



SAFEGROUNDS

The UK regulatory framework for contaminated land on nuclear-licensed sites and defence sites

*Information paper for the SAFEGROUNDS Learning
Network*

Marion Hill



Classic House, 174-180 Old Street, London EC1V 9BP
TEL: +44 (0)20 7549 3300 FAX: +44 (0)20 7253 0523
EMAIL: enquiries@ciria.org WEBSITE: www.ciria.org

SAFEGROUNDS The UK regulatory framework for contaminated land on nuclear-licensed sites and defence sites

Hill, Marion

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Foreword

This is the seventh version of a paper that was originally produced for the SAFEGROUNDS project steering group. It is intended to be a factual summary of the key features of the UK regulatory framework for the management of contaminated land on nuclear-licensed sites and defence sites. The regulatory regimes included are those for radioactive contamination, non-radioactive contamination and mixed contamination on such sites, and on other sites where it is known or suspected that radioactive contamination may be present. The paper incorporates information from the regulatory bodies for England, Scotland, Wales and Northern Ireland, from UK government departments and from the devolved administrations but it is in no way a formal statement of their positions. Nor does it constitute legal advice.

This version of the paper reflects developments over the period from April 2009 to March 2010. The main text deals primarily with the regulatory framework in England. Differences in Scotland, Wales and Northern Ireland are signposted in the main text and summarised in an appendix. There is a parallel paper for CIRIA's SD:SPUR learning network that contains information about the regulatory framework for the management of radioactive and non-radioactive wastes produced during the remediation of contaminated land (see <www.sdspur.com>).

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Acronyms and abbreviations

ALARA	As low as reasonably achievable
ALARP	As low as reasonably practicable
BAT	Best available techniques
BPEO	Best practicable environmental option
BPM	Best practicable means
Bq	Becquerel (unit of radioactivity), also kBq (kilobecquerel, a thousand Becquerels), MBq (megabecquerel, a million Becquerels), Bq/g (Becquerels per gram), Bq/ml (Becquerels per millilitre)
BSS Directive	European Directive on basic safety standards for protection against exposure to ionising radiation
CAR	Water Environment (Controlled Activities) (Scotland) Regulations 2005 (and the 2007 Amendment Regulations)
CDM	Construction (Design and Management) Regulations
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research and Information Organisation
CLEA	Contaminated Land Exposure Assessment (project, package, methodology, model)
CLG	Department for Communities and Local Government
CLR	Contaminated Land Report
COSHH	Control of Substances Hazardous to Health Regulations
DE	Defence Estates
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs (responsibilities for radioactive waste and radioactively contaminated land now transferred to DECC)
DETR	Department of Environment, Transport and the Regions (a predecessor of Defra)
DoE	Department of Environment (a predecessor of Defra)
DoE(NI)	Department of Environment (in Northern Ireland)
DNSR	Defence Nuclear Safety Regulator
EA	Environment Agency
EDR	Environmental Damage (Prevention and Remediation) Regulations
EIA	Environmental impact assessment
EIADR	Nuclear Reactors (Environmental Impact Assessments for Decommissioning) Regulations
EO	Exemption Order (made under the Radioactive Substances Act)
EPA90	Environmental Protection Act 1990
EPR2010	Environmental Permitting Regulations 2010 (for England and Wales)
Gy	Gray (a unit of radiation dose), also μ Gy, microGray, one millionth of a Gray
HCVs	Health criteria values (for non-radioactive substances)

HPA	Health Protection Agency
HSE	Health and Safety Executive
HSE(NI)	Health and Safety Executive (Northern Ireland)
HSWA74	Health and Safety at Work etc Act 1974
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
IRR99	Ionising Radiations Regulations 1999
LA	Local authority
LLW	Low level (radioactive) waste
LLWR	UK Low Level Waste Repository (near Drigg in Cumbria)
MHSW	Management of Health and Safety at Work Regulations
MoD	Ministry of Defence
mSv	Millisievert: unit of radiation dose, one thousandth of a Sievert (Sv)
NDA	Nuclear Decommissioning Authority
NHBC	National House Building Council
NIA65	Nuclear Installations Act 1965
NIEA	Northern Ireland Environment Agency (previously the Environment and Heritage Service, Northern Ireland)
NISR03	Nuclear Industries Security Regulations 2003
NRPB	National Radiological Protection Board (now the Radiation Protection Division of the Health Protection Agency)
OCNS	Office of Civil Nuclear Security
ODPM	Office of the Deputy Prime Minister (responsibilities relevant to this paper are now with CLG)
PAN 33	Planning Advice Note 33, for Scotland, see (Scottish Executive, 2000)
PAN 51	Planning Advice Note 51, for Scotland see (Scottish Executive, 2006)
Part 2A	Part 2A of the Environmental Protection Act 1990 (inserted by the Environment Act 1995)
PPC	Pollution prevention and control (regime, regulations, permits)
PPS 23	Planning Policy Statement 23, for England, see (ODPM, 2004)
PSRE EO	Phosphatic Substances, Rare Earths etc Exemption Order
RCLEA	Radioactively Contaminated Land Exposure Assessment (methodology, model)
RSA93	Radioactive Substances Act 1993
SAPs	Safety assessment principles (for nuclear facilities)
Schedule 1	Schedule 1 of the Radioactive Substances Act 1993
SD:SPUR	Site decommissioning: sustainable practices in the use of resources
SEA	Strategic environmental assessment
SEPA	Scottish Environment Protection Agency
SGVs	Soil guideline values
SI	Statutory Instrument
SLC	Site licence company
SoLA EO	Substances of Low Activity Exemption Order
SPOSH	Significant possibility of significant harm (in the Part 2A regime)

SR	Statutory Rule (in Northern Ireland)
SSI	Scottish Statutory Instrument
VLLW	Very low level (radioactive) waste
WAG	Welsh Assembly Government
WLGA	Welsh Local Government Association

1 Key features of the regulatory framework

1.1 Sites included

Throughout this paper the term “nuclear-licensed site” is used to mean:

- any site in respect of which or part of which a nuclear site licence is for the time being in force
- any site in respect of which, after revocation or surrender of a nuclear site licence, the period of responsibility of the licensee has not come to an end.

There is a complete list of nuclear-licensed sites on the website of the Health and Safety Executive (HSE) (see <www.hse.gov.uk/nuclear>). All the nuclear power station sites are nuclear-licensed sites, as are the sites where nuclear fuel is manufactured, the site where spent fuel is reprocessed (Sellafield), the sites previously owned by UKAEA where R&D was carried out, and the low level radioactive waste repository (LLWR) near Drigg. Sites where nuclear weapons are made and sites where nuclear-powered submarines are maintained are also nuclear-licensed sites, these sites are owned by the Ministry of Defence (MoD) but operated by contractors. Other nuclear-licensed sites include radioisotope production facilities and research reactors. All the major civil nuclear-licensed sites that are being wholly or partly decommissioned are owned by the Nuclear Decommissioning Authority (NDA) and operated by “site licence companies” (SLCs), under contract to the NDA (see <www.nda.gov.uk> for further details).

The term “defence site” is used to mean any site that is owned by MoD that is not a nuclear-licensed site and on which it is known or suspected that radioactive contamination is present on, in or under the land. Most defence sites are ones where the main operation involving radioactive materials was the maintenance of radium luminised instruments, and where this ceased many years ago. MoD is in the process of remediating many of these sites with a view to their sale or re-use for another purpose. A small number of defence sites are ones where nuclear operations (particularly the storage of nuclear weapons) are, and will continue to be, carried out. These defence nuclear sites are not subject to the civilian control regime imposed by the Nuclear Installations Act but it is MoD policy that, where practicable, equivalent standards of control should be applied.

For completeness, mention is also made of other sites where radioactive contamination may be present. These include industrial sites and sites formerly owned by MoD. All sites are subject to the Health and Safety at Work etc Act and regulations made under it (in particular, in the present context, the Ionising Radiations Regulations 1999).

1.2 Summaries of regulatory regimes

Table A1.1 shows the UK regulatory regimes for radioactively and non-radioactively contaminated land and Table A1.2 shows the principal regulators. Tables A1.3 to A1.5 summarise the key features of the current regulatory regimes for:

- radioactively contaminated land on nuclear-licensed sites (Table A1.3)
- chemically (ie non-radioactively) contaminated land, and land with mixed contamination (ie radioactive and non-radioactive), on nuclear-licensed sites (Table A1.4)

- all contaminated land on defence sites and other sites (Table A1.5).

Chapters 2 and 3 identify the major differences between the regimes for radioactive and non-radioactive contamination that appear at the beginning of Tables A1.3 to A1.5. These concern definitions of “contaminated land” (see Chapter 2) and their implications for the management, and in particular the remediation, of that land (see Chapter 3). Chapters 2 and 3 deal primarily with the regulatory regimes in England. Differences in Scotland, Wales and Northern Ireland are summarised in Appendix A2 and mentioned in the main text. Legislation is listed on pages 36–41.

2

Definitions of contaminated land

In UK law there is no single definition of “contaminated land” that applies to both radioactive and chemical (non-radioactive) contamination or to all types of site. The definitions for non-radioactive contamination are somewhat more straightforward so these are dealt with first, in Section 2.1 below. The definitions for radioactively contaminated land are discussed in Section 2.2.

2.1

Definitions for non-radioactively contaminated land

There are two main components of the environmental regulatory framework that are relevant for definitions for non-radioactively contaminated land. These are:

- the Part 2A regime, which applies to land in its current use (including any use for which planning permission has been granted), and which is designed to deal with the legacy of contaminated land that is posing the greatest risks to people, human activities and the environment
- the planning regime, which applies to land proposed for development.

The Part 2A regime, which applies in England, Scotland and Wales, has a statutory definition of “contaminated land” (see Section 2.1.1), as does the corresponding legislation in Northern Ireland (see Appendix A2). English guidance under the planning regime uses the wider term “land affected by contamination” (see Section 2.1.2). Scottish planning guidance also has a definition that is broader than that in Part 2A (see Appendix A2).

2.1.1

Part 2A definition of “contaminated land”

Part 2A of the Environmental Protection Act 1990 (inserted by Section 57 of the Environment Act 1995) defines “contaminated land” as any land that appears to the local authority “to be in such a condition, by reason of substances in, on or under the land, that significant harm is being caused or there is a significant possibility of such harm being caused” or “pollution of controlled waters is being, or is likely to be caused”. In this definition “harm” means harm to the health of human beings and various other living organisms, or other interference with the ecological systems of which they form a part, and, in the case of humans, includes harm to property. Regulations and Statutory Guidance set out what harm is to be regarded as “significant”, what is meant by “significant possibility” and how to determine whether pollution of controlled waters is being or is likely to be caused (Defra, 2006a).

There is also non-statutory guidance on the legal definition of “contaminated land” under Part 2A (Defra, 2008). This non-statutory guidance goes further than the statutory guidance in explaining what is meant by “significant possibility of significant harm” (SPOSH) and in advising how to determine whether there is a SPOSH from a particular piece of land. The guidance states that the determination should be carried out by conducting a science-based, site specific risk assessment and using judgement, taking account of the purpose of Part 2A (Defra, 2008). It outlines the non-statutory technical guidance that is available for such assessments via the Contaminated Land Exposure Assessment (CLEA) project.

The CLEA package, which was revised in January 2009, provides a software tool, a handbook for the software, a report on the technical background to the CLEA model, a

general report on the approach to assessing the toxicity of substances and a report on the use of “soil guideline values” (SGVs) (EA, 2009a-e). New substance-specific toxicological reports (“TOX reports”), with “health criteria values” (HCVs), and new reports containing SGVs are being published as they become available (EA, 2009f). The reports are for substances for which HCVs and SGVs already exist, and for other priority substances. The existing substance-specific toxicological reports can continue to be used until they are replaced. The Contaminated Land Reports on SGVs (CLR7-CLR10) have been withdrawn because they do not fully reflect the current approach by the Environment Agency.

SGVs can be used as screening thresholds for SPOSH. If concentrations of contaminants are below SGVs it can be assumed that there is no SPOSH. If concentrations are above SGVs it is necessary to determine, via detailed quantitative risk assessment, whether: (a) there is no possibility of significant harm, or (b) there is a non-significant possibility of significant harm, or (c) there is a SPOSH (Defra, 2008).

The Part 2A definition of “contaminated land” is based on the principles of risk assessment and the application of the definition has two steps. The first is to find out whether a “contaminant”, a “pathway” and a “receptor” all exist for one or more of the substances on the land. The second is to determine whether these “pollutant linkages” are leading to, or are likely to lead to, significant harm or pollution of controlled waters. Unless there is one or more “significant pollution linkage” for the land it cannot be deemed to be contaminated land under Part 2A, whatever the levels of contamination present.

If land on nuclear-licensed sites or defence sites is determined to be “contaminated land” the sites are dealt with as “special sites” under the Part 2A regime. This means, in essence, that they are regulated by the relevant environment agency (see below). If the land on a nuclear-licensed site or defence site is not contaminated land (as defined above) then the site will not be a “special site” under Part 2A. Other sites on which there is land that is deemed to be contaminated land and that are not “special sites” are regulated by local authorities, with advice from the environment agencies where necessary.

Local authorities are responsible for identifying land in their areas which meets the Part 2A definition of contaminated land. In doing so, they will seek information from the relevant environment agency and advice in respect of pollution of controlled waters. In cases where a local authority believes that land, if found to be contaminated land, would subsequently be a “special site”, it will normally ask the relevant environment agency to carry out a site inspection prior to determination. However, the responsibility for the formal determination of land as contaminated land remains with the local authority in all cases. Once land has been determined to be contaminated land, and where the relevant environment agency and local authority agree (or in case of dispute the relevant Minister decides) that the land is also a “special site”, the relevant environment agency will take over regulatory responsibilities from the local authority to ensure that appropriate remediation is carried out.

2.1.2

Planning regime definition of “land affected by contamination”

In late 2004 the then Office of the Deputy Prime Minister (ODPM)¹ issued Planning Policy Statement 23 (PPS 23), which, in Annex 2, provides guidance to English planning authorities on development on contaminated land (ODPM, 2004). The PPS 23 guidance uses the term “land affected by contamination”, which it states is intended

¹ The responsibilities of the ODPM with respect to planning are now within the Department for Communities and Local Government (CLG).

to cover “all cases where the actual or suspected presence of substances in, on or under the land may cause risks to people, human activities or the environment, regardless of whether the land meets the statutory definition in Part 2A”.

This wide term “land affected by contamination” reflects the context of planning control. The aim of the guidance is to ensure that all situations in which there are, or could in future be, unacceptable risks from land contamination are addressed in the planning process and that developments are carried out in such a way as to remove these unacceptable risks (see also Section 3.1.2). The PPS 23 guidance covers radioactive contamination as well as non-radioactive contamination (see also Section 2.2.6) and applies to both natural and artificial contamination (ODPM, 2004).

The PPS 23 guidance is for all sites in England that come within the planning regime. Nuclear-licensed sites are included after they have been delicensed and when a development is proposed that requires planning permission. Defence sites for which a change of use is proposed are included if that change requires planning permission. Planning guidance for Scotland is given in PAN 33 and is discussed in Appendix A2 (Scottish Executive, 2000). There is also guidance for developers in Wales (WAG, 2006).

2.2 Definitions for radioactively contaminated land

Six definitions for radioactively contaminated land are used in connection with the regulatory framework. These are:

- a general definition of “radioactively contaminated land” that is largely consistent with the Radioactive Substances Act 1993²
- the definition of “radioactively contaminated land” in the Health and Safety Executive’s (HSE’s) safety assessment principles for nuclear facilities
- the definition of “radioactive contaminated land” in the Part 2A regime for England and Wales
- the definition of “radioactive contaminated land” in the Part 2A regime for Scotland
- the Environment Agency definition of “land contaminated with radioactivity”
- a definition relevant to the planning regime guidance on development on “land affected by contamination”.

These definitions are discussed in turn below.

2.2.1 General definition of “radioactively contaminated land”

This definition is that land is radioactively contaminated if activity levels are above the ubiquitous natural and artificial background that is typical of the area in which the land is located. The ubiquitous artificial background is taken to include radioactivity from atmospheric testing of nuclear weapons in the 1950s and 1960s, fallout from the Chernobyl accident, and radioactivity resulting from effluent discharges from distant nuclear facilities. The definition is, in most respects, consistent with the regulatory regime for the control of radioactive materials and radioactive wastes of the Radioactive Substances Act 1993. Under this Act a substance or article is “radioactive material” if:

- it contains activities per unit mass (expressed in Becquerels per gram or Bq/g) of

² Most of the provisions of the Radioactive Substances Act 1993 are now included in the Environmental Permitting (England and Wales) Regulations 2010, which repeal much of the Act for England and Wales. The Act still applies in full in Scotland and Northern Ireland. For brevity, the term “Radioactive Substances Act” is used throughout this paper to mean the Environmental Permitting Regulations and the remaining parts of the Act in England and Wales, and the whole Act in Scotland and Northern Ireland.

- the naturally-occurring radioelements uranium, thorium, radium, protactinium, polonium, lead and actinium that are above the levels given in Schedule 1 of the Act
- it contains any substances that are not naturally occurring and the radioactivity of which is wholly or partially due to nuclear fission or to bombardment by neutrons or ionising radiations, but excluding radioactivity that is a consequence of past disposals of radioactive waste that at the time were authorised under the Act.

Item (a) of this definition of a radioactive material is not applicable when defining radioactively contaminated land. This is because Schedule 1 levels were derived several decades ago in the context of the management of radioactive wastes. Subsequent reviews of the appropriateness of these levels have also focused on this context and it could be that, in some circumstances, land contamination at or below the Schedule 1 levels would lead to risks that could be considered unacceptable. Item (b) is applicable except that radioactive contamination that is a consequence of past disposals of radioactive waste from the site in question, or nearby sites, is usually viewed in the same way as any other contamination.

The Radioactive Substances Act 1993 defines “radioactive waste” as:

- a substance or article which, if it were not waste would be “radioactive material”
- a substance or article which has been contaminated in the course of the production, keeping or use of radioactive material, or by contact with or proximity to other radioactive waste.

This definition is not applicable when defining radioactively contaminated land because the land itself is not waste. It applies to wastes generated during site investigation or remediation. Radioactivity that is a consequence of past disposals, whether authorised or not, should be included when deciding whether such wastes are radioactive wastes.

With this general definition the determination of whether land is radioactively contaminated relies only on measurement. Unlike the Part 2A definition for non-radioactive contamination (see Section 2.1.1), and the Part 2A definitions for radioactive contamination (see Section 2.2.3 and 2.2.4), there is no identification of pollutant linkages or risk assessment involved. When this definition is used it is implicitly assumed that if radioactivity levels are above background in, on or under the land then there may be risks to people or the environment. It follows that assessment is needed to find out whether action is required to reduce or remove these risks. In some cases the assessment need only be very simple, for example if there are no receptors or no pathways to people.

In the past it has been argued that the Substances of Low Activity Exemption Order (the SoLA EO) made under the Radioactive Substances Act is relevant to the definition of radioactively contaminated land. The SoLA EO states that solid materials and wastes that contain artificial radionuclides at levels less than 0.4 Bq/g, in substantially insoluble form, need not be dealt with as radioactive substances or radioactive wastes under the Radioactive Substances Act regime. This argument is no longer considered valid, for the same reason as given above for the Schedule 1 levels. The situation now is that the 0.4 Bq/g level in the SoLA EO is not used in defining whether land is radioactively contaminated on nuclear-licensed sites, defence sites, or any other types of sites.

SoLA and Schedule 1 are under review as part of a general UK Government and devolved administrations review of EOs. It is not yet known what the implications will be for definitions of radioactive materials and radioactive wastes, or for a general definition of radioactively contaminated land. Progress on the review can be followed via the DECC and SD:SPUR websites.

2.2.2

HSE definition of “radioactively contaminated land” for nuclear-licensed sites

The 2006 HSE safety assessment principles (SAPs) for nuclear facilities contain principles for dealing with radioactively contaminated land on nuclear-licensed sites (HSE, 2006). They define “radioactively contaminated land” as “land containing radioactive contamination that would preclude HSE giving notice in writing that in its opinion there ceases/has ceased to be any danger from ionising radiations on the site, or part of the site”. The criterion for delicensing is that the risk of death to an individual should not be more than one in a million per year (see Section 3.2.2). Thus, in effect, the SAPs definition is that land is radioactively contaminated if the risk it would present to any individual in any future use is greater than one in a million per year.

2.2.3

Part 2A definition of “radioactive contaminated land”, England and Wales

During 2006 the Part 2A regimes in England and Wales were extended to include radioactive contaminated land (Defra, 2006a and WAG, 2006). A corresponding extension was made in Scotland in 2007 (see Section 2.2.4 and Appendix A1). Regulations for radioactive contaminated land were introduced in Northern Ireland in 2006 that serve the same purpose as the Part 2A extensions (see Appendix A1).

Like the remainder of the Part 2A regime (see Section 2.1), the extension is designed to deal with contaminated land that is at present posing the greatest risks. It applies to land in its current use, including any new use for which planning permission has already been granted and any foreseeable change of use for which planning permission would not be required. The 2006 extension was for the legacy of radioactively contaminated land, and land that becomes contaminated as a result of a future, non-nuclear, radiological emergency. Further regulations introduced in 2007 extended it to land contaminated as a result of accidents at nuclear-licensed sites or at nuclear sites in other countries (see Section 3.4). Land that is within nuclear-licensed sites is excluded from the Part 2A regime for radioactive contaminated land because it is regulated under the Nuclear Installations Act (see Sections 2.2.2 and 3.2.1).

In the extension to Part 2A for England and Wales, “radioactive contaminated land” is defined as any land that appears to the local authority to be “in such a condition, by reason of substances in, on or under the land that harm is being caused or there is a significant possibility of harm being caused”. In this definition, “harm” refers only to the potential effects of long-lasting radiation exposure on the health of humans. Land is defined as “radioactive contaminated land” under Part 2A if the individual effective dose from lasting exposure is equal to or greater than 3 mSv per year (and/or the dose to the skin is equal to or greater than 50 mSv per year, and/or the dose to the lens of the eye is equal to or greater than 15 mSv per year) (Defra, 2006a). The individuals to be considered in determining whether the land is contaminated are those currently present and those who might be present if the land is used for other purposes that are consistent with existing planning permission. Individuals who are not likely to be present can be disregarded. The Statutory Guidance also indicates what is to be considered as “a significant possibility of harm being caused” (Defra, 2006a). The approach in the extension is based on the principles of risk assessment and is consistent with the use of “significant pollutant linkages” in the remainder of the Part 2A regime (see Section 2.1.1).

Land that is “radioactive contaminated land” under the extension to Part 2A is to be dealt with as a “special site”. In England and Wales, local authorities are responsible for

identifying radioactively contaminated land that meets the statutory definition. In doing so they only need to inspect sites that they have “reasonable grounds” for believing are radioactively contaminated. Local authorities are expected to seek advice from the Environment Agency in identifying sites and to ask the Environment Agency to inspect each site before determining formally that it is “radioactive contaminated land” and hence a “special site”. As in the remainder of the Part 2A regime (see Section 2.1.1), the Environment Agency takes over the regulation of sites after local authorities have determined that they are “radioactive contaminated land” and hence “special sites” (Defra, 2006a, and WAG, 2006).

2.2.4

Part 2A definition of “radioactive contaminated land”, Scotland

The regulations that extend the Part 2A regime in Scotland to radioactive contaminated land came into force at the end of October 2007. They were amended later that year and amended again in 2009 (see Appendix A2).

The Scottish Part 2A definition of “radioactive contaminated land” is “any land that appears to the appropriate Agency to be in such a condition, by reason of substances in, on or under the land, that:

- significant harm is being caused or there is a significant possibility of such harm being caused, or
- significant pollution of the water environment is being caused or there is a significant possibility of such pollution being caused”.

The “appropriate Agency” mentioned in the definition is SEPA (see Appendix A2). The statutory guidance that accompanies the 2007 regulations defines “significant harm” to human beings as an individual effective dose from lasting exposure of more than 3 mSv per year (and/or a dose to the skin of more than 50 mSv per year, and/or a dose to the lens of the eye of more than 15 mSv per year) (Scottish Government, 2009).

“Significant pollution of the water environment” is defined as occurring when:

- radionuclide concentrations are leading to “significant harm” to human beings
- substances in the water environment are leading to “significant harm” to non-human species, where such harm is defined as dose rates above:
- 400 μ Gy per hour for aquatic biota or plants
- 40 μ Gy per hour for terrestrial biota or plants.

The statutory guidance defines “significant possibility of significant harm” to human beings in terms of potential radiation doses. “Significant possibility of significant pollution” of the water environment is defined in terms of potential radiation doses to human beings and the likelihood of “significant harm” to non-human species (see Appendix A2) (Scottish Government, 2009).

2.2.5

Environment Agency definition of “land contaminated with radioactivity”

The Environment Agency website (www.environment-agency.gov.uk/landcontamination) contains guidance for land with radioactive contamination, to accompany the extended Part 2A regime. The guidance gives the Part 2A definition of “radioactive contaminated land” for England and Wales (see Section 2.2.3) and introduces the term “land contaminated with radioactivity”. This is defined as “land into or onto which radioactive substances have been introduced as a consequence of man’s activities”, where “radioactive substances” are “radioactive materials” and “radioactive wastes” as defined in the Radioactive Substances Act 1993. This definition of “land contaminated with radioactivity” is similar to the general definition of “radioactively contaminated land” given in Section 2.2.1. The major difference is that the Environment Agency definition contains no caveats about the interpretation of the Radioactive Substances Act in the context of radioactively contaminated land.

2.2.6

Definition of “land affected by radioactive contamination” for the planning regime

PPS 23 does not contain an explicit definition of “land affected by radioactive contamination”. From the discussion above, it appears that a suitable definition of “land affected by radioactive contamination” could be one that is very similar to the general definition of radioactively contaminated land given in Section 2.2.1. This is because the definition in Section 2.2.1 would meet the objective of the PPS 23 guidance of ensuring that all land that has potentially unacceptable risks from radioactive contamination is addressed in the planning process. Such a definition would also have the advantage of being largely consistent with the Radioactive Substances Act regime.

As noted in Section 2.1.2, the PPS 23 guidance is for all sites in England that come within the planning regime. Nuclear-licensed sites are included after they have been delicensed and when a development is proposed that requires planning permission. Defence sites for which a change of use is proposed are included if that change requires planning permission.

3 Management of contaminated land

3.1 Management of non-radioactively contaminated land

3.1.1 Management under the Part 2A regime

By definition, land that is “contaminated land” in the Part 2A sense is causing or is likely to cause significant harm or pollution of controlled waters and therefore some kind of action is required. In general this action will take the form of “remediation”, which is defined in Part 2A as:

- “the doing of anything for the purpose of assessing the condition of:
 - the contaminated land in question
 - any controlled waters affected by that land
 - any land adjoining or adjacent to that land
- the doing of any works, the carrying out of any operations or the taking of any steps in relation to such land or waters for the purpose 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
 - restoring the land or waters to their former state
- the making of subsequent inspections from time to time for the purpose of keeping under review the condition of the land or waters.”

The Statutory Guidance for Part 2A describes the aim of remediation for an area of contaminated land as the “standard of remediation” (Defra, 2006a, and WAG, 2006). The standard of remediation should be established for each significant pollutant linkage. The minimum aim in each case should be to ensure that the land in its current use (including any future use for which planning permission exists) is no longer “contaminated land”, and that the effects of any significant harm or pollution are remedied. Under Part 2A, the enforcing authority (ie the local authority or, on “special sites”, the relevant environment agency) has a clear role in establishing and implementing the standard of remediation under a variety of situations. In particular:

- under voluntary remediation, the enforcing authority reviews the proposed works to ensure that they will meet the required standard of remediation and then reviews the implementation of the works to ensure that they continue to do so
- under a remediation notice, the enforcing authority is responsible for identifying the standard of remediation to be achieved by the actions specified within the notice. The authority will then review the implementation of the works to ensure that they continue to meet the required standard.

The enforcing authority is required to take into account the best practicable technique for remediation and in all cases the remediation selected must be reasonable. If remediation actions are not reasonable then they cannot be considered to be the best practicable techniques for the relevant significant pollution linkages (Defra, 2006a, and WAG, 2006).

The Part 2A regime is designed to encourage voluntary remediation. It is recognised that this will often be funded by redevelopment and that in such cases it is for the

planning system to ensure that the contaminated land is investigated appropriately and that remediation is carried out. It is the responsibility of the developer to carry out the remediation and, in most cases, remediation requirements will be enforced through planning conditions and building control, rather than through remediation notices. The Government view is that the Part 2A regime should be held in reserve for use when there is no suitable voluntary solution, for example where development has already taken place but the land is still “contaminated land” in the Part 2A sense (Defra, 2008).

Defra and the Environment Agency, in conjunction with ODPM, the Welsh Assembly Government, SEPA, the Northern Ireland Environment and Heritage Service³, the Chartered Institute of Environmental Health and the Welsh Development Agency, sponsored the development of *Model procedures for the management of land contamination*. These are described in Contaminated Land Report 11 (CLR11) (EA, 2004). They are intended to provide the technical framework for structured decision-making about land contamination, and to assist land owners, developers, planners and regulators.

3.1.2 Management under the planning regime

PPS 23 states that, in all cases where it is known or suspected that contamination is present, or when the proposed use of the land would be particularly vulnerable (eg housing, schools, hospitals, children’s play areas), the local authority should, as a minimum, require the applicant for planning permission to submit a report of a desk study and site reconnaissance (walk-over). In some cases these will be sufficient to show either that there is no contamination present or to develop a conceptual model, carry out a risk assessment and appraise remediation options. If contamination is present, it is more likely that the desk study and site reconnaissance will be used to provide input to the design of further site investigations and more detailed risk assessments. PPS 23 states that local planning authorities should take a balanced approach when specifying the investigations and assessments that the applicant is required to carry out, so that the effort and costs for the applicant are commensurate with the potential risks of the contaminated land to people and the environment (ODPM, 2004).

In deciding on planning applications for land affected by contamination the local authority needs to be satisfied that the proposed development does not create, or allow the continuation of, unacceptable risks, either from the land in question or from adjoining land. All existing significant pollution linkages should be broken and no new ones created. Part 2A principles apply when assessing and acting on risks (see Section 3.1.1) but the planning regime is broader because it is concerned with both existing and new risks and with a wider range of receptors (eg general fauna and flora, landscape, amenity and heritage are included). The local authority has to be satisfied that the proposed development will protect all receptors relevant to a site to appropriate standards and that, as a minimum, the land in its new use will not be “contaminated land” under Part 2A.

The local authority also has to consider the potential impact of remediation activities and be satisfied that the development can be carried out without unacceptable risks to workers, neighbours or other off-site receptors. PPS 23 states that a balance should be struck between the overall social and economic benefits of the development, including the remediation proposals, and the temporary impacts of remediation activities. It also recommends that applicants carefully consider waste management implications when deciding on the best approach to remediation (ODPM, 2004). The local planning authority can attach conditions to planning permissions to ensure that proposed developments meet their requirements.

³ Now the Northern Ireland Environment Agency (NIEA), which was formed in July 2008 by reorganising the Environment and Heritage Service.

The management of contaminated land in Scotland under the planning regime is outlined in PAN 33 (Scottish Executive, 2000). The terms used are somewhat different to those in PPS 23 but the overall intentions are similar (see Appendix A2).

The Model Procedures (CLR11) are applicable to the management of contaminated land under the planning regime (EA, 2004). There is also guidance for the safe development of housing on land affected by contamination. This was produced jointly by the National Council of House Building (NHBC), the Environment Agency and the Chartered Institute of Environmental Health (NHBC *et al*, 2008). It is consistent with CLR11 and is intended to be good practice guidance for house builders, developers, local authority and Environment Agency regulators, and consultants and other professional advisers (eg chartered surveyors, insurers). Although the guidance is written for housing development, much of it is relevant to other forms of development on contaminated land, to existing developments and to undeveloped land (NHBC *et al*, 2008).

3.1.3 Management of non-radioactively contaminated land outside the Part 2A and planning regimes

There are sites that are not proposed for development where contamination is present but that are not “contaminated land” as defined in the Part 2A regime (for example, because there is no significant pollutant linkage). The options for such sites are to:

- do nothing
- implement any remedial measures that the site owner feels to be desirable (for example, to be consistent with good environmental practice, to increase the value of the land when it is eventually sold)
- implement any remedial measures that are needed for reasons not connected with Part 2A (for example, to comply with the Environment Agency’s requirements specified under the Anti-Pollution Works Notice Regulations 1999).

At nuclear-licensed sites remediation of non-radioactively contaminated land may be necessary in order to comply with site licence conditions related to general safety, or because of the potential for contamination to affect nuclear safety (for example, because of the presence of flammable substances, or substances that could influence radionuclide movement in soils and groundwater).

Strictly, none of the Government’s statutory guidance or non-statutory guidance for Part 2A or the planning regime is applicable in such cases. However, the Model Procedures (CLR11) are applicable to all land with non-radioactive contamination present and can be used to aid decisions on how land can be managed outside the Part 2A and planning regimes (EA, 2004).

3.1.4 Management of land that has become non-radioactively contaminated since 2009

The environmental damage and liability regulations (EDR) came into force in 2009. There are separate regulations for England, Scotland, Wales and Northern Ireland EDR apply to land that has become non-radioactively contaminated⁴ since the date that the regulations came into force (1 March 2009 in England, 6 May 2009 in Wales, 24 June 2009 in Scotland, 24 July 2009 in Northern Ireland), except in cases where the

⁴ EDR do not apply to radioactively contaminated land because they exclude “environmental damage” and any “imminent threat of environmental damage” that is caused by radioactivity arising from any activity covered by the Euratom Treaty and any activity or incident for which liability and compensation are covered by the 1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy and the 1963 Brussels Supplementary Convention (Defra & WAG, 2009a).

contamination is a result of an incident, event or emission that took place before that date, or an incident, event or emission that was caused by an activity that had ceased before that date (Defra & WAG, 2009a).

The regulations are about preventing non-radioactive contamination (see Section 3.6), as well as remedying contamination that has already occurred. The regulators for land are the environment agencies and local authorities. The contaminants covered by EDR are substances, preparations, organisms and micro-organisms. There are exemptions for natural disasters, acts of terrorism, activities for national defence or international security and diffuse pollution.

EDR Guidance states that the regimes for dealing with non-radioactively contaminated land should be considered in the following order (Defra & WAG, 2009a):

- EDR
- the Planning regime
- the Part 2A regime.

EDR only apply where there is an operator of a listed activity and where contaminated land is resulting in a “significant risk of adverse effects on human health”. Listed activities include activities requiring environmental permits (including waste management operations) and transport of dangerous goods.

“Significant risk” is not defined in EDR. Government guidance states that what is significant is a matter of judgement and refers to the Statutory Guidance to Part 2A (Defra & WAG, 2009a, and Defra, 2006a). EDR contain an indicative list of “adverse effects on human health”, which is not dissimilar to the descriptions of “harm” in the Part 2A guidance (Defra & WAG, 2009a, and Defra, 2006a). The EDR guidance suggests the use of CLR 11 methods of risk assessment and decision making for contaminated land (EA, 2004). It is for the regulator to decide whether there is a risk to human health and whether this risk is significant. The guidance lists factors that the regulator should consider when making judgements about whether a risk is significant (Defra & WAG, 2009a).

The regulator also decides on the remedial measures to be implemented, taking into account any proposals made by the land owner or operator. It is for the land owner/operator to carry out remediation or arrange to have it carried out, and to pay for it (Defra & WAG, 2009).

3.2 Management of radioactively contaminated land

3.2.1 Radioactively contaminated land on nuclear-licensed sites – general

HSE guidance to its inspectors on the management of radioactively contaminated land is given in its safety assessment principles for nuclear facilities (SAPs) (HSE, 2006). Some of the previous guidance is also still relevant (HSE, 2001). The SAPs contain eight principles for the control and remediation of radioactively contaminated land. These principles are about (HSE, 2006):

- preparation of a strategy for managing radioactively contaminated land up to the time of any delicensing (see Section 3.2.2)
- detecting radioactively contaminated land on or adjacent to nuclear-licensed sites

- when radioactively contaminated land is discovered, identifying and controlling the source of contamination
- characterisation of the contaminated areas
- monitoring and surveillance
- preparing and implementing plans for the control and remediation of all radioactively contaminated areas
- record-keeping
- remediating radioactively contaminated land before any new facilities are constructed on it.

“Remediation” is defined in the SAPs as “any measure that may be carried out to reduce the radiation exposure from existing contamination of land areas through action applied to the contamination itself (the source) or to the exposure pathways to humans”.

It is for licensees to identify and evaluate the possible management options for radioactively contaminated land when developing their strategies and plans. HSE enforcement powers in this area derive from the conditions attached to nuclear site licences, particularly the conditions that require adequate arrangements for storage of nuclear matter, including radioactive material and radioactive waste (condition 4), adequate records of amounts and locations (conditions 6 and 25), safety cases (conditions 14 and 23), wastes to be minimised (condition 32) and wastes to be contained (condition 34). The environment agencies have powers relating to unauthorised discharge of radioactive materials into the environment and, in principle, these could be used in the event of, for example, movement of radioactive contamination into off-site groundwater. In practice, under arrangements between HSE and the environment agencies, HSE aims to ensure that remediation is undertaken before such events occur.

HSE requires licensees to prepare safety cases for radioactively contaminated land that are compatible with their land management strategies, and to review any existing safety cases that might be affected by the presence of newly-discovered radioactively contaminated land. The detail in safety cases should reflect the extent and nature of the contamination, the harm it could cause, and how much it is spreading or could spread. HSE provides guidance on the information to be included in safety cases (HSE, 2006).

3.2.2

Radioactively contaminated land on nuclear-licensed sites – delicensing

Under the Nuclear Installations Act 1965 (as amended), in order to delicense part or all of a nuclear site HSE must be satisfied that there is “no danger” from ionising radiations from anything on, in or under the land that is to be delicensed. In 2005, after a public consultation, HSE issued its policy statement on the criterion for delicensing (HSE, 2005). The criterion for what HSE will regard as constituting “no danger” is “a demonstration that any residual radioactivity, above background radioactivity, which remains on the site, which may or may not have arisen from licensable activities, will lead to a risk of death to an individual using the site for any reasonably foreseeable purpose of no greater than one in a million per year”. The statement notes that the overarching requirements of the Health and Safety at Work etc Act to reduce risks to “as low as reasonably practicable” (ALARP)⁵ apply but, if risks are

⁵ HSE Nuclear Directorate’s guidance to its inspectors on the demonstration of ALARP in all nuclear contexts is available on its website (HSE, 2009).

below 10^{-6} , HSE will only expect licensees to show that there are no other, inexpensive clean-up activities that could be carried out.

In 2008 HSE issued guidance to its inspectors on the interpretation and implementation of the “no danger” policy criterion. This guidance sets out the issues that HSE expects a licensee to cover in a safety case to support an application for delicensing (HSE, 2008). These issues include:

- identification of radioactively contaminated areas of a site, with details of the methods employed for their remediation
- documentation, records and results of radiological surveys and analyses of samples
- an assessment of doses and risks to the public following delicensing, using an internationally accepted methodology and including all reasonably foreseeable uses of the site
- record keeping arrangements.

The guidance contains advice about establishing the local background level of natural and artificial radioactivity. It states that HSE’s preference is that licensees demonstrate that risks are below the 10^{-6} criterion by showing that residual activity levels, after background has been subtracted, are below the values in Annex 1 of IAEA Safety Guide RS-G-1.7 (IAEA, 2004). Where it is not suitable to use the RS-G-1.7 values, licensees may present other values and arguments to demonstrate that risks will be below 10^{-6} , but the arguments need to be very robust (HSE, 2008).

When determining the extent of remediation required in order to make land delicensable, it is necessary to take into account radioactive contamination in surface water, groundwater and any structures that are to remain in place, as well as the contamination in soils and rocks. The range of exposure pathways considered must be wide enough to encompass all the uses to which the land might be put in future, not only the next proposed use. Remediation techniques that rely on blocking or removing one exposure pathway will rarely be appropriate when land is to be delicensed.

There is no requirement for licensees to remediate all the radioactively contaminated land on their sites to the extent necessary for delicensing, ie so that the land is no longer “radioactively contaminated land” in the SAPs sense. Any land that remains radioactively contaminated must be managed appropriately and in particular be subject to monitoring and surveillance.

3.2.3

Radioactively contaminated land on defence sites

On defence nuclear sites the situation is similar to that on nuclear-licensed sites except that nuclear safety is regulated by MoD’s Defence Nuclear Safety Regulator (DNSR), and HSE regulation is via the Health and Safety at Work etc Act and the Ionising Radiations Regulations. MoD were involved in preparing the 2006 HSE SAPs and the DNSR has adopted them for its own assessments.

Non-nuclear defence sites that are to remain in MoD ownership and in their current use are subject to the Part 2A regime (see Section 3.2.4) if levels of radioactive contamination on them are sufficiently high for the land to be “radioactive contaminated land” in the Part 2A sense (see Sections 2.2.3 and 2.2.4). Defence sites that are scheduled for a change of ownership and/or use come under the planning regime if the proposed development of the site requires planning permission (see Section 3.2.5).

For all defence sites that are to be transferred to civilian ownership and/or use a primary consideration is that the requirements of the Radioactive Substances Act are met. The Act does not control radioactively contaminated land directly, it controls the management of radioactive wastes. As soon as any work is carried out on such land, whether site investigation or remediation, the potential to generate radioactive wastes exists and, unless the site has Crown immunity, the Act applies (EA, 2006).

3.2.4 Management of radioactive contaminated land under the extension to the Part 2A regime

The management approach for “radioactive contaminated land” (see Section 2.2.3) in the extension to the Part 2A regime is designed to implement the requirements of the European Basic Safety Standards Directive for “intervention” to protect people against lasting exposure to radiation (the BSS Directive) (Council of the European Communities, 1996). In essence these requirements are that “intervention” to reduce radiation exposure should only be undertaken if it will do more good than harm (“justification”), and that it should always be undertaken in such a way as to maximise the net benefit of intervening (“optimisation”) (Defra, 2006a, and WAG, 2006).

The Statutory Guidance on Part 2A contains information on identifying the types of “intervention” that would be “justified” and choosing those that would be “optimised” (Defra, 2006a, and WAG, 2006). It suggests that the enforcing authority (ie the Environment Agency, because sites with “radioactive contaminated land” are “special sites”) may find it useful to use quantitative decision-aiding methods, such as multi-attribute analysis, and to consult relevant stakeholder groups when assessing what is “justified” and “optimised”. The guidance makes it clear that social, as well as financial, costs of remediation should be considered in decision-making and indicates what those social costs could be (Defra, 2006a, and WAG, 2006).

The Environment Agency website contains a series of briefing notes about the Agency’s roles under the Part 2A regime and for other “land contaminated with radioactivity” (EA, 2006). The Environment Agency’s Radioactive Substance Regulation Environmental Principles (REPs) contain general and specific principles that its regulators use in duties related to radioactively contaminated land (EA, 2009g). The radioactively contaminated land exposure assessment (RCLEA) methodology is the recommended approach for the first stage of a tiered approach to assess radioactively contaminated land under the Part 2A regime (Defra, 2006b-d). RCLEA can be used for initial screening and, where the scenarios and assumptions are representative of the actual situation, for site specific dose assessments.

The statutory guidance for the Part 2A radioactive contaminated land regulations in Scotland contains no new guidance for the management of “radioactive contaminated land” (Scottish Government, 2009). It simply states that the existing statutory guidance on Part 2A for “contaminated land” applies to “radioactive contaminated land”. However, the Part 2A regulations for Scotland specify that when remediation includes an “intervention”, that intervention must be justified and optimised (see Appendix A2).

3.2.5 Management of radioactively contaminated land under the planning regime

Under the planning regime, the management of radioactively contaminated land is the responsibility of the developer, who has to meet any conditions set in the planning permission granted by the local authority. The environment agencies regulate the management of any radioactive wastes produced and advise local authorities and developers on radioactive waste management matters (EA, 2002, 2006 and 2009g).

Local authorities and developers are expected to take account of the views of the Health Protection Agency (HPA), which has advised that (NRPB, 1998, and HPA, 2009):

- no remediation will usually be required if land in its new use would lead to individual risks below 10^{-6} per year
- remediation is likely to be required if individual risks are above 10^{-5} per year.

When risks are between these two levels, and in complex situations, an evaluation and comparison of land management options should be carried out to assist decisions on whether and what type of remediation should take place. Environment Agency advice is that the risk level of 10^{-5} per year (equivalent to a dose of about 0.3 mSv per year) should be regarded as a constraint and that an options assessment should be carried out as part of showing that risks are as low as reasonably achievable (ALARA). At sites where an environmental impact assessment (EIA) or strategic environmental assessment (SEA) is needed for a proposed development, the evaluation and comparison of options for the radioactively contaminated land will be part of that assessment.

3.2.6 Management of radioactively contaminated land outside the Nuclear Installations Act, Part 2A and the planning regimes

There are a number of situations in which it could be necessary to decide how to manage radioactively contaminated land outside the Nuclear Installations Act, Part 2A and planning regimes outlined in Sections 3.2.1 to 3.2.5. These are situations in which the land is outside the boundary of any nuclear-licensed site, in which activity levels are below those that would make the land “radioactive contaminated land” in the Part 2A sense, and in which there are no plans for development on the land so the planning regime does not apply.

Such situations will also generally be outside the Radioactive Substances Act regime. This is because this regime only applies when “radioactive materials” are kept or used, or “radioactive wastes” are accumulated, on “premises used for the purposes of an undertaking” (see the Radioactive Substances Act 1993 for definitions). The Act does not apply unless the land is used for an “undertaking” and unless “radioactive wastes” are being generated. Owning or occupying undisturbed radioactive contaminated land does not constitute keeping or using “radioactive materials”, and undisturbed the land would not constitute “radioactive waste”. In such cases the relevant environment agency can offer advice and, if contamination levels warrant it, encourage remediation, but has no powers to require action to be taken.

In the case of land associated with nuclear-licensed sites, it is likely that the relevant environment agency’s advice on whether or not to carry out remediation would take into account the need to be consistent on “both sides of the fence”. It would be inappropriate to apply one approach inside the boundary of the licensed site and a very different approach immediately outside it. Thus, unless the land is already in public use and to do anything would entail significant disruption of people’s lives, the environment agency would be likely to encourage characterisation, control of the spread of contamination, monitoring, and assessment of remediation options (see Section 3.2.1). If the land will be used by the public in the future, for example when the nuclear site is delicensed, then the environment agency would be likely to encourage remediation to the standards needed for delicensing (see Section 3.2.2). If the land is already in public use the situation is less clear cut and would involve extensive consultation with those who use the land and whose lives would be disrupted by remediation. In all cases it would be good practice to make the local authority aware of the situation, as is recommended for delicensing (HSE, 2008).

In the case of land that is not associated with nuclear-licensed sites, the relevant environment agency might advise the owner to carry out an assessment of a range of options for managing the land, including the option of doing nothing. This is similar to the type of assessment required under the planning regime (see Section 3.2.5), but with the added factor that if the land is in public use remediation could entail significant disruption to people's lives. If the contamination was caused by discharges or disposals from a nuclear site, the land may be "designated" to be the responsibility of the NDA (see Section 3.4).

3.3 Protection of surface water and groundwater

In England and Wales the Part 2A regime for non-radioactively contaminated land covers the "pollution" of "controlled waters". "Controlled waters" are defined in the Water Resources Act 1991 and include surface freshwater, coastal water and "ground waters" (ie all underground water, including groundwater in the saturated zone and water above the saturated zone). The Statutory Guidance for Part 2A gives information on how to determine whether "pollution of controlled waters is being or is likely to be caused" (Defra, 2006a). The Environment Agency also has powers under the Water Resources Act 1991 to require remediation of non-radioactive contamination in controlled waters that is caused by contaminated land. These powers apply whether or not the land is "contaminated land" in the Part 2A sense (see Section 2.1.1).

Groundwater in England and Wales is specifically protected through the groundwater provisions of the Environmental Protection Regulations 2010. These replace the Groundwater Regulations 1998. They transpose into law Article 6 of the "Groundwater Daughter Directive" (2006/118/EC).

Under the Environmental Protection Regulations 2010 a permit is required from the Environment Agency for discharges of "hazardous substances" and "non-hazardous pollutants" to groundwater. Radioactive substances are included as hazardous substances. The Environment Agency is required to maintain and publish a list of hazardous substances. This will include the List 1 substances from the 1998 Groundwater Regulations and any other substances that meet the criteria for persistence, toxicity and bioaccumulation. All substances that are not hazardous are potentially "non-hazardous pollutants". The Environment Agency will decide which non-hazardous substances to control as pollutants (Defra & WAG, 2009b).

The Environmental Protection Regulations 2010 apply to both direct inputs to groundwater (ie where there is no percolation) and indirect inputs, including leachates from deposited wastes that have moved across a natural geological barrier or an engineered barrier. They do not apply to contaminated land in its undisturbed state (because there is no surface activity to control, and because such "passive inputs" are controlled under contaminated land legislation and the Water Resources Act). They do apply to investigations and remedial actions that disturb the ground and hence cause direct or indirect inputs to groundwater (Defra & WAG, 2009b).

The aim of the Groundwater Daughter Directive is to "prevent" inputs of hazardous substances to groundwater, where "prevent" means "taking all measures deemed necessary and reasonable", and "reasonable" means technically feasible and not involving disproportionate costs (Defra & WAG, 2009b). For radioactive substances the EU Basic Safety Standards must be considered in determining what is necessary and the principle of optimisation must be applied in deciding what is reasonable (CEC, 1996). In the case of non-hazardous pollutants the objective is to limit inputs to groundwater (Defra & WAG, 2009b).

The Environment Agency can exempt discharges and activities from the requirement for a permit if (Defra & WAG, 2009b):

- in the opinion of the Environment Agency, the quantity or concentration of the input is so small that it will not lead to any deterioration in the quality of the receiving groundwater
- in the view of the Environment Agency the input to groundwater cannot be prevented without taking measures that would increase risks to human health or to the quality of the environment as a whole
- for technical reasons the input cannot be prevented or limited without using disproportionately costly measures to remove pollutants from, or otherwise control percolation in, contaminated land or subsoil.

3.4 Land contaminated by nuclear activities

The Part 2A regime in England, Scotland and Wales, and the corresponding regime in Northern Ireland, covers “land contaminated by a nuclear occurrence”, that is an accident at a nuclear site in the UK or another country. Accidental radioactive contamination on nuclear sites themselves is excluded from the Part 2A regime because this is dealt with under the regimes for nuclear sites (see Sections 3.2.1 and 3.2.2). Remediation of accidental radioactive contamination that has to be carried out as part of emergency response is also outside the Part 2A regime. The Environment Agency and SEPA can use the Part 2A regime to require nuclear site licensees to remediate long-standing radioactive contamination outside the boundaries of their licensed sites, if this contamination was caused by past activities at the sites, and the land is “radioactive contaminated land” (see Sections 2.2.3 and 2.2.4).

The Energy Act 2004 contains arrangements that could be used to clean up any sites in the UK that are “contaminated as a result of nuclear activities” but that are outside nuclear-licensed sites and (non-licensed) defence nuclear sites. Under the Act, such “contaminated sites” can be “designated” by the Secretary of State, acting with Scottish Ministers for sites in Scotland, to be the responsibility of the NDA. It would then be for the NDA to arrange and pay for remediation of the sites, in accordance with its duties under the Energy Act, and in compliance with other relevant legislation. The Energy Act also allows sites that are designated as contaminated sites to be designated as “related sites”, where the relationship is to the site from which the contamination originated. In such cases the NDA can require the SLC at the originating site to clean up the contamination. These arrangements cover radioactive and non-radioactive contamination arising from incidents and from routine operations.

3.5 Providing information to the public

The full provisions of the Freedom of Information Act 2000 came into force at the beginning of 2005, as did the Environmental Information Regulations 2004 made under this Act, and the corresponding Act and regulations in Scotland. The regulations are relevant to contaminated land in that they require “public authorities” to disseminate progressively to the public “environmental information” that they hold and to make such information available to the public on request.

“Public authorities” include all government departments and agencies (most notably, in the context of this paper, MoD, HSE, the Environment Agency, SEPA and the NDA). “Environmental information” includes any information (written, visual, aural, electronic) on the state of land and soil, with respect to factors that include radioactivity

and other releases to the environment, and information about the state of human health and safety. It also includes information about policies and plans for protecting the environment and human health, reports on the implementation of environmental legislation and cost benefit and other economic analyses, and assumptions used in protecting the environment and human health.

There are some grounds on which a “public authority” can refuse to disclose information (eg because disclosure would have an adverse effect on public safety or national security or protection of the environment, or would infringe commercial confidentiality where this is protected by law). Although these exceptions apply in some situations, the general effect of the freedom of information regime is to bring more information on contaminated land on nuclear-licensed sites and defence sites into the public domain. Under the Part 2A regime for non-radioactively contaminated land, and the extensions to radioactively contaminated land, information about sites that have been assessed to be “contaminated” has to be placed on a public register. Estimates of the quantities and radionuclide contents of radioactive wastes that would be produced if all radioactively contaminated land on nuclear and defence sites were remediated by removing soil are given in the 2007 UK Radioactive Waste Inventory (Defra and NDA, 2008).

3.6 Preventing new contamination of land

The potential for land on nuclear-licensed sites and defence sites to become contaminated is controlled through various pieces of legislation. For radioactive contamination the most important regimes are those of the Nuclear Installations Act 1965 and the Radioactive Substances Act 1993. For non-radioactive contamination the relevant legislation includes the Environmental Protection Act 1990, the Pollution Prevention and Control Act 1999, the Environmental Permitting (England and Wales) Regulations 2010, the Environmental Damage (Prevention and Remediation) Regulations 2009, and the corresponding legislation in Scotland and Northern Ireland. The Ministry of Defence has immunity from some of this legislation but operates its own controls to achieve the same standards, consulting regulators as appropriate.

3.7 Management of wastes arising during the remediation of contaminated land

The SD:SPUR website (www.sdspur.com) contains a paper summarising the regulatory frameworks for the management of radioactive and non-radioactive wastes that could be produced during the remediation (or investigation) of contaminated land. There is also a paper that outlines on-going programmes of work that could result in changes to these frameworks.

3.8 Security at nuclear-licensed sites

The main pieces of legislation that are relevant to security on civil nuclear sites are the Nuclear Industries Security Regulations 2003 (NISR03) and the 2006 regulations that amend these, and the Terrorism Act 2006. The regulator is the Office for Civil Nuclear Security (OCNS), which is a division of HSE’s Nuclear Directorate. The regulations require nuclear premises (as defined in NISR03) to have security plans that are approved by OCNS. Information about the current status of plans and security is given in the OCNS annual reports (OCNS, 2009).

The security plans for nuclear premises must contain standards, procedures and arrangements to ensure the security of “nuclear material” (as defined in the Anti-Terrorism, Crime and Security Act 2001 and NISR03), other nuclear and radioactive material, equipment, software and “sensitive nuclear information” (as defined in the 2001 Act). They must describe the arrangements for receipt and despatch of nuclear material, for policing and guarding nuclear premises and for approving people who work in such premises. There must also be arrangements for dealing with events such as unauthorised access, malicious damage, and theft or attempted theft of nuclear or radioactive material or sensitive information. The security plans and arrangements should include radioactively contaminated land and wastes produced during its remediation.

References

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Contaminated Land Report 14 (CLR14), Department for Environment, Food and Rural Affairs, London

DEFRA (2006a)

Environmental Protection Act 1990: Part 2A Contaminated Land. Statutory guidance

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Defra/RAS/08.002, NDA/RWMD/004. Department for Environment, Food and Rural Affairs, London, and Nuclear Decommissioning Authority, Cumbria. Available from: <www.nda.gov.uk> (ISBN: 978-1-84029-388-3)

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DoE(NI) (2009)

Guidance on the interpretation and implementation of the 2009 Groundwater Regulations

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Department of the Environment (Northern Ireland). Available from:

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Science Report SC050021/SR4, Environment Agency, Rotherham

EA (2009c)

Updated technical background to the CLEA model

Science Report SC050021/SR3, Environment Agency, Rotherham

EA (2009d)

Human health toxicological assessment of contaminants in soil

Science Report SC050021/SR2, Environment Agency, Rotherham

EA (2009e)

Using Soil Guideline Values: SGV introduction

Science Report SC050021/SGV, Environment Agency, Rotherham

EA (2009f)

SGV and TOX Reports on: Benzene, Toluene, Ethylbenzene, Xylenes, Mercury, Selenium, Arsenic, Nickel, Cadmium, Phenol, and Dioxins, Furans and Dioxin-like PCBs

Note: there is work in progress (March 2010) on SGV and TOX reports for chromium, cyanide, lead and polycyclic aromatic hydrocarbons

EA (2009g)

Radioactive substances regulation environmental principles

Environment Agency, Rotherham

EA (2006)

Briefing notes on:

- 1 Potential sources of radioactive contamination.
- 2 Overview of land contaminated with radioactive substances.
- 3 Developing land contaminated with radioactivity.
- 4 Contaminated land regime (Part 2A) and radioactivity.
- 5 Land contaminated with radioactivity on nuclear licensed sites.
- 6 Land contaminated with radioactivity and the Radioactive Substances Act 1993.
- 7 Voluntary remediation of land contaminated with radioactivity.
- 8 Land contaminated with radioactivity and the principles of radiation protection.

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Contaminated Land Report 1 (CLR11), Environment Agency, Rotherham
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Environment Agency, Rotherham
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HSE, London
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R&D Publication 66. National House-Building Council, Amersham, Environment Agency, Bristol and Chartered Institute of Environmental Health, London. Available from: <<http://publications.environment-agency.gov.uk/pdf/SR-DPUB66-e-e.pdf>>. (ISBN: 978-1-904306-82-5)
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The Scottish Government, Edinburgh. Available from: <www.scotland.gov.uk>

SCOTTISH EXECUTIVE (2006a)

Environmental Protection Act 1990: Part IIA contaminated land – statutory guidance: Edition 2 SE/2006/44, The Scottish Government, Edinburgh (ISBN: 0-7559-6097-1)

SCOTTISH EXECUTIVE (2006b)

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The Scottish Government, Edinburgh. Available from: <www.scotland.gov.uk>

WLGA (2006)

Land contamination: A guide for developers

Environment Agency and Welsh Assembly Government, Welsh Local Government Association. Available from: <www.cardiff.gov.uk>

Note

All the above references are available on the web sites of the authoring organisations unless otherwise stated. These and other websites that are useful for details of the UK regulatory framework for contaminated land are as follows:

<www.defra.gov.uk>	<www.hseni.gov.uk>	<www.sepa.org.uk>
<www.doeni.gov.uk>	<www.netregs.gov.uk>	<www.scotland.gov.uk>
<www.environment-agency.gov.uk>	<www.ni-environment.gov.uk>	<www.wales.gov.uk>
<www.hse.gov.uk>	<www.opsi.gov.uk>	

Legislation

1 Legislation on contaminated land

1.1 Primary legislation directly relevant to contaminated land

Environment Act 1995
Environmental Protection Act 1990
Environmental Protection Act 1990: Part IIA Contaminated Land. The Radioactive Contaminated Land (Scotland) Regulations 2007, SG/2009/87 (ISBN: 978-0-75597-058-2)
Environmental Protection Act 1990: Part 2a statutory guidance on contaminated land (2006) (2007 No. 2) (Wales)
Nuclear Installations Act 1965 (as amended) (and conditions attached to nuclear site licences)

1.2 Contaminated land regulations for England

Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 (SI 1379)
Radioactive Contaminated Land (Modification of Enactments) (England) Amendment Regulations 2007 (SI 3245)
Radioactive Contaminated Land (Modification of Enactments) (England) Amendment Regulations 2008 (SI 520)
Contaminated Land (England) Regulations 2006 (SI 1380)
Clean Neighbourhoods and Environment Act 2005 (Commencement No2) (England) Order 2006 (SI 1361)
Environmental Protection Act 1990 (Isles of Scilly) Order 2006 (SI 1381)
Radioactive Contaminated Land (Enabling Powers) (England) Regulations 2005 (SI 3467)

1.3 Contaminated land regulations for Scotland

Contaminated Land (Scotland) Regulations 2000 (SSI 178)
Contaminated Land (Scotland) Regulations 2005 (SSI 658)
Radioactive Contaminated Land (Scotland) Regulations 2007 (SSI 179)
Radioactive Contaminated Land (Scotland) (Amendment) Regulations 2007 (SI 3240)
Radioactive Contaminated Land (Scotland) Amendment Regulations 2009 (SSI 202)

1.4 Contaminated land regulations for Wales

Radioactive Contaminated Land (Modification of Enactments) (Wales) Regulations 2006 (SI 2988) (W277)
Radioactive Contaminated Land (Modification of Enactments) (Wales) (Amendment) Regulations 2007 (SI 3250)
Radioactive Contaminated Land (Modification of Enactments) (Wales) Amendment Regulations 2008 (SI 521)
Contaminated Land (Wales) Regulations 2006 (SI 2989) (W278)

1.5 Contaminated land regulations for Northern Ireland

Radioactive Contaminated Land Regulations (Northern Ireland) 2006 (SR 345)

Radioactive Contaminated Land Regulations (Northern Ireland) (Amendment) Regulations 2007 (SI 3236)
Waste and Contaminated Land (Northern Ireland) Order 1997 (SI 2778) (NI 19)

2 Legislation on radioactive waste management

2.1 UK Legislation on radioactive waste management

Radioactive Substances Act 1993 (as amended)
Radioactive Substances (Phosphatic Substances, Rare Earths etc) Exemption Order 1962 (SI 2648)
Radioactive Substances (Substances of Low Activity) Exemption Order 1986 (SI 1002)
Nuclear Installations Act 1965 (as amended) (and conditions attached to nuclear site licences)

Note: In England and Wales most of the provisions of the Radioactive Substances Act 1993 have been repealed and replaced by similar provisions in the Environmental Permitting (England and Wales) Regulations 2010. All the Exemption Orders made under the Radioactive Substances Act 1993 are currently being reviewed.

2.2 Radioactive waste management legislation for England and Wales

Environmental Permitting (England and Wales) Regulations 2010 (SI 675)
Environmental Permitting (England and Wales) (Amendment) Regulations 2010 (SI 676)

2.3 Radioactive waste management legislation for Scotland

Radioactive Substances (Basic Safety Standards) (Scotland) Direction 2000

2.4 Radioactive waste management legislation for Northern Ireland

Radioactive Substances (Phosphatic Substances, Rare Earths etc) Exemption Order (Northern Ireland) 1962 (No. 248)
Radioactive Substances (Substances of Low Activity) Exemption Order (Northern Ireland) 1990 (No. 115)

3 Legislation on management of non-radioactive wastes

3.1 Waste management legislation for the UK or Great Britain

Control of Pollution Act 1974
Control of Pollution (Amendment) Act 1989
Environmental Protection Act 1990
Pollution Prevention and Control Act 1999
Controlled Waste Regulations 1992 (SI 588)
Controlled Waste (Amendment) Regulations 1993 (SI 566)
Environmental Protection (Duty of Care) Regulations 1991 (SI 2839)

3.2 Waste management legislation for England and Wales

Clean Neighbourhoods and Environment Act 2005
Environmental Permitting (England and Wales) Regulations 2007 (SI 3538)*
Environmental Permitting (England and Wales) (Amendment) Regulations 2009 (SI 1799)*
Environmental Permitting (England and Wales) (Amendment) (No. 2) Regulations 2009 (SI 3381)*
Environmental Permitting (England and Wales) Regulations 2010 (SI 675)
Environmental Permitting (England and Wales) (Amendment) Regulations 2010 (SI 676)
Hazardous Waste (England and Wales) Regulations 2005 (SI 894)
Hazardous Waste (England and Wales) (Amendment) Regulations 2009 (SI 507)
Waste Management (England and Wales) Regulations 2006 (SI 937)

Note: Regulations marked * have been largely revoked by the Environmental Permitting (England and Wales) Regulations 2010, which came into force on 6 April 2010.

3.3 Waste management legislation for England

Environmental Protection (Duty of Care) (England) (Amendment) Regulations 2003 (SI 63)
List of Wastes (England) Regulations 2005 (SI 895)
List of Wastes (England) (Amendment) Regulations 2005 (SI 1673)

3.4 Waste management legislation for Scotland

Environmental Protection (Duty of Care) (Scotland) (Amendment) Regulations 2003 (SSI 533)
Landfill (Scotland) Regulations 2003 (SSI 235)
Landfill (Scotland) (Amendment) Regulations 2003 (SSI 343)
Pollution Prevention and Control (Scotland) Regulations 2000 (SSI 323)
Special Waste Regulations 1996 (SI 972)
Special Waste (Amendment) Regulations 1996 (SI 2019)
Special Waste (Amendment) Regulations 1997 (SI 251)
Special Waste (Scotland) Regulations 1997 (SI 257)
Special Waste Amendment (Scotland) Regulations 2004 (SSI 112)
Waste Management Licensing Amendment (Scotland) Regulations 2003 (SSI 171)
Waste Management Licensing Amendment (Scotland) Regulations 2004 (SSI 275)
Waste Management Licensing Amendment (Scotland) Regulations 2006 (SSI 541)

3.5 Waste management legislation for Wales

Environmental Protection (Duty of Care) (Wales) (Amendment) Regulations 2003 (SI 1720)
Hazardous Waste (Wales) Regulations 2005 (SI 1806)
Hazardous Waste (Wales) (Amendment) Regulations 2009. (SI 2861)
List of Wastes (Wales) Regulations 2005 (SI 1820)
Waste Management Licensing (Amendment) (Wales) Regulations 2002 (SI 1087)
Waste Management Licensing (Amendment) (Wales) Regulations 2003 (SI 780)
Waste Management Licensing (Amendment) (Wales) Regulations 2004 (SI 70)

3.6

Waste management legislation for Northern Ireland

Pollution Control and Local Government (NI) Order 1978 (SI 1049 (NI 19), including amendments up to 2004)
Waste and Contaminated Land (Northern Ireland) Order 1997 (SI 2778 (NI 19), including amendments up to 2004)
Controlled Waste Regulations (NI) 2002 (SR 248)
Controlled Waste (Amendment) Regulations (NI) 2003 (SR 404)
Controlled Waste (Duty of Care) Regulations (NI) 2002 (SR 271)
Controlled Waste (Duty of Care) (Amendment) Regulations (NI) 2004 (SR 277)
Hazardous Waste Regulations (Northern Ireland) 2005 (SR 300)
Hazardous Waste (Amendment) Regulations (Northern Ireland) 2005 (SR 461)
Landfill Regulations (Northern Ireland) 2003 (SR 496)
Landfill (Amendment) Regulations (Northern Ireland) 2004 (SR 297)
List of Wastes Regulations (Northern Ireland) 2005 (SR 301)
List of Wastes (Amendment) Regulations (Northern Ireland) 2005 (SR 462)
Pollution Prevention and Control Regulations (Northern Ireland) 2003 (SR 46)
Waste Management Licensing Regulations (Northern Ireland) 2003 (SR 493)
Waste Management Licensing (Amendment) Regulations (Northern Ireland) 2009 (SR 76)
Waste Management Regulations (Northern Ireland) 2006 (SR 280)

4

Health and safety legislation

4.1

Health and safety legislation for Great Britain

Health and Safety at Work etc Act 1974
Construction (Design and Management) Regulations 2007 (SI 320)
Control of Substances Hazardous to Health Regulations 2002 (SI 2677)
Control of Substances Hazardous to Health (Amendment) Regulations 2003 (SI 978)
Control of Substances Hazardous to Health (Amendment) Regulations 2004 (SI 3386)
Ionising Radiations Regulations 1999 (SI 3232)
Management of Health and Safety at Work Regulations 1999 (SI 3242)

4.2

Health and safety legislation for Northern Ireland

Health and Safety at Work (Northern Ireland) Order 1978 (SI 1039) (NI 9)
Health and Safety at Work (Amendment) (Northern Ireland) Order 1998 (SI 2795) (NI 18)
Control of Substances Hazardous to Health Regulations (Northern Ireland) 2003 (SR 34)
Control of Substances Hazardous to Health (Amendment) Regulations (Northern Ireland) 2003 (SR 288)
Control of Substances Hazardous to Health (Amendment) Regulations (Northern Ireland) 2005 (SR 165)
Construction (Health, Safety and Welfare) Regulations (Northern Ireland) 1996 (SR 510)
Construction (Design and Management) Regulations (Northern Ireland) 1995 (SR 209)
Construction (Design and Management) (Amendment) Regulations (Northern Ireland) 2001 (SR 142)
Ionising Radiations Regulations (Northern Ireland) 2000 (SR 375)
Management of Health and Safety at Work Regulations (Northern Ireland) 2000 (SR 388)
Management of Health and Safety at Work (Amendment) Regulations (Northern Ireland) 2006 (SR 255)

5 Planning and environmental assessment legislation

5.1 Planning legislation for England and Wales

Town and Country Planning Act 1990
Planning and Compulsory Purchase Act 2004
Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (SI 293)
Town and Country Planning (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2000 (SI 2867)

5.2 SEA legislation for England

Environmental Assessment of Plans and Programmes Regulations 2004 (SI 1633)

5.3 EIA and SEA legislation for Scotland

Environmental Assessment (Scotland) Act 2005
Environmental Impact Assessment (Scotland) Regulations 1999 (SSI 1)
Environmental Impact Assessment (Scotland) Amendment Regulations 2002 (SSI 324)

5.4 SEA legislation for Wales

Environmental Assessment of Programmes and Plans (Wales) Regulations 2004 (Welsh SI 1656) (W170)

5.5 SEA legislation for Northern Ireland

Environmental Assessment of Programmes and Plans Regulations (Northern Ireland) 2004 (SR 280)

5.6 EIA for nuclear decommissioning

Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (SI 2892)
Nuclear Reactors (Environmental Impact Assessment for Decommissioning) (Amendment) Regulations 2006 (SI 657)

6 Legislation on water resources

Water Resources Act 1991
Environmental Permitting (England and Wales) Regulations 2010 (SI 675)
Environmental Permitting (England and Wales) (Amendment) Regulations 2010 (SI 676)
Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 (SI 3104)
Water Environment and Water Services (Scotland) Act 2003
Water Environment (Controlled Activities) (Scotland) Regulations 2005 (SSI 348)
Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2007 (SSI 219)
Water Environment (Groundwater and Priority Substances) (Scotland) Regulations 2009 (SSI 420)
Groundwater Regulations (Northern Ireland) 2009 (SR 254)
Groundwater (Amendment) Regulations (Northern Ireland) 2009 (SR 359)

Water Northern Ireland) Order 1999 (SI 662)
Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003 (SR 544)

7 Legislation on environmental damage and liability

Environmental Damage (Prevention and Remediation) Regulations 2009 (SI 153)
Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009 (SI 995)
Environmental Liability (Scotland) Regulations 2009 (SSI 266)
Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 (SR 252)
Environmental Liability (Prevention and Remediation) (Amendment) Regulations (Northern Ireland) 2009 (SR 361)

8 Legislation on transport of radioactive materials and dangerous goods

Radioactive Material (Road Transport) (Definition of Radioactive Material) Order 2002 (SI 1092)
Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 1348)
Radioactive Substances (Carriage by Road) Regulations (Northern Ireland) 1983 (SR 344)
Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Northern Ireland) 2006 (SR 173)
Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Amendment) Regulations (Northern Ireland) 2006 (SR 525)
Transfrontier Shipment of Radioactive Waste and Spent Fuel Regulations 2008 (SI 3087)

9 Other legislation

Anti-Terrorism, Crime and Security Act 2001
Energy Act 2004
Environment Act 1995 (for England, Wales and Scotland)
Environmental Information Regulations 2004 (SI 3391)
Environmental Information (Scotland) Regulations 2004 (SSI 520)
Freedom of Information Act 2000
Freedom of Information (Scotland) Act 2002
Nuclear Industries Security Regulations 2003 (SI 403)
Nuclear Industries Security (Amendment) Regulations 2006 (SI 2815)
Terrorism Act 2006

Table A1.1 Regulatory regimes

Type of site		Radioactive contamination	Non-radioactive contamination	Mixed contamination
1 Nuclear-licensed sites				
1.1	Operational sites	NIA, (RSA) (see Sections 2.2.2 and 3.2.1)	Part 2A (see Sections 2.1.1, 3.1.1, 3.3, A2.1.2, A2.1.4, A2.2)	NIA, (RSA) Part 2A (see <i>Radioactive and non-radioactive contamination</i>)
1.2	Sites to be delicensed	NIA, (RSA), (planning regime) (see Sections 2.2 and 3.2.2)	Part 2A, (planning regime) (see Sections 2.1.1, 3.1.1, 3.3, A2.1.2, A2.1.4, A2.2)	NIA, (RSA) Part 2A (see <i>Radioactive and non-radioactive contamination</i>)
2 MoD sites (other than nuclear-licensed sites)				
2.1	Nuclear sites	Part 2A, (MoD) (see Sections 2.2.3, 2.2.4, 3.2.4, A2.1.3, A2.1.4, A2.2, A1.3)	Part 2A (see Sections 2.1.1, 3.1.1, 3.3, A2.1.2, A2.1.4, A2.2, A1.3)	Part 2A (MoD) (see <i>Radioactive and non-radioactive contamination</i>)
2.2	Non-nuclear sites, no change of land-use proposed	Part 2A (MoD) (see Sections 2.2.3, 2.2.4, 3.2.4, A2.1.3, A2.1.4, A2.2, A2.3)	Part 2A (see Sections 2.1.1, 3.1.1, 3.3, A2.1.2, A2.1.4, A2.2, A1.3)	Part 2A (MoD) (see <i>Radioactive and non-radioactive contamination</i>)
2.3	Non-nuclear sites, change of land-use proposed	Planning regime, (RSA) (see Sections 2.2.6, 3.2.5, A2.1.3, A2.1.4, A2.2, A2.3)	Planning regime (see Sections 2.1.2, 3.1.2, 3.3, A2.1.2, A2.1.4, A2.2, A2.3)	Planning regime (RSA93) (see <i>Radioactive and non-radioactive contamination</i>)
3 Other sites				
3.1	No change of land-use proposed	Part 2A, (RSA) (see Sections 2.2.3, 2.2.4, 3.2.4, A2.1.3, A2.1.4, A2.2, A2.3)	Part 2A (see Sections 2.1.1, 3.1.1, 3.3, A2.1.2, A2.1.4, A2.2, A2.3)	Part 2A (RSA) (see <i>Radioactive and non-radioactive contamination</i>)
3.2	Change of land-use proposed	Planning regime, (RSA) (see Sections 2.2.6, 3.2.5, A2.1.3, A2.1.4, A2.2, A2.3)	Planning regime (see Sections 2.1.2, 3.1.2, 3.3, A2.1.2, A2.1.4, A2.2, A2.3)	Planning regime (RSA) (see <i>Radioactive and non-radioactive contamination</i>)

Key

NIA – Nuclear Installations Act 1965 (as amended)

RSA – Radioactive Substances Act 1993 (as amended) and Environmental Protection (England and Wales) Regulations 2010

Part 2A – Part 2A of the Environmental Protection Act 1990 (and associated Regulations and Statutory Guidance)

Planning regime – see PPS 23 for England, PAN 33 for Scotland, WLGA et al guidance for Wales

Regimes in parenthesis are relevant but subsidiary.

Notes

- i See Section 3.2.6 for management of radioactively contaminated land outside the NIA, Part 2A and planning regimes.
- ii See Section 3.1.3 for management of non-radioactively contaminated land outside of the Part 2A and planning regimes.

Table A1.2

Principal regulators

	Radioactive contamination	Non-radioactive contamination	Mixed contamination
Nuclear-licensed sites	HSE	Environment Agency, SEPA	HSE, Environment Agency, SEPA
Defence sites (other than nuclear-licensed sites)	MoD, HSE, Environment Agency, SEPA, NIEA	Environment Agency, SEPA, NIEA	MoD, HSE, Environment Agency, SEPA, NIEA
Other sites	Environment Agency, SEPA, NIEA, local authorities	Local authorities (environment agencies on "special sites")	Environment Agency, SEPA, NIEA, local authorities

Key

HSE – Health and Safety Executive. In Great Britain, Northern Ireland has its own agency, the Health and Safety Executive for Northern Ireland (HSE(NI))

SEPA – Scottish Environment Protection Agency

MoD – Ministry of Defence

NIEA – Northern Ireland Environment Agency (previously the Environment and Heritage Service (Northern Ireland))

Note

There are no nuclear-licensed sites in Northern Ireland.

Table A1.3

Summary of current regulatory framework for radioactively contaminated land on nuclear-licensed sites

Regulator	Key features of regulatory framework (principal legislation) (references to regulatory and other guidance)
HSE	<ul style="list-style-type: none"> ● NIA65 does not apply but IRR99 do apply ● strategy required for management of radioactively contaminated land, to be developed by comparing management options on a range of factors (NIA65) (HSE, 2006) ● to be integrated with waste management and decommissioning strategies (NIA65) (HSE, 2006) ● definition of “radioactively contaminated land” linked to delicensing (HSE, 2006 and 2008) ● all site licence conditions apply but conditions 4, 14, 23, 25, 32, 34 are particularly important (NIA65) ● sources of contamination to be controlled (HSE, 2006) ● contaminated areas to be characterised, controlled and remediated (HSE, 2006) ● environmental impact assessments required for reactor decommissioning (EIADR99) ● standards and procedures for worker safety same as for other operations on nuclear-licensed sites (IRR99) ● delicensing requires demonstration of “no danger” (NIA65) (HSE, 2005 and 2008) ● remediate to appropriate standards before constructing new facilities (HSE, 2006) ● see HSE (2006), HSE (2008) and HSE (2001) for further details.
Environment Agency, SEPA	<ul style="list-style-type: none"> ● authorisations for disposals of radioactive wastes (authorisations generally include conditions) (RSA93) (EA, 2009g) ● movement of contamination off-site is an unauthorised discharge, remediation of off-site contamination may be required (RSA93) ● need to compare remediation strategies, for BPEO, ALARA, BAT (RSA93) (EA, 2002 and 2009g) ● availability of methods for disposal of remediation wastes depends on EOs (under review) and new LLW and VLLW arrangements (RSA93) <www.sdspur.com> ● planning guidance relevant after land is delicensed, if it is to be redeveloped, see PPS 23 for England, PAN 33 for Scotland (ODPM, 2004, and Scottish Executive, 2000).

Notes

See pages 36–41 for a list of legislation and pages 7–9 for a list of abbreviations and acronyms.

There are no nuclear-licensed sites in Northern Ireland.

Table A1.4

Summary of regulatory framework for non-radioactive and mixed contamination on nuclear-licensed sites

Regulator	Key features of regulatory framework (principal legislation) (references to regulatory and other guidance)
<i>Non-radioactive contamination</i>	
Environment Agency, SEPA	<ul style="list-style-type: none"> ● nuclear-licensed sites that have “contaminated land” are “special sites” under Part 2A regime (Part 2A of EPA90, inserted by Section 57 of Environment Act 95) ● definition of “contaminated land” depends on presence of a “significant pollution linkage” (has to be shown that “significant harm” or water pollution is happening or likely to happen) (Part 2A) (Defra, 2006a, Scottish Executive, 2006a, WAG, 2006, and Defra, 2008) ● all “contaminated land” must be remediated if it is reasonable to do so (Defra, 2006a, Scottish Executive 2006a, and WAG, 2006) ● voluntary remediation of “contaminated land” is encouraged (ie remediation without enforcement under Part 2A) ● environment agencies agree remedial measures and issue remediation notices if necessary (Part 2A) ● “appropriate persons” bear remediation costs (typically licensee or site owner if not licensee) (Part 2A) ● planning guidance relevant after land is delicensed if it is to be redeveloped, see PPS 23 for England, PAN 33 for Scotland (ODPM, 2004, and Scottish Executive, 2000) ● non-radioactive waste regime for management of remediation wastes <www.sdspur.com>.
HSE	<ul style="list-style-type: none"> ● general rules for occupational health and safety apply (HSWA74 and regulations (MHSW, CDM, COSHH)) ● potential effects of non-radioactive contaminants on nuclear safety must be considered (NIA65).
<i>Mixed radioactive and non-radioactive contamination</i>	
HSE and environment agencies	<ul style="list-style-type: none"> ● joint responsibilities, HSE and the relevant environment agency decide how to fulfil them ● regimes for radioactively contaminated land and non-radioactively contaminated land apply (NIA65, RSA93, Part 2A for non-radioactive contamination) ● disposal options for remediation wastes may be very limited (RSA93, Environmental Permitting Regulations, Hazardous Waste Regulations) ● planning guidance relevant after land is delicensed if it is to be redeveloped, see PPS 23 for England, PAN 33 for Scotland (ODPM, 2004, and Scottish Executive, 2000).

Notes

See pages 36–41 for a list of legislation and pages 7–9 for a list of abbreviations and acronyms.

There are no nuclear-licensed sites in Northern Ireland.

Table A1.5

Summary of regulatory framework for defence and other sites

Regulator	Key features of regulatory framework (principal legislation) (references to regulatory and other guidance)
Defence sites (other than nuclear-licensed sites)	
<i>Radioactive contamination</i>	
MoD, HSE, environment agencies	<ul style="list-style-type: none"> ● NIA65 does not apply but IRR99 do apply ● operational defence sites have Crown immunity from RSA93 ● standards of control at defence nuclear sites similar to those at nuclear-licensed sites, under arrangements between MoD, HSE and the Environment Agency ● Environment Agency guidance is relevant in England and Wales (EA, 2006) ● extension to Part 2A for “radioactive contaminated land” (see “other sites”) applies where no change of land use is planned (Defra, 2006a, Scottish Government, 2009, and WAG, 2006) ● planning guidance will apply if site is to be redeveloped (see “other sites”) ● RSA93 applies at defence sites being transferred to civilian ownership/use (EA, 2009g).
<i>Non-radioactive contamination</i>	
Environment agencies	<ul style="list-style-type: none"> ● defence sites that have “contaminated land” are “special sites” under Part 2A regime (Part 2A of EPA90) ● definition of “contaminated land” depends on presence of a “significant pollution linkage” (has to be shown that “significant harm” or water pollution is happening or likely to happen) (Part 2A) (Defra, 2006a, Scottish Executive 2006a, WAG, 2006, and Defra, 2008) ● all “contaminated land” must be remediated if it is reasonable to do so (Defra, 2006a, Scottish Executive, 2006a, and WAG, 2006) ● voluntary remediation of “contaminated land” is encouraged (ie remediation without enforcement under Part 2A) ● environment agencies agree remedial measures and issue remediation notices if necessary (Part 2A) ● “appropriate persons” bear remediation costs (usually MoD) (Part 2A) ● planning guidance will apply if site is to be redeveloped (see “other sites”) ● non-radioactive waste regime for management of remediation wastes (www.sdspur.com).
HSE	<ul style="list-style-type: none"> ● concerned primarily with occupational health and safety (HSWA74 and regulations (MHSW, CDM, COSHH)).
<i>Mixed radioactive and non-radioactive contamination</i>	
MoD, HSE and environment agencies	<ul style="list-style-type: none"> ● regimes for defence sites with radioactive and non-radioactive contamination all apply (see above).
Other sites (not nuclear-licensed sites or defence sites)	
<i>Radioactive contamination</i>	
Environment agencies and local authorities	<ul style="list-style-type: none"> ● Part 2A for “radioactive contaminated land” applies to land in current use, sites with “radioactive contaminated land” are “special sites”, regulated by environment agencies (Part 2A) (Defra, 2006a, Scottish Government, 2009, and WAG, 2006) ● planning guidance for local authorities applies where a change of land use is proposed and where remediation can be carried out as part of redevelopment, see PPS 23 for England, PAN 33 for Scotland (ODPM, 2004, and Scottish Executive, 2000) ● in England and Wales local authorities identify sites where there is “radioactive contaminated land” and designate as “special sites”. SEPA and NIEA identify and designate in Scotland and Northern Ireland ● EA guidance on radioactively contaminated land applies in England and Wales (EA, 2006) ● RSA93 applies to management of radioactive wastes from remediation (EA, 2009g)
HSE	<ul style="list-style-type: none"> ● concerned with occupational health and safety, accident risks to the public (HSWA74, IRR99).

Table A1.5 (contd) Summary of regulatory framework for defence and other sites

Non-radioactive contamination	
Local authorities (or environment agency if special site)	<ul style="list-style-type: none"> • Part 2A regime for “contaminated land” applies to sites in their current use (Defra, 2006a, Scottish Executive 2006a, WAG, 2006 and Defra, 2008a) • planning guidance applies if site is to be redeveloped, see PPS 23 for England, PAN 33 for Scotland (ODPM, 2004 and Scottish Executive, 2000) • non-radioactive waste regime for management of remediation wastes <www.sdspur.com>.
HSE	<ul style="list-style-type: none"> • concerned with occupational health and safety, accident risks to the public (HSWA74 and regulations (MHSW, CDM, COSHH)).
Mixed radioactive and non-radioactive contamination	
Environment agencies and local authorities	<ul style="list-style-type: none"> • sites where no change of land use is planned covered by extension to Part 2A for “radioactive contaminated land” (see above) and are “special sites”, regulated by the relevant environment agency (Part 2A) • sites to be redeveloped are covered by planning guidance, see PPS 23 for England PAN 33 for Scotland (ODPM, 2004 and Scottish Executive, 2000) • disposal options for remediation wastes may be very limited (RSA93, Environmental Permitting Regulations, Hazardous Waste Regulations).

Note

See pages 36–41 for a list of legislation and pages 7–9 for a list of abbreviations and acronyms.

A2 Differences in Scotland, Wales and Northern Ireland

This appendix briefly outlines the ways in which the regulatory frameworks for contaminated land in Scotland, Wales and Northern Ireland differ from that in England. Reference should be made to the legislation and associated guidance for further details.

A2.1 Scotland

A2.1.1 Legislation

Health and safety at work and nuclear safety are not devolved matters in Scotland so all the primary and secondary legislation on these topics mentioned in this paper applies in Scotland. Environmental matters are devolved but most of the primary legislation (Acts) on environmental topics listed on pages 36–41 apply in Scotland. In particular, the Environmental Protection Act 1990, the Environment Act 1995 and the Radioactive Substances Act 1993 all apply in Scotland. There are a number of pieces of secondary legislation (regulations) that are specific to Scotland (see Section 5). Those that relate directly to contaminated land are the Contaminated Land (Scotland) Regulations 2000, the Contaminated Land (Scotland) Regulations 2005, the Radioactive Contaminated Land (Scotland) Regulations 2007, the Radioactive Contaminated Land (Scotland) (Amendment) Regulations 2007 and the Radioactive Contaminated Land (Scotland) Amendment Regulations 2009.

A2.1.2 Non-radioactively contaminated land in Scotland

Until 2005 the Part 2A regime for non-radioactively contaminated land in Scotland operated in essentially the same way as the corresponding regime in England (see Sections 2.1.1 and 3.1.1). The 2005 regulations changed the sections of the Part 2A regime that deal with pollution of water. These changes were necessary to make Part 2A in Scotland more consistent with the Water Environment and Water Services (Scotland) Act 2003 and to prevent disproportionate regulation of trivial amounts of water pollution caused by contaminated land. The main changes were to replace “controlled waters” by the “water environment”, as defined in the Water Environment and Water Services (Scotland) Act 2003, and to amend the part of the definition of contaminated land that deals with water pollution so that it refers to “significant pollution” of the water environment and a “significant possibility” of such pollution being caused. Revised statutory guidance was issued to accompany the 2005 regulations (Scottish Executive, 2006a). This includes guidance to local authorities on determining what is significant pollution of the water environment and what constitutes a significant possibility of pollution. SEPA’s role in Part 2A is outlined in the Scottish Executive’s Planning Advice Note 51 (Scottish Executive, 2006b).

The planning regime in Scotland is outlined in the Scottish Executive’s Planning Advice Note 33 (PAN 33) (Scottish Executive, 2000). PAN 33 defines contaminated sites, for planning purposes, as “any site where the presence or suspected presence of contaminants is an obstacle to development, regardless as to whether development is proposed”. It recommends a “suitable for use” approach to dealing with the legacy of such contaminated sites (Scottish Executive, 2000). This approach is also included in the Part 2A statutory guidance (Scottish Executive, 2006a). It has three elements:

- ensuring that land is suitable for its current use
- ensuring that land is made suitable for any new use, as planning permission is given for that new use
- limiting requirements for remediation to 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.

The approach involves site specific risk assessments, which are carried out by developers in all cases where initial site investigations (walkovers, desk studies or other investigations) indicate that significant levels of contaminants are or may be present. It is then for the developer to propose a restoration scheme that will ensure that all human and other receptors are protected adequately in the proposed use of the site. PAN 33 provides “model planning conditions” that local authorities can attach to planning permissions to ensure that appropriate restoration schemes are formulated and carried out.

The Environmental Liability (Scotland) Regulations 2009 fulfil the same role as the Environmental Damage (Prevention and Remediation) Regulations in England. They apply mainly to land that has become contaminated since the regulations came into force (24 June 2009) (see Section 3.1.4 for further details).

A2.1.3

Radioactively contaminated land in Scotland

The regulatory regimes for radioactively contaminated land in Scotland, other than on nuclear-licensed sites, are those under Part 2A, planning legislation and the Radioactive Substances Act 1993 (see Table A1.1, and Sections 2.2 and 3.2). The regulators for these regimes are SEPA and the local authorities. The Nuclear Installations Act 1965 applies in Scotland and is the main regime for radioactively contaminated land on nuclear-licensed sites – the regulator is HSE. MoD regulates nuclear safety on the (non-licensed) nuclear defence sites that it operates (see Table A1.2).

The Scottish Part 2A regime for “radioactive contaminated land” is similar in many respects to the English one. The major differences are:

- the use of “significant harm” to human beings in defining “radioactive contaminated land” (see Section 2.2.4)
- the inclusion of water as a receptor and of “significant pollution of the water environment” as part of the definition of “radioactive contaminated land” (see Section 2.2.4)
- the inclusion of non-human species within the definition of “significant pollution of the water environment”, with definitions of “significant harm” to aquatic and terrestrial biota and plants (see Section 2.2.4)
- local authorities have no responsibilities for identifying, inspecting or designating “radioactive contaminated land”
- radon is included as a “substance” (except for land contaminated by nuclear occurrences).

The use of “significant harm” to human beings, rather than “harm”, is not expected to lead to any practical differences between the Scottish Part 2A regime and the regimes in the rest of the UK. This is because the Scottish Government’s statutory guidance to accompany the 2007 regulations uses the same dose criteria to define “significant harm” as the English and Welsh Part 2A regimes use for “harm” (see Section 2.2.3), and as the corresponding regime in Northern Ireland uses for “lasting exposure” (see Section A2.3) (Scottish Government, 2009).

There is also more explicit guidance than in the English and Welsh Part 2A statutory guidance documents on “significant possibility” of “significant harm” to human beings (Scottish Government, 2009). In summary this states that:

- the possibility of significant harm cannot be significant if the potential dose is less than 3 mSv
- the possibility of significant harm is always significant if the potential dose is greater than 100 mSv
- if the potential dose is between 3 mSv and 100 mSv, the possibility of significant harm is significant if the potential dose multiplied by the probability of exposure is greater than 3 mSv.

“Significant possibility” of “significant pollution of the water environment” is defined as occurring when there is “significant possibility” of “significant harm” to human beings, as defined above, or when, on the balance of probabilities, there is more likely than not to be “significant harm” to non-human species (Scottish Government, 2009).

The inclusion of non-human species within the definition of “significant pollution of the water environment” in Scotland (see Section 2.2.4) could, in principle, make the results of the application of its Part 2A regime differ from those in England and Wales. In practice there will be very few sites in any part of the UK to which the Part 2A regime applies, and the differences in Scotland may be small.

The Scottish extension to the Part 2A regime for radioactive contaminated land has the same approach to radioactive pollution of water as to non-radioactive pollution (see Section A2.1.2). This differs from the Part 2A extensions in England and Wales, in which water is only considered as a pathway that could lead to human exposure to radiation, not as a receptor in its own right. The definition of “significant pollution” of the water environment refers to exposure of human beings and non-human species, but does not require such receptors to be present (Scottish Government, 2009). The “water environment” means all surface water, groundwater and wetlands (see also Section A2.1.4).

In Scotland SEPA has the responsibility for identifying, inspecting and determining whether land is “radioactive contaminated land” and for designating it to be a “special site”, as well as for regulating its remediation. This is in contrast to England and Wales where identification, inspection and determination are carried out by local authorities, and the Environment Agency regulates remediation.

The Scottish statutory guidance on remediation of “contaminated land” under Part 2A also applies to “radioactive contaminated land” (Scottish Executive, 2006a). In particular, all remediation must be “reasonable”, having regard to the cost and the seriousness of the harm or pollution of the water environment. The regulations for “radioactive contaminated land” specify that, where the remediation includes an “intervention”, the part of it which is the intervention may only be considered reasonable if the reduction in radiation detriment is sufficient to justify any adverse effects and costs (including social costs), and the form, scale and duration of the intervention are optimised. These are essentially the same as the requirements in the English and Welsh Part 2A regimes (see Section 3.2.4).

Management of radioactively contaminated land under the planning regime in Scotland is carried out in a similar way to England (see Section 3.2.5). SEPA regulates

7 The NIEA was formed in July 2008 by reorganising the Environment and Heritage Service for Northern Ireland.

the management of radioactive wastes from land investigation and remediation (see Section 3.7). Local authorities and developers are expected to take into account the criteria recommended by the HPA when deciding whether remediation of radioactively contaminated land is necessary and what form it should take (NRPB, 1998, and HPA, 2009). The Energy Act 2004 provisions on land contaminated by nuclear activities apply in Scotland (see Section 3.3), as do the nuclear site security regulations (see Section 3.8).

A2.1.4

Protection of surface water and groundwater in Scotland

The Part 2A regime in Scotland covers “pollution” of the “water environment” by radioactive and non-radioactive contaminants. Hence SEPA has the powers to require remediation of surface waters and ground waters under Part 2A if the contaminants in the water originate from “contaminated land” or “radioactive contaminated land” (see Sections A2.1.2 and A2.1.3).

Additional powers related to non-radioactive contamination of the water environment are available to SEPA under the Water Environment and Water Services (Scotland) Act 2003, the Water Environment (Controlled Activities) (Scotland) Regulations 2005 and the Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2007. (These regulations are together known as the Controlled Activities Regulations, CAR). These powers parallel those available to the Environment Agency in England and Wales (see Section 3.3) and apply when land is not “contaminated land” in the Part 2A sense.

The Water Environment (Groundwater and Priority Substances) (Scotland) Regulations 2009 amend the Water Services (Scotland) Act 2003 and the Water Environment (Controlled Activities) (Scotland) Regulations 2005. They complete the transposition into Scots law of the Groundwater Daughter Directive (2006/118/EC) and the Priority Substances Directive (2008/105/EC). The 2009 Regulations require SEPA to take into account and seek compliance with these two Directives and they add a definition of “hazardous substances”.

A2.2

Wales

Health and safety at work and nuclear safety are not devolved matters in Wales. Environmental matters are devolved but the Welsh Assembly can only make secondary legislation. Thus all the primary legislation mentioned in this paper applies in Wales, as does all the secondary legislation on health and safety at work and nuclear safety.

Much of the secondary legislation on environmental matters is common to England and Wales but there are some regulations that are specific to Wales. Two of the Welsh regulations are those that replace the original Part 2A regime with one that includes radioactive contaminated land. These are the Radioactive Contaminated Land (Modification of Enactments) (Wales) Regulations 2006 and the Contaminated Land (Wales) Regulations 2006. The Welsh Assembly Government issued statutory guidance to accompany these regulations (WAG, 2006). The Radioactive Contaminated Land (Modification of Enactments) (Wales) (Amendment) Regulations 2007 extended the Part 2A regime to land that has radioactive contamination as a result of a nuclear accident (excluding land inside nuclear-licensed sites).

The main regulatory regimes for radioactively contaminated land in Wales are the same as those in England. These are the regime under the Nuclear Installations Act 1965, for nuclear-licensed sites, and those under Part 2A, planning legislation, the Radioactive

Substances Act 1993 and the Environmental Permitting Regulations 2010 for other sites (see Table A1.1 and Sections 2.2 and 3.2). The regulators for these regimes are HSE, the Environment Agency and the local authorities. MoD has regulatory responsibilities on the nuclear defence sites that it operates (see Table A1.2).

The Part 2A regime for non-radioactively contaminated land in Wales operates in essentially the same way as the corresponding regime in England (see Sections 2.1.1 and 3.1.1). The Welsh Assembly Government's statutory guidance for this regime is similar to that issued by Defra for England (WAG, 2006 and Defra, 2006a). The non-statutory Defra guidance and Environment Agency technical guidance is applicable in Wales (Defra, 2008a, and EA, 2004 and 2009a-e). The Welsh Local Government Association, with the Welsh Assembly Government and the Environment Agency, has published guidance to developers on dealing with contaminated land under the planning regime (WLGA *et al*, 2006).

There are separate Environmental Damage (Prevention and Remediation) Regulations for Wales but their provisions are the same as the regulations for England (see Section 3.1.4) and the same guidance applies (Defra & WAG, 2009a). The regulatory framework for water protection in Wales is the same as that in England (see Section 3.3).

A2.3

Northern Ireland

In Northern Ireland nuclear safety is not devolved but health and safety at work and environmental matters are. The parts of NIA65 that apply are those about the effects in Northern Ireland of accidents at nuclear-licensed sites elsewhere in the UK and accidents at nuclear sites in other countries.

The principal pieces of Northern Ireland health and safety legislation that are relevant to this paper are the Health and Safety at Work (Northern Ireland) Order 1978 and the regulations made under it, particularly the Ionising Radiations Regulations (Northern Ireland) 2000. The regulator for these is the Health and Safety Executive for Northern Ireland (HSE(NI)).

The main environmental legislation for contaminated land is in the Waste and Contaminated Land (Northern Ireland) Order 1997, for non-radioactive contaminated land, the Radioactive Contaminated Land Regulations (Northern Ireland) 2006, and the Radioactive Contaminated Land (Amendment) Regulations (Northern Ireland) 2007. The Radioactive Substances Act 1993 applies in full in Northern Ireland. The regulator for most environmental legislation is the Northern Ireland Environment Agency (NIEA)⁷, which is part of the Department of the Environment (DoE(NI)). For radioactive substances legislation the Competent Authority is the Chief Inspector appointed under Section 4 of the Radioactive Substances Act 1993.

Part III of the Waste and Contaminated Land (Northern Ireland) Order 1997 makes provision for introducing a regulatory regime for non-radioactively contaminated land that would correspond to Part 2A of the Environmental Protection Act 1990 (which does not apply to Northern Ireland). Part III defines "contaminated land" as any land that appears to a district council "to be in such a condition, by reason of substances in, on or under the land, that significant harm is being caused or there is a significant possibility of harm being caused" or "pollution of waterways or underground strata is being or is likely to be caused". It contains provisions for designation of land to be a "special site", in which case it would be regulated by NIEA rather than by the relevant district council.

To bring Part III of the Order into force there would have to be a Commencement Order, and regulations and statutory guidance that were specific to Northern Ireland. In 2006 the Department of Environment carried out a public consultation on proposed regulations and statutory guidance (DoE(NI), 2006). A summary of responses to the consultation was published (DoE(NI), 2008). The final versions of the Commencement Order, regulations and statutory guidance are being prepared and there will be further stakeholder engagement in due course. The planning regime for non-radioactively contaminated land in Northern Ireland contains a “suitable for use approach” that has features similar to those of the planning regime in Scotland (see Section A2.1). The Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 fulfil the same role as the Environmental Damage (Prevention and Remediation) Regulations in England. They apply mainly to land that has become non-radioactively contaminated since the regulations came into force (24 July 2009) (see Section 3.1.4 for further details).

The Radioactive Contaminated Land Regulations 2006 require the Chief Inspector appointed under the Radioactive Substances Act 1993 to investigate land if he has “reasonable grounds” to believe that the land is causing “lasting exposure” to ionising radiation. “Lasting exposure” is defined in the regulations to mean an effective dose to an individual person of 3 mSv per year or more from a past practice, past works or a radiological emergency (and/or a dose to the lens of the eye of 15 mSv per year or more, and/or a dose to the skin of 50 mSv per year or more).

If “lasting exposure” is occurring the Chief Inspector must require the responsible person to demarcate the land, monitor it, regulate access to it and carry out any appropriate intervention. Intervention must be justified and optimised, as in the Part 2A regulations for Great Britain (see Section 3.2.4). The Chief Inspector has powers to issue an “intervention notice” if this is necessary to ensure that action is taken. Through the 2007 amendment, the regulations include land contaminated by accidents at nuclear-licensed sites in Great Britain or nuclear sites in other countries. Radioactively contaminated land that is not causing “lasting exposure” is managed under the planning regime and the Radioactive Substances Act 1993.

In Northern Ireland pollution of surface water and groundwater is regulated under the Water (Northern Ireland) Order 1999, the Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003 and the Groundwater Regulations (Northern Ireland) 2009. The provisions of the last of these are very similar to the groundwater provisions in the Environmental Permitting (England and Wales) Regulations 2010 (see Section 3.3) and the NIEA guidance for the regulations is substantially the same as that for England and Wales (NIEA, 2009).