem

1. In considering the re-use of land, the possibility that it may be contaminated cannot be ignored. Chemicals are extensively used in industrial, domestic and agricultural applications. They may be introduced to land during their manufacture, use or disposal, and may also be deposited from the atmosphere, accidental spills, migration, leaks and illegal disposal. There are also natural sources of contamination, whereby concentrations of certain substances in the soil are elevated, and may pose a threat to people or the environment e.g. methane may build up from the breakdown of organic material.
2. In Scotland contamination is most frequently associated with past industrial activity, inadequate waste disposal and some agricultural activities. Some materials, once commonly used without any safeguards, are now known to be contaminants e.g. asbestos. It is likely to be an issue where land has been used for gasworks, oil refineries, metal processing, landfill, chemical manufacturing, heavy engineering facilities, wood preserving yards, and petrol stations. The range of contaminants found at such sites is diverse. Of particular concern are: toxic or phytotoxic metals such as lead and cadmium; inorganic compounds such as sulphates, sulphides and cyanides; organic compounds such as phenols, polycyclic aromatic hydrocarbons and solvents; flammable and toxic gases; pesticides; and asbestos. Neither the list of uses, nor the list of substances, is exhaustive.
3. Contamination may be found in any location, but is most common around the urban areas that developed during the industrial revolution. There is no definitive list of all the potentially contaminated sites in Scotland, but the Scottish Vacant and Derelict Land Survey (SVDLS) provides information on the number of sites where land is vacant, or derelict as a result of its former use. The SVDLS is an important source of information on potential contaminated land, but it is not definitive - the position on contamination was unknown for 43% of the vacant and derelict land in the 1999 survey (Scottish Executive Statistical Bulletin, 1999, paragraph 4.1). Of the remainder, 78% of the derelict land was known, or

suspected, to be contaminated. (NB the definition of contaminated land in the SVDLS is not the Part IIA definition as set out at paragraph 51). It should be recognised, of course, that contamination is not confined to sites which are vacant or derelict.

4. In summary, there is no single source of information available that lists the distribution and scale of contaminated land in Scotland.

4. Scottish Executive approach to contaminated land

The "Suitable For Use" Approach

1. The Scottish Executive considers the "suitable for use" approach as the most appropriate to deal with our historic legacy of contaminated land, in a way that takes account of environmental, social and economic objectives. It is also consistent with Scottish Executive policy on sustainable development. This approach focuses on the risks caused by land contamination, and recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Risks therefore need to be assessed on a site-by-site basis (see paragraphs 21-23).
2. The "suitable for use" approach consists of three elements:
 - i) ensuring that land is suitable for its current use - in other words, identifying land where contamination is causing unacceptable risks to human health and the environment, on the basis of the current use and circumstances of the land, and returning it to a condition where such risks no longer arise ("remediating" the land); this is the role of the Scottish Environment Protection Agency (SEPA) in the case of "special sites 1" and local authorities in the case of any other type of site;
 - ii) ensuring that land is made suitable for any new use, as planning permission is given for that new use - in other words, assessing the potential risks from contamination, on the basis of the proposed future use and circumstances, before permission is given for the development and, where necessary, to avoid unacceptable risks to human health and the environment, remediating the land before the new use commences; this is the role of the town and country planning and building control regimes; and
 - iii) limiting requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land for which planning permission is being sought - in other words, recognising that the risks from contaminated land can be satisfactorily assessed only in the context of specific uses of the land (whether current or proposed), and that any attempt to guess what might be needed at some time in the future for other uses, is likely to result either in premature work (thereby risking distorting social, economic and environmental priorities) or in unnecessary work (thereby wasting resources).

3. Within this 'suitable for use' framework, it is important to recognise both that the use of any particular area of land may cover several different activities, and that some potential risks arising from contamination (particularly impacts on water and the wider environment) may arise independently of the use of the land. For example the current use of a site may be irrelevant if harm is being caused off-site e.g. the pollution of a nearby watercourse. In practical terms, the current use of any land should be taken to be any use which: (a) is currently being made of the land, or is likely to be made of it; and (b) is consistent with any existing planning permission, or is otherwise lawful under town and country planning legislation.

Site Specific Risk Assessment

1. The site specific risk assessment approach requires a view to be taken of the risks posed by a specific site, given the particular source(s), pathway(s) and receptor(s), and the extent of remedial treatment required to ensure that human health and the environment are no longer at risk.
2. The statutory regime applies where it is necessary to deal with unacceptable risks which arise as a result of current uses of land. Remediation should require that land is returned to a quality where it is fit for its existing use. Where development is proposed on contaminated land, the planning system is the appropriate mechanism for tackling remediation, either as a part of the planning application, or by conditions. Each site has to be considered on its own merits, and within its own environmental setting, a concept familiar to planners. The planning authority should ensure that the land is made suitable for the proposed use.
3. It is inherent in the site specific approach, that a site is only considered to be contaminated, and requiring remedial treatment, if there is a risk of any harm posed by the site. Any remedial treatment is then designed to address the actual, or potential, risk posed. Therefore, the developer must build-up a picture of the source(s), pathway(s) and receptor(s) that are relevant to the particular site, consider the risks that are relevant and design an appropriate remedial solution. This process of Risk Assessment is summarised in Annex 1. Implicit within this site specific approach is that generic concentrations in soil of contaminants above which a site is considered contaminated (sometimes called "trigger levels"), are not relevant to site specific risk assessments and should not be used.

5. The role of the planning system

1. Contamination may threaten public safety, the natural and built environment, and act as a barrier to economic activity. As described at paragraph 19, a key role of the planning system with regard to contaminated land, is to ensure that land is made suitable for any new use, as planning permission is given for that new use. Therefore, whether confirmed or suspected, contamination is a material planning consideration. It should be considered as one of the factors in the preparation of development plans, as well as in the determination of planning applications.
2. The best way of minimising any associated risks is to ensure that potentially contaminated sites are identified at an early stage. The necessary investigations

can then be carried out to enable cost-effective solutions to be devised and thus reduce the need for urgent and expensive emergency action later.

3. The prospect of enhanced land values is often an incentive to the remediation of a contaminated site. Development may be proposed as a means of increasing the value of a contaminated site, thus covering the cost of remediation. This is a perfectly acceptable approach to tackling contaminated land and is consistent with Scottish Executive policy with regard to sustainable development. In these circumstances, if the proposed development is satisfactory in other respects, then the planning authority is responsible for ensuring that remediation leaves the land in a condition suitable for the proposed use.

6. Development Plans

1. In preparing development plans, planning authorities are expected to encourage and promote the re-use of brownfield land, including contaminated sites. Development plans provide an opportunity for authorities to set out their priorities for the reclamation and re-use of contaminated land, and to inform developers of the availability of sites, and the potential constraints attached to them.
2. Effective policy making should be based on adequate and accurate information. Any survey preparatory to drawing up development plans should identify, as far as possible, the physical and chemical constraints on land within the plan area. The requirement under Part IIA for local authorities to identify contaminated land in their area should furnish a more complete information base on sites than has hitherto been the case, even where the land is found not to be Part IIA contaminated land.
3. Local plans should set out site specific proposals for land use in their area so that opportunities for development and redevelopment are readily identifiable to landowners, prospective developers and the local community. The allocation of a site for a particular use however, does not in itself approve the suitability of a site for that purpose. Only investigation by the developer or applicant can confirm this.
4. Planning authorities should not be deterred from allocating contaminated land for development on the grounds that a high level of remediation would be required for the new use, e.g. housing. Where there are high remediation costs they may be more easily borne by a new high value use, though other planning considerations will also be relevant in allocating sites and determining applications. There may however be situations where the anticipated benefits of remediation are significant enough for them to take priority over other policy objectives and a high value end use is essential to make remediation viable.
5. General advice on the preparation of Structure Plans and Local Plans in Scotland has been given in previous Planning Advice Notes (PAN 37 Structure Planning, and PAN 49 Local Planning).

7. Development Control

1. It is a long established principle that "planning powers should not normally be used to secure objectives which can be achieved under other legislation" (NPPG1 - The Planning System, paragraph 49). PAN 51 Planning and Environmental Protection, provides advice on good practice and information on the role of the planning system in controlling pollution and its relation to environmental protection regimes.
2. However where development is to take place on contaminated land, a key element of the 'suitable for use' approach is to ensure that land is made suitable for the proposed new use (or other uses allowed under the Use Classes Order); this is the responsibility of the planning authority. Planning authorities should therefore require that applications include suitable remediation measures. If they do not, then there are grounds for refusal. Where applications are approved, conditions should be put in place to ensure that land is remediated before the commencement of any new use.
3. Even before an application is made, informal discussions between the developer, planning authority and any other interested party should be beneficial in identifying the likely state of contamination and the most appropriate means of remediation. There are clear benefits in bringing in expert advice, including that from other council departments, at this early stage. If the planning authority has reason to believe that the land might be contaminated, then this should be brought to the attention of the developer immediately and the implications explained. Furthermore, if there are severe obstacles to the proposed development, other than the question of contamination, these should be brought to the developers attention at an early stage, so that the developer can make a judgement as to whether to carry out what might be an expensive site assessment for a development which has little prospect of approval.
4. Early examination of site characteristics, either through the first stage of the remediation process (see paragraph 59), or desk studies, is crucial. If initial investigations indicate significant levels of contaminants, it is appropriate to require site specific risk assessment to be applied to land that is proposed for development i.e. a new use. It is the responsibility of the developer to undertake an adequate risk assessment of a site, and to propose measures to ensure that these risks are appropriately addressed. For a mixed use development, the restoration plan should consider the most sensitive receptor for each land use.
5. A planning officer will need to consider, with specialist advice if necessary, whether the developer has adequately identified the sources of contamination and put forward a restoration scheme suitable for the proposed use that will ensure that all the receptors are adequately protected from contamination. If the information provided by the applicant is insufficient to enable the authority to determine the application, the applicant may need to be asked to provide further information by means of a direction under Article 13 of the Town & Country Planning (General Development Procedure) (Scotland) Order 1992.
6. Applications need not, however, be delayed pending an investigation by the developer unless there is good reason to suppose that the land is actually

contaminated. Moreover, where there is potentially only slight contamination, planning permission may be granted on condition that development will not be permitted to start until a site investigation and assessment has been carried out and that the development itself will incorporate measures shown in the assessment to be necessary. Section 1.2 of the addendum (issued in April 1999) to Circular 4/1998, The Use of Conditions in Planning Permissions sets out model planning conditions relating to contaminated land (see box below). If an issue cannot be resolved by imposing a planning condition, it may be possible to do so by concluding an agreement under section 75 of the Town & Country Planning Act 1997.

Extract from Model Planning Conditions, the addendum to circular 4/1998, The Use of Conditions in Planning Permissions

'Development shall not begin until a scheme to deal with contamination on the site has been submitted to and approved in writing by the planning authority. The scheme shall contain details of proposals to deal with contamination to include: i. the nature, extent and types(s) of contamination on the site. ii. measures to treat/remove contamination to ensure the site is fit for the use proposed. iii. measures to deal with contamination during construction works. iv. condition of the site on completion of decontamination measures.

Before any [specify e.g. residential/commercial/business/retail] unit is occupied the measures to decontaminate the shall be fully implemented as approved by the planning authority.' In addition, in appropriate circumstances, a condition covering monitoring measures may be included.

Section 1.2, Page 15 1.

1. Ultimately however, if the restoration plan is inadequate and the applicant is unwilling or unable to amend it, a refusal may be the only option. On planning appeals relating to contaminated land, it is important that the principle parties provide adequate information at the outset concerning the contamination that has been found; details of the risk assessment undertaken to consider the implications of those contaminants in that location; the proposed restoration programme; and the planning conditions considered appropriate to deal with these issues. For those appeals proceeding by way of public inquiry, this information should be provided no later than the submission of the statement of case.
2. The assessment of the significance of contamination and of the associated risks requires careful professional judgement. It is therefore recommended that planners should obtain advice from experts in other local authority departments, such as environmental health, waste disposal, land reclamation, building control, surveying and engineering (see paragraphs 46 - 48). In some circumstances, these departments may indicate that other organisations should be consulted with regard to matters for which they have regulatory responsibility. For example, the Health and Safety Executive may be consulted on worker exposure and SEPA on matters such as water pollution and waste disposal issues. When such consultations take place it should be made clear by the planning authority that

contamination is the reason for the consultation. In some circumstances it may be necessary to use specialist consultants.

3. Planning officers should recognise that, with regard to Part IIA contaminated land, remediation notices may only require that sites be restored to a standard suitable for the existing use. Additional clean up measures will frequently be required in relation to a proposed new use. It is more effective and efficient to undertake a single restoration operation, rather than for the owner to first restore the site to a certain standard, and then second, for a developer to separately restore the site to a higher level, suitable for the development proposed. In these circumstances, planning officers should, wherever possible, seek to encourage owners and potential developers to co-operate and share the cost burden by agreeing a single restoration strategy to provide a site adequate for the new use (see paragraphs 70-75).
4. The planning authority must consider whether a developer's restoration plan is adequate to avoid unacceptable risks to human health and the wider environment from the contamination on the site, both during the restoration period and for the final end use. The end use of the site is a crucial consideration when determining whether a restoration plan is adequate. In general, business and industrial development is likely to require less remediation than, for example, low-rise housing with private gardens, but each site and proposal should be considered on its merits. The choice of future use and the layout of uses on the site, can be most effective in reducing the need for treatment action, provided that pollution of surface water or groundwater is not an issue.
5. In those parts of the country which contain a significant number of potentially contaminated sites the planning authority may find it useful to include a question on contamination on their standard application form and a note to applicants on the subject.
6. Where planning consent is granted for a site on which the presence of contamination is known or suspected, an advisory note may be attached to the planning permission informing the applicant(s) that the responsibility for the safe development of the site rests with the developer. It may also warn the applicant that the planning authority has determined the application on the basis of the information available to it, but this does not mean that the land is free from contamination.

8. Environmental Impact Assessment

1. The Environmental Impact Assessment (Scotland) Regulations 1999 require that certain projects (projects in Schedule 1 of the regulations and projects in Schedule 2 which are likely to have significant environmental effects) must be the subject of Environmental Impact Assessment (EIA) prior to development consent. The presence of contamination in itself is not sufficient to trigger the requirement for EIA, although it could be a factor in establishing if a development is likely to have significant environmental effects.

2. If EIA is required then the applicant will be required to submit an environmental statement in support of the planning application. This statement must address the potential impacts of the development on the environment. For EIA development involving contaminated land, impacts may arise during site remediation and after construction is complete (where contaminants remain on site under the protection of a containment system). If the development is likely to produce contaminants, either by the project process, or in its construction, then the environmental statement should include an assessment of the likely effects. EIA must also address any measures to be used to eliminate or reduce the environmental impacts.

9. Other issues

1. Internal relationships
2. Contaminated land issues are likely to impinge on several local authority functions - environmental health, estates, engineering, economic development - as well as planning. A number of authorities have found it useful to form dedicated multi-disciplinary working groups to deal with this cross-cutting issue. Regardless of whether this approach is adopted, it is important that other departments with an interest contribute to pre-application discussions (see paragraph 34), and are consulted when applications are submitted (see paragraph 39).
3. Close co-operation between those parts of an authority responsible for implementing the requirements of the Part IIA regime, and those responsible for Town and Country Planning is desirable. Historical information from the planning register can be of assistance in identifying land likely to be contaminated, and information gleaned as a result of the duty of local authorities to inspect their areas, can be used as an input into development plan preparation.
4. The new requirement to identify contaminated land within an authority's area will provide a prime source of information in the future. Local authorities will be required to collect, manage and review a variety of data sources in relation to a potentially large number of sites. For authorities who do have a large number of sites, Geographical Information Systems (GIS) applications may prove useful in handling the data. One site may be linked to a number of different reports including previous site investigations.

Working in Partnership with other Organisations

1. There is much benefit to be gained by forming alliances with other agencies, particularly members of the Local Enterprise Company (LEC) network. A major obstacle to the development of contaminated, or potentially contaminated, sites is uncertainty as to the extent and nature of the contamination. Furthermore, such sites often have other problems e.g. instability, or fragmented/unknown ownership. Planning authorities and other agencies can play a positive role in reducing uncertainty and promoting opportunity. Scottish Enterprise Lanarkshire has developed a strong working relationship with North and South Lanarkshire

Councils to tackle the problem of derelict industrial land. They have targeted individual sites and clusters of sites to promote development. This has involved compiling information on sites, including site investigations, and producing and distributing fact sheets to potential developers. Putting information together in such a package assists prospective developers to ascertain relevant information and identify what further investigative work is required. This has proved successful in bringing land that has lain vacant and derelict for a considerable time into productive use.

10. The contaminated land regime

1. The new contaminated land regime is introduced by the Environment Act 1995, which inserts a Part IIA into the Environmental Protection Act 1990. The main objective of the new Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment, assessed in the context of the current use and circumstances of the land. The new contaminated land regime as described here does not apply to any radioactive contamination of land. Part IIA makes provision for the regime to be applied to such contamination with such modifications as the Scottish Ministers consider appropriate. Separate regulations will be brought into force at a later date.
2. The definition of "contaminated land" in Part IIA is as follows :

'Contaminated Land' is 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 -

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or (b) pollution of controlled waters is being, or is likely to be caused;"

(Environmental Protection Act as amended, Section 78A(2)).

11. A Brief Summary of the New Contaminated Land Regime

- Local authorities will prepare written inspection strategies to be formally adopted and published within 15 months of the issue of the statutory guidance (i.e. by 14 October 2001);
- Local authorities will inspect their areas to identify contaminated land and designate special sites; Enforcing authorities (the local authority, or SEPA in the case of a "special site") will establish the appropriate person(s) to bear responsibility for remediation;
- The regime encourages voluntary remediation, therefore the enforcing authorities will work with appropriate persons to ensure remediation occurs;
- Where voluntary remediation is not forthcoming, the enforcing authority is able to serve a notice to require remediation;

- Enforcing authorities will maintain a record of all prescribed regulatory action on a public register; Remediation requirements are limited to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or the officially permitted future use;
- Responsibility for paying for remediation will, where feasible, follow the "Polluter Pays" principle.
- Persons who caused or knowingly permitted the substances to be in, on or under the land will be liable, in the first instance. If none can be found, responsibility will pass to the current owners or occupier.
- Part IIA of the 1990 Act provides that a pollutant linkage (source, pathway and receptor - see box at paragraph 8) is identified in order for land to be designated as "contaminated land" i.e. site specific risk assessment is implicit in the statutory regime. In the statutory context, it is not possible to state that land is contaminated simply because certain levels of a contaminant are present.
- Under the regime, the regulatory role for Part IIA contaminated land is performed by the "enforcing authorities 3 (see below). The primary role will fall to local authorities, but SEPA will also have new duties and powers, including the regulation of remediation of 'special sites'.

12. Duties And Powers Of Enforcing Authorities Under Part IIA

Local Authorities' Duties:

- Inspect their areas to identify contaminated land and designate special sites;
- Ensure remediation of land identified as contaminated land;
- Maintain remediation registers for contaminated land; and
- Consult SEPA on the pollution of controlled waters.

Local Authorities' Powers:

- Recover costs for remediation undertaken itself.

SEPA Duties:

- Provide site specific advice to local authorities on contaminated land;
- Maintain remediation register of special sites;
- Prepare a national report on the state of contaminated land; and
- Require remediation of special sites.

SEPA Powers:

Recover costs for remediation undertaken itself.

1. The standard of remediation required by enforcing authorities should result in the land being suitable for use. In other words the aim of any remediation should be to ensure that the circumstances of the land are such that, in its current use, it is no longer Part IIA contaminated land (as statutorily defined - see paragraph 51). It may be desirable to achieve a higher level of remediation, to make the site suitable for a different use, but that objective would have to be achieved by means other than a remediation notice, for example through the planning system.
2. Part IIA incorporates the site specific risk assessment approach. This means that there are no generic UK statutory standards for acceptable concentrations of contaminants in soil. For a site to be designated as contaminated land under Part IIA, there must be at least one source, pathway and receptor which will result in significant harm to human health or the environment (see paragraph 51) or pollution of controlled waters, or there must be potential for such harm to occur. The risks from each site must be assessed on their own merits to determine if harm or pollution are occurring. There are a variety of technical methodologies to assist the determination.
3. More detailed information on the new 'Contaminated Land Regime' may be found in the statutory guidance in SERAD Circular 1/2000.

13. Remediation of contaminated land

Definition of remediation

1. The definition of 'remediation' given in section 78A(7) of Part IIA extends more widely than the common usage of the term (Environmental Protection Act 1990 as amended). It includes not only the actions to restore the "contaminated land", but also the assessment of : the land in question; any controlled waters affected by that land; or any land adjoining or adjacent to the land in question.
2. It also includes subsequent inspections to keep the condition of the land or waters under review. For the purposes of this section, 'remediation' should be understood in these terms, unless the context dictates otherwise.

Remediation process

1. The box below sets out the key stages in the remediation process.

Key Stages In The Remediation Process

- Site characterisation (comprising site investigation and risk assessment)
- Formulation of a restoration strategy

- Detailed design specification
- Implementation and post-works activities (including monitoring)

Adapted from How to Approach Contaminated Land, Scottish Enterprise, 1998

14. Site characterisation

1. A site is typically characterised by undertaking site investigations (desk study, walkover survey and intrusive investigations) in association with a risk assessment, to develop a conceptual site model, whereby the source(s), pathway(s) and receptor(s) are identified. A multi-disciplinary approach is especially important for investigations into contamination.
2. There is no firm dividing line where site investigation ends and risk assessment begins. The purpose of risk assessment is to establish whether a site is likely to pose unacceptable risks to human health or the environment, given its existing or proposed use. Risk is a combination of the likelihood of an event occurring and the consequences if it did occur. The approach adopted by the new regime is for site specific risk assessment (see paragraphs 21-23).

Formulation of a Restoration Strategy

1. A restoration strategy (also known as a remediation plan, or risk management) should be prepared for contaminated sites. It should address the management of the risks identified in the risk assessment, and should not only include details for restoring the site, but also the means of verifying the restoration. In order to do so, the strategy should identify means by which all the source-pathway-receptor links are broken. The table below shows a variety of remedial options. For any one site a number of different means might be employed, particularly if there is a variety of contaminants and/or receptors.

15. Remedial Options

Means of remediation

Example(s)

Treatment of source

1. Remove all contaminated material from the site and dispose of it elsewhere (dig 'n' dump);
2. Treat contaminants on site so that concentration and/or availability is reduced.

Blocking pathways Break pathway through installation of a physical barrier.

Isolating receptors Design layout so that receptors cannot make contact with areas of contamination.

Standards

1. There are no UK statutory standards for acceptable concentrations of contaminants in soil, as decisions are made on a site by site basis. If it is decided to reduce the concentrations of contaminants, it should be noted that SNIFFER (Scotland and Northern Ireland Forum for Environmental Research), SEPA, the Environment Agency and Department of Environment Transport and the Regions (DETR) have developed methods for establishing the degree of soil clean-up required to protect water resources, ecosystems and human health.

Detailed specification

1. Once an appropriate restoration strategy has been identified the next stage is to prepare a specification to implement the strategy. The detailed design should include health and safety procedures and environmental precautions. An implementation plan should be prepared to specify the works to be undertaken, the provisional remedial targets to be met, the verification procedure to be carried out, and any on-going monitoring to ensure the effectiveness of remedial measures after the works have been implemented.

Implementation and post-works activities

1. At the implementation stage, once the remedial works have commenced, appropriate records should be kept on the progress of the works. Progress reports (including verification sampling) will enable the implementation to be monitored, and enable the significance of any variations against the implementation plan to be assessed. Modifications to the remedial works may need to be undertaken if remediation standards are not being met.
2. Ongoing monitoring might be required as part of post-treatment management to demonstrate effectiveness in the long term or as regulation of waste licensing or planning conditions. What constitutes completion of the remedial works should be determined at the outset of the project.
3. If all contaminants of significance are removed or destroyed at the end of implementation, and the site specific remediation standards have been met, no further action is needed apart from ensuring comprehensive, appropriate documentation is prepared and maintained. If, however, contaminants remain or the end-point of remedial treatment is uncertain, post-treatment management will be required.
4. In some cases, the carrying out of remediation activities may itself constitute development within the meaning given at section 26 of the Town and Country Planning (Scotland) Act 1997, and therefore require planning permission.
5. Further information on the remediation process can be found at Annex 1.

Interaction between the planning and contaminated land regimes

1. Although the planning and contaminated land regimes are two distinct systems, there is a degree of interaction between them. There are two main circumstances in which a planning application and Part IIA procedures may overlap:
 - (i) where land is designated as contaminated land under Part IIA, and subsequently the appropriate person wishes to develop the land; and
 - (ii) where development of land means, in its new use, that land will be designated as contaminated land under Part IIA.
1. In scenario (i) above, the local authority will have made the determination that an area of land is Part IIA contaminated land. At this point, negotiations between the local authority and the "appropriate person(s) 4" will commence. It may emerge that the appropriate person sees inherent advantages in developing the site, and at the same time providing the level of remediation required to ensure that all harm on the site is adequately dealt with. Development may provide the finance necessary to fund the remediation, for example. In addition, some engineering operations carried out for remediation purposes may require planning permission.
2. If remediation of Part IIA contaminated land is proposed as part of a planning application, then it is the responsibility of the planning authority to ensure that the land is suitable for the proposed use. In this instance, the proposal to develop the land may represent agreed remediation. The appropriate person would have to supply sufficient information to both the enforcing authority under Part IIA, and to the planning authority, which may require separate documentation of the proposed development. Remediation should be enforced through the planning permission and/or conditions, wherever possible.
3. Where a site is Part IIA contaminated land, it is unlikely to be acceptable for land to remain in a contaminated state for a long period of time awaiting development - by definition, the site is causing significant harm or there is a significant possibility of such harm being caused (see paragraph 51). In the absence of a definite timetable for progress, in a reasonable period of time, the option is available to the enforcing authority to take action under Part IIA to deal with the harm from the current use of the site.
4. In scenario (ii) above, a development proposal may be submitted to the planning authority. In its current use the land is not causing any harm, and therefore is not Part IIA land. However, development may:
 5. introduce new receptors onto a site, for example by changing the use of the site;
or
 6. expose new pathways by which contaminants can reach existing receptors.
7. In either of these instances, development may result in land being designated as Part IIA contaminated land. It is in the developer's interests to ensure that

development of the site will not result in designation as contaminated land under Part IIA, and thus become prone to a remediation notice under the contaminated land regime. As with scenario (i) the planning authority should ensure that the land is suitable for its proposed use.

8. There are also opportunities for sharing information. Under the new regime, local authorities are required to prepare a strategy to identify Part IIA contaminated land in their area. Historical planning records could prove useful to an authority carrying out its Part IIA duties and the subsequent inspection of sites is likely to yield a more thorough information base for councils than has hitherto been the case. Even where the land use planning service is not the responsible department charged with undertaking this task, the information has the potential to be used for planning purposes.
9. Both local authorities and SEPA are required to maintain public registers detailing remediation activity at statutorily contaminated sites. SEPA also has a statutory duty to compile a national report on "contaminated land". In time, these requirements are likely to provide additional sources of information on the distribution of contaminated land.

16. Financial assistance

Government Sources

1. Funding is made available through Scottish Enterprise, Highlands & Islands Enterprise and the Local Enterprise Company (LEC) network to support site redevelopment costs for projects aimed at particular social and economic regeneration objectives. Remediation of contaminated land is one facet of Scottish Enterprise's regeneration activities. The distribution of funding is administered through the local enterprise network, and will vary from LEC to LEC. A higher priority is likely to be given to remediation schemes where there is a legacy of substantial industrial dereliction harming local economic development prospects.
2. Following consultation with the Convention of Scottish Local Authorities, additional resources have been allocated to help local authorities carry out their responsibilities under the contaminated land regime i.e. develop inspection strategies, carry out site investigations and take forward enforcement action.

European funding

1. European funding for the remediation of contaminated land has been forthcoming in the past, but at the time of writing the scale and precise detail of future European funding had yet to be finalised. Nevertheless, planning authorities are advised to explore the possibility of European funding when considering remediation schemes.

Recovering Costs

1. Where land is statutorily defined as contaminated land then the provisions of Part IIA allow for the recovery of the enforcing authorities remediation costs from the polluter or, if the polluter is unable to be located, from the owner or occupier of the land. However, remediation notices can only require that land is made suitable for its existing use. Where development is involved it is expected that the remediation costs would be borne by the developer.

17. Other legislation

1. Other legislation, in addition to the planning system and Part IIA, has an impact on contaminated land, particularly where the aim is to prevent future contamination.

Building Control

1. Where it is proposed to build on a contaminated site, particular attention should be paid to the provisions of Part G of the Technical Standards for compliance with the Building Standards (Scotland) Regulations 1990, as amended. The intention of Part G is to ensure that measures are taken to protect people, and the fabric of a building, from harm which could be caused by site conditions. Essentially the site beneath a building and ground immediately adjoining that site, must have harmful or dangerous substances removed or made safe. Thorough investigation is necessary to ensure that appropriate measures can be taken where there is evidence of such substances. An appendix to Part G gives outline guidance on the preparation of a site where harmful or dangerous substances are suspected or identified.

2. Future contamination of land is controlled by :

Integrated Pollution Control (IPC) - Part I of the 1990 Act places a requirement on operators of prescribed industrial processes to operate within the terms of permits issued by SEPA to control harmful discharges;

Pollution Prevention and Control (PPC) - a new regime is due to be introduced shortly to replace IPC, and to implement the European Union's Integrated Pollution Prevention and Control Directive, phased in between 2001 and 2007; that includes the specific requirement that permits for industrial plants and installations must include conditions to prevent the pollution of soil and the requirement for site restoration on closure;

Waste Management Licensing - Part II of the 1990 Act places controls over the handling, treatment and disposal of controlled wastes;

Groundwater Regulations 1998 - aimed at preventing certain types of discharges to groundwater of listed substances via land;

Control of Major Accident Hazard Regulations (COMAH), - deals with accident hazards at major industrial installations; and

Health & Safety : legislation such as Health & Safety at Work Act 1974/Control of Substances Hazardous to Health Regulations (COSHH) 1988.

18. Conclusion

1. Planning authorities have a positive role to play in tackling the legacy of contaminated land by : ensuring that, in most instances, contaminated land is identified at an early stage in the planning process; developing appropriate development plan policies for the remediation and redevelopment of contaminated land; and taking contamination issues into account in determining planning applications and attaching conditions.
2. The Scottish Ministers look to planning authorities and developers to put into practice the advice given in this Planning Advice Note, but recognise that the specific policies and practices to be adopted by planning authorities are for them to decide given the particular local circumstances in their areas.

Note

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19. Annex 1: remediation process

Site Characterisation

A.1 A site is typically characterised by undertaking site investigations (desk study, walkover survey and intrusive investigations) in association with a risk assessment, to develop a conceptual site model.

Site Investigation

A.2 Site investigations should always commence with a desk study, so that consideration can be given to health, safety and environmental hazards prior to fieldwork commencing. Information on potential hazards should be translated into a Health & Safety Plan for the work. A key indicator of whether a site is potentially contaminated is the current and/or previous uses (see paragraphs 14-17). Several sources of information can be used in an initial investigation to establish the potential for contamination:

- Planning history;

- Current and historical OS maps;
- Current and historical site plans;
- Photographic information;
- Financial records;
- Information about surrounding sites; and
- Previous investigations.

A.3 The desk study should be followed by a walk-over study if there are indications that contamination may be present, and provided that the initial desk study has indicated that risk to personnel is minimal. A walk-over study can provide obvious visual signs of pollution such as oil staining and vegetation stress.

A.4 If the initial investigation gives cause to believe that there may be a problem with contamination then further more detailed investigation will be required. Physical site investigations take a variety of forms including:

- Trial pits;
- Surface samples;
- Boreholes;
- Soil gas and vapour surveys;
- Groundwater monitoring;
- Surface water sampling; and
- Geophysics.

A.5 For an effective site investigation an appropriate sampling strategy has to be developed. Data quality is dependent on:

- Completeness - the extent to which the available information adequately defines the situation being assessed;
- Relevance - the extent to which the information is relevant to the situation being assessed;
- Reliability - the extent to which measurements or observations accurately reflect true or likely site conditions and the implications of information gaps on assessment findings; and
- Clarity - the extent to which the available information presents a clear and unambiguous account of the situation being assessed.

A.6 For more detailed information on site investigations please see How to Investigate Contaminated Land, Scottish Enterprise (1998).

Risk Assessment

A.7 There is no firm dividing line where site investigation ends and risk assessment begins. The purpose of risk assessment is to establish whether a site is likely to pose unacceptable risks to human health or the environment. Generally it comprises identifying and assessing potential hazards and then estimating and evaluating the degree of risk. Risk is a combination of the likelihood of an event occurring and the consequences if it did occur.

Purposes of risk assessment

- Systematically determine whether there are any current or potential unacceptable risks to human health or other targets;
- Determine the effects of foreseeable events, such as weather extremes, rising water table, flooding, increases in neighbouring populations etc., on the nature and magnitude of the risks;
- Determine the consequences (e.g. potential impacts on the environment, groundwater resources, human health) of a change of use, development, redevelopment or other works on site;
- Identify the critical contaminants and pathways relevant to the site so that the steps necessary to reduce risks to 'acceptable' levels both currently and in the foreseeable future, can be determined;
- Make judgements about the significance and acceptability of identified risks;
- Help to set objectives and priorities for reducing risks; and
- Provide a rational and defensible basis for discussing a proposed course of action with third parties (e.g. regulators, communities, funders, insurers etc.).

A.8 Generally risk assessment comprises four main components:

1. Hazard investigation
2. identification of contaminant sources, pathways and receptors, taking into account the actual or intended use of the site and its environmental setting.
3. Hazard assessment
4. consideration of the plausibility of pollutant linkages and determination of the potential for human health and environmental risks.
5. Risk estimation
6. estimation of the risk that identified receptors will suffer adverse effects if they come into contact with contaminants under defined conditions.
7. Risk evaluation

8. evaluation of the need for risk management action having regard to the nature and scale of risk estimates, any uncertainties associated with the assessment process and, where further action is required, the objectives and broad costs and benefits of that action.

A.9 This approach allows a view to be taken of the risks posed by the site, given the particular source, pathways and receptors. It also helps to set objectives and priorities for reducing risks so that a restoration strategy can be devised.

Site Restoration

A.10 A restoration plan (also known as a remediation plan, or risk management) should be prepared for contaminated sites. It should address the management of risks identified in the risk assessment and should include details for restoring the site, and also the means of verifying the restoration. Such a plan is an essential part of a planning application for contaminated land. Alternatively, where contamination is only suspected or is of a minor nature the planning authority may wish to make restoration a condition of the planning consent (see paragraph 37).

Methods of Restoration

A.11 Source, pathway and receptor may be considered as links in a chain. The potential for harm only occurs when the chain is complete. In order to manage risk the links must therefore be broken. This might be done by removing or reducing the source of the pollution by the physical removal of the offending material or by treatment e.g. bio-remediation, incineration or soil washing. Alternatively the pathway may be blocked by, for example, a physical barrier. The final link may be broken by keeping receptors away from the source/pathway e.g. preventing the establishment of sensitive uses on sites which have not been the subject of remediation. Generally, restoration proposals will entail one of the following:

- removal of all the contaminated material from the site and disposing of it elsewhere (dig 'n' dump)
- breaking the pathways through installation of barriers etc.
- treatment of contaminants on site such that concentrations and/or availability of contaminants are reduced; or
- retaining the contaminants in a particular area of the site.

A.12 Remediation measures should be evaluated to identify an appropriate and cost-effective strategy to deal with those unacceptable actual or potential risks to human health or the environment which have been identified, taking into account the actual or intended use of the site. For any one site a number of different means might be employed, particularly if there is a variety of contaminants.

A.13 The following criteria may be used for the analysis of remedial options:

- Protection and compliance - the ability to provide the necessary degree of protection for receptors, achieve specific remedial objectives and comply with any regulatory requirements.
- Long-term performance and permanence - residual risk remaining at the site after treatment should be considered, and post-treatment management controls should be assessed.
- Technical sufficiency - depending on the nature of the material treated, the quantities of hazardous materials on-site, the reversibility of the methods and the types of residual materials generated.
- Impacts during implementation - on human health, health and safety of the workforce, and the environment including air, land and water quality and ecosystems.
- Practicality - assess the risks and uncertainties associated with the use of each method in the field and the effects of any known constraints.
- Cost - including pre-implementation costs, implementation costs and longer-term operation and/or maintenance costs.
- Social and community impact and acceptance - any specific requirements or concerns likely to be expressed by the local community.
- Institutional acceptance - potential concerns of owners, investors etc..
- Implementation and verification

A.14 The implementation of the restoration plan begins when the preferred remedial strategy has been selected and decisions need to be taken about how it is going to be applied. "Remedial action", may be of a technical nature (i.e. involving direct action on the contaminants or their behaviour) or a non-technical nature (i.e. where action involves the management of receptor behaviour to reduce/alter their ability to come into contact with the contaminants). The main stages in implementation are :

- Management Context: identifying management objectives for the implementation of risk management action and ensuring that the technical, planning and management scope of the preferred remedial strategy is clear and documented.
- Design and Procurement: confirming that the remedial works have been designed and specified in sufficient detail for the strategy to be implemented.
- Implementation and Verification: ensuring that once the remedial works have commenced appropriate records are kept on the progress of the works (including any variations). Records of verification sampling should be used to confirm that objectives have been met.
- Ongoing Monitoring and Maintenance: The purposes, aims and results of ongoing monitoring and maintenance should be recorded.

Further Reading

A.15 A number of texts explore site remediation in greater detail. As a starting point please refer to How to Investigate Contaminated Land, and How to Approach Contaminated Land, both by Scottish Enterprise (1998).

20. Annex 2 : processing an application for development on a contaminated site - issues checklist

At pre-application stage or on receipt of the application

Information on contamination:

- Has the site been classified as statutorily contaminated?
- Is the site known or suspected to be contaminated?
- Are previous uses likely to have left the site in a contaminated state?
- Does the site require investigation prior to the determination of the application?
- Has the local authority gathered information on the site in meeting the requirements of Part IIA?
- Does the local authority possess any information on the type and extent of contamination?
- Have studies already been undertaken on the site?
- Is the developer in possession of relevant information on contamination?
- Has the developer thoroughly investigated the site?

Remediation:

- Does the site require some form of remediation for its current/proposed use?
- Has the developer provided a strategy for the remediation of the site?

If so :

- Is the strategy suitable for the proposed use of the site?
- Have a number of remediation techniques been considered?
- Have suitable standards been employed?
- Does the remediation plan contain arrangements for checking compliance with the standards selected?
- Does the site require to be monitored on completion of the works? If so, what arrangements are proposed/required?

If not :

- Is a remediation strategy required before the application can be determined or can the necessary measures be applied through conditions?

Post-Approval Monitoring

- Has the development been carried out in accordance with the approved plans?
- Has the developer complied with any planning conditions?
- Has the site been treated in accordance with the remediation plan?
- If required, have post-works monitoring procedures been put in place?

Selected Bibliography

British Geological Survey (BGS) (1990) Hydrogeology of Scotland (and associated Hydrogeology of Scotland map (1988)). British Standards Institute (BSI) (1999), BS5930 Code of Practice for Site Investigations. CIRIA, Special Publications 101-112 (1995-97), Remedial Treatment of contaminated land, Volumes I-XII. Contaminated Land (Scotland) Regulations 2000 (SSI 178/2000), The Stationery Office. Department of the Environment (DoE) (1994), Guidance on Preliminary Site Inspection of Contaminated Land (CLR No.2). DoE (1994), Documentary Research on Industrial Sites (CLR. No. 3). DoE (1994) Sampling Strategies for Contaminated Land (CLR. No. 3). DoE (1995/1996), Industry Profiles. Department of the Environment, Transport and the Regions (DETR), The Contaminated Land Exposure Assessment Model (CLEA). DETR (1997), A Quality Approach to Contaminated Land Consultancy (1997) Environmental Protection Act 1990, The Stationery Office. Environment Act 1995, The Stationery Office. Environmental Impact Assessment (Scotland) Regulations 1999 (SSI 1/1999), The Stationery Office. Scottish Enterprise (1998), How To Investigate Contaminated Land. Scottish Enterprise. Scottish Enterprise (1998), How To Approach Contaminated Land. Scottish Enterprise. Scottish Executive Rural Affairs Department (2000), Circular 1/2000, Environmental Protection Act 1990 : Part IIA - Contaminated Land. Scottish Executive (2000), Scottish Vacant and Derelict Land Survey 1999, Statistical Bulletin Environment Series ENV/2000/1. Scottish Office Development Department (SODD) (1994), NPPG 1 : The Planning System. SODD (1998), Circular 4/1998, The Use of Conditions in Planning Permissions. Scottish Office Development Department (1999) Addendum to Circular 4/1998, Model Planning Conditions. SEPA (1999), Methodology to Derive Tolerable Daily Intakes. SNIFFER (1999), Communicating Understanding of Contaminated Land Risks. SNIFFER (2000), Framework for Deriving Numeric Targets to Minimise the Adverse Human Health Effects of Long-term Exposure to Contaminants in Soil. Technical Standards for Compliance with the Building Standards (Scotland) Regulations 1990, as amended. www.detr.gov.uk
www.scotland.gov.uk

Footnotes

1. If land is "contaminated land" and it falls within a description in paragraphs (a) to (h) of regulation 2(1) of The Contaminated Land (Scotland) Regulations 2000,

then it is a "special site" (Environmental Protection Act as amended, Section 78A(3)).

2. 'Harm' means "harm to the health of living organisms or other interference with the ecological systems of which they form part and, in the case of man, includes harm to his property." (Environmental Protection Act as amended, Section 78A(4)).
3. The "enforcing authority" is, in relation to a special site, SEPA, otherwise it is the local authority in which the "contaminated land" is situated (Environmental Protection Act as amended, Section 78A(9)).
4. The "appropriate person" to bear responsibility for remediation is defined by section 78F of the Environmental Protection Act as amended.

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