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SAFEGROUNDS
Good practice guidance for land quality records management for nuclear-licensed and defence sites

Guidance prepared for the SAFEGROUNDS Learning Network

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SAFEGROUNDS Learning network

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Good practice guidance for land quality records management for nuclear-licensed and defence sites

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This guidance has been developed primarily for site owners, site operators and their contractors. It is also addressed to governmental and non-governmental organisations and other groups with the public	AVAILABILITY	Unrestricted
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Participation (by organisations or individuals) in the SAFEGROUNDS project should not be taken as an indication of either support for, or disagreement with, the content of the guidance in its entirety.

Preface

As part of its ongoing programme, the SAFEGROUNDS Learning Network has provided resources to produce good practice guidance for land quality records management for nuclear-licensed and defence sites, taking account of recommendations and discussions within and among the Project Steering Group (PSG) members, and of recent developments in the sector. This document has been prepared following several rounds of consultation on draft versions.

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Glossary

Contaminated land terms

Characterisation	Establishing information on the presence and characteristics of contaminants, details of the environment in which they are present, and potential pathways to man and other environmental receptors. This can be achieved by various investigative methods. Guidance on site characterisation has been developed by SAFEGROUNDS (Baker *et al*, 2000).
Conceptual model	A simplified representation of how the real system is believed to behave based on a qualitative analysis of field data. A quantitative conceptual model includes calculations for key processes.
Contaminated land	The working definition used in SAFEGROUNDS guidance documents is any land in, on or under which there are radioactive or non-radioactive contaminants above natural and artificial background levels that are typical of the area of the UK in which the site is located. This is not the same as the statutory definition in Part IIA of the Environmental Protection Act, 1990 which defines the presence of contamination by the possibility of significant harm or the pollution of controlled waters.
Controlled waters	Defined by the Water Resources Act 1991, Part III, Section 104 which includes all groundwater, inland waters, estuaries and coastal water to three nautical miles from the shore.
Desk study (contaminated land)	Interpretation of historical, archival and current information to establish where previous activities were located, and where areas or zones containing distinct and different types of contamination may be expected to occur, and to understand the environmental setting of the site in terms of pathways and receptors.
Decommissioning	The set of actions taken at the end of a nuclear facility's operational life to take it permanently out of service. It includes actions to systematically and progressively reduce the level of hazard on a site and may include the physical dismantling of facilities. The ultimate aim of decommissioning of a nuclear-licensed site is to make the site available for other purposes. The end-point for decommissioning may be delicensing or re-use of the site for nuclear purposes, or the keeping of the site under institutional control.
Defence site	In this guidance, non-nuclear sites that have been or are being used for defence activities and for which a change of use and/or ownership is planned. Nuclear sites that are operated for MoD by contractors and that are licensed and regulated by HSE under the Nuclear Installations Act are nuclear-licensed sites.

Delicensing	The process of releasing a nuclear-licensed site from regulation under the Nuclear Installations Act, and of releasing the operator from his period of responsibility for any nuclear liability.
Environment	The environment includes, but is not limited to, people's property (eg houses and land), existing and potential resources (eg groundwater, water quality, air quality) and natural ecosystems. In this guidance, people are regarded separately from the environment. The distinction is made for consistency with health and safety, and radiological protection terminology.
Hazard	A property or situation that in particular circumstances could lead to harm.
Land quality	The condition of ground (soil, water and buried structures) due to natural or manmade factors which could have an impact on people or the environment.
Monitoring (contaminated land)	A continuous or regular periodic check to determine the presence or absence of contamination, its nature and the performance of any remediation works, which includes measurements undertaken for compliance purposes, and those undertaken to assess remedial performance.
Pathway	A route or means through which a receptor could be or is being exposed to, or affected by a contaminant.
Pollutant linkage	The relationship between a contaminant, pathway and receptor.
Receptor	A living organism, a group of organisms, an ecological system or a piece of property that could be or is being adversely affected by a contaminant.
Remediation (SAFEGROUNDS)	Any measure that may be carried out to reduce the exposure from existing contamination of land areas through action applied to the contamination itself (the source) or to the exposure pathways to humans or other organisms.
Remediation (Part IIA)	Defined in Section 78A(7) as: (a) The doing of anything for the purpose of assessing the condition of; (i) the contaminated land in question (ii) any controlled waters affected by that land (iii) any land adjoining or adjacent to that land (b) The doing of any works, the carrying out of any operations or the taking of any steps in relation to any such land or waters for the purpose; (i) of preventing or minimising, or remedying or mitigating the effects of any significant harm, or any pollution of controlled waters, by reason of which the contaminated land is such land (ii) of restoring the land or waters to their former state (c) The making of subsequent inspections from time to time for the purpose of keeping under review the condition of the land or waters.

	OR with respect to radioactive contamination defined in Section 78A(7)(as modified) as: (a) The doing of anything for the purpose of assessing the condition of; (i) the contaminated land in question (ii) any land adjoining or adjacent to that land. (b) The doing of any works, the carrying out of any operations or the taking of any steps in relation to any such land for the purpose; (i) of preventing or minimising, or remedying or mitigating the effects of any harm by reason of which the contaminated land is such land (ii) of restoring the land to its former state. (c) The making of subsequent inspections from time to time for the purpose of keeping under review the condition of the land.
Risk	A combination of the probability, or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.
Risk assessment	The formal process of identifying, assessing and evaluating the health and environmental risks that may be associated with the hazard.
Risk management	The processes involved in identifying, assessing and determining risks, and/or, the implementation of actions to mitigate the consequences or probabilities of occurrence.
Safety case	Documentation for a nuclear installation that demonstrates safety. Safety cases must be produced and maintained during the design, construction, manufacture, commissioning, operation and decommissioning of the installation.
Site (contaminated land)	A contiguous area of land on which contamination is known or suspected to be present. In most cases, a site will have a single owner/operator. Sites considered in this guidance are further classified as nuclear-licensed sites or defence sites.
Site investigation	On-site investigation which involves the collection and analysis of soil, surface water, groundwater and/or soil gas as a means of further informing the conceptual site model and the risk assessment. This investigation may be undertaken in a single or a number of successive stages.
Site reconnaissance	A walk over survey of the site.
Stakeholder (contaminated land)	A person or organisation that has an interest in (or is affected by) the contaminated land. There are various groups of stakeholders: Institutional stakeholders include the owner/operator, regulators and government departments. External stakeholders are all those outside the owner/operator organisation. Those stakeholders involved in decisions on the management of contaminated land are participating stakeholders.
Validation of remediation	The process of demonstrating, by means of inspection, sampling, testing and recording, that the remediation meets the site specific remedial objectives.

Records management terms

Access	To use, find, or retrieve information.
Accountability	To be responsible for one's actions and to be able to explain them to others.
Active record	A record referenced on a frequent basis. Active records are usually maintained onsite in departmental filing areas.
Annotate	The act of adding or attaching notes to an original record.
Archives	A location for the long-term preservation of historical records.
Audit	Periodic examinations to determine whether appropriate procedures, practices, and laws are being followed.
Audit hold	A directive to cease destruction of certain records, even if the records retention programme mandates destruction, when an audit by an authorised government agency is pending or imminent.
Backfile conversion	The process of analysing and indexing unclassified historical documents into a record keeping system for records retention purposes.
Backup	A computer security protection method of duplicating information in the event that the retrieval of this information is necessary due to the original records being lost or destroyed.
Benchmarking	Identifying a standard unit for the basis of comparison.
Business continuity	A discipline ensuring the continuity or uninterrupted provision of business operations and services on an enterprise-wide basis. Disaster recovery is a part of a business continuity plan.
Business function	A broad classification used to represent a core business function irrespective of departmental ownership.
Business resumption plan	A document outlining the approved course of action to take in the event of a disaster or business interruption to ensure the organisation's critical business functions are restored.
Classification	A systematic method of identifying and arranging business activities and/or records into categories.
Convenience record	Any duplicate copies, reference materials etc that are for convenience or reference purposes and are not designated as official records.
Conversion	To change records from one medium to another or from one format to another.
Copyright	A protection by statute or by law giving authors and artists exclusive rights to publish or reproduce the work, or determine who may so publish.
Database	A collection of data stored on a computer system for access when needed.
Destruction	To eliminate or delete records beyond any possible reconstruction.

Destruction, suspension of	A term used in records retention programmes to indicate the process or procedure that halts the destruction of records when it has been determined that the records are subject to an audit hold, legal hold, or tax hold.
Disaster Recovery	The technical aspect of business continuity planning that includes the planning and preparations necessary to minimise loss and ensure continuity of an organisation's critical business functions in the event of a disaster.
Discovery	A process in the pre-trial phase of a legal action whereby parties collect information held by the adverse party.
Disks	A computer memory device storing information for later retrieval by laser or other systems.
Disposition	The act of transferring records to their final destination.
Document	An object containing recorded information regardless of medium and characteristics.
Domain	A group of connected computers accessible via the internet.
Electronic record	Records that contain machine-sensible or machine-readable information
Encryption	A procedure that renders data unintelligible in order to prevent unauthorised use and can be accessed only by users with a decryption key.
File classification system	To classify records in a logical and systematic arrangement such as subject groups or categories.
File conversion	To change records either from one filing system to another or from one medium to another.
File management	The process of creating, retrieving and updating records within a file.
Floppy disk	A flat disk made of plastic and covered with a magnetic coating.
Historical record	A record that documents significant decisions or milestones in an organisation's history, past or present that has enduring historical significance and is targeted for long-term preservation in the archives.
Hold	The procedure to cease destruction of certain records, even if the records retention programme mandates destruction.
Imaging	The process of converting a document (paper or electronic) to a digital image file.
Inactive record	A record no longer referenced frequently or regularly but which must be retained in accordance with the records retention schedule.
Indefinite	A term used to indicate that the retention period for certain records cannot be determined in advance and that these records must be reviewed periodically to determine whether they have continuing effectiveness or whether they can be destroyed.
Indexing	To identify access points to facilitate the retrieval of records and/or information.
Internet	A worldwide network of computers linking public networks for communication purposes.

Intranet	A network confined to a single organisation for use by organisation members.
Law	A statute or regulation. An organisation must apply the law to the records management programme in all the jurisdictions in which it does business.
Legal consideration	A law or legal issue that has a bearing on the records retention period but which is not a legal requirement.
Legal group	A group of laws and regulations used to set the retention period for the record class.
Legal hold	The procedure to cease destruction of certain records, even if the records retention schedule mandates destruction, when litigation or government investigation related to those records is pending, imminent, or, in some cases, foreseeable.
Legal requirement	A law that states a requirement related to records that must be followed. For records retention purposes, the minimum length of time that a record must be retained for legal purposes.
Legal retention period	The length of time that a record must be retained to meet legal needs based on legal requirements and legal considerations.
Magnetic media	Magnetically coated materials used by computers for data storage such as a card, cartridge, cassette, floppy disk, hard disk, magnetic tape, etc.
Metadata	Data that describes the context, content and structure of records.
Migration	To move records from one system to another, while maintaining the records' integrity.
Office of record	The group, department, or office in the organisation responsible for ownership of specified records for the full duration of the official records retention period.
Official record	Record containing information that is required to be retained for business or legal reasons
Official records retention period	The period for retaining the official version of the record.
Preservation	The technical and intellectual survival of authentic records through time.
Proprietary record	A record exclusively possessed by an organisation.
Protocol (computer)	Standard rules that govern how computers communicate with each other.
Public record	Any record related to any instrument of government in connection with the transition of public business.
Record	For the purposes of this guidance, a record is a piece of information which supports the management of contaminated land on nuclear and defence sites. Records are not specific to any particular media or format. They may take the form of: (a) Paper documents, forms, reports, drawings, maps, manuals, correspondence, and files.

	(b) Electronic or computer files such as spreadsheets, databases, word-processed documents, and e-mail messages. (c) Information in other formats such as video tape, audio tape, microfilm, photographs and, physical models.
Record class	A group of similar or related records that reflect a specific area of business information. The records in a record class may be filed or destroyed together.
Record class code	The alphanumeric code assigned to a record class.
Record type	Examples of typical documents that fall within a record class.
Record value	The importance or usefulness of a record for operational, fiscal, legal, historical, or other purposes.
Record keeping system	A system used to ensure access to information.
Records management	The systematic control of records through the records cycle – creation, maintenance and disposition. Records management ensures that records needed by the organisation will be maintained and protected until they are destroyed under the records retention programme.
Records retention analysis	A component of a records management programme that establishes the period of time for retaining different classes of records and authorises the destruction of records at the appropriate time.
Records retention schedule	The published list of all records classes, the period of time for retaining each, and their designated disposition.
Retention event	The event upon which the retention period is calculated. The retention event triggers the start of a record's official retention period.
Retention period	The period of time during which records must be maintained because they are needed for operational, legal, fiscal, historical, or other purposes. A retention period may be stated in terms of months or years, and it sometimes is expressed as contingent upon the occurrence of an event.
Tracking	To monitor the movement and use of records through time.
Unofficial record	Records that are not required to be retained for business or legal reasons.
Unofficial retention	The period of time for maintaining duplicate or convenience copies including paper, microfilm, microfiche, duplicate reports, duplicate forms, etc.
User retention period	The length of time that a record must be retained to meet departmental, operational, or user group record needs.
Vital record	A record identified as essential for the continuation or survival of the organisation if disaster strikes. Loss of vital records would seriously impair the corporation's ability to resume or conduct business.

Abbreviations

BE	British Energy plc
BNFL	British Nuclear Fuels Ltd
BNG	British Nuclear Group
BRIMS	British Radwaste Information Management System
BSI	British Standards Institution
CIRIA	Construction Industry Research and Information Association
DCLG	Department for Communities and Local Government
DE	Defence Estates
Defra	Department of Environment, Food and Rural Affairs
DETR	Department of Environment, Transport and Regions
DoE	Department of the Environment
Dti	Department of Trade and Industry
EA	Environment Agency
EDRMS	Electronic document management system
e-GIF	Electronic government interoperability framework
e-GMS	Electronic government metadata standard
EPA 1990	Environmental Protection Act 1990
EU	European Union
FOI	Freedom of Information Act 2000
GIS	Geographic information systems
HSE	Health and Safety Executive
IAEA	International Atomic Energy Agency
IAR	Information asset register
LC	Licence condition
LCR	Land condition record
LPC	Loss Prevention Council
M&O	Management and operation
MOD	Ministry of Defence
NDA	Nuclear Decommissioning Authority
NGO	Non-governmental organisation
NIA65	Nuclear Installations Act 1965 (as amended)
NII	Nuclear Installations Inspectorate
NISR	Nuclear Industry Security Regulations
NNA	National nuclear archive
NSD	Nuclear Safety Directorate
NISR	Nuclear Industry Security Regulations 2003
OCNS	Office for Civil Nuclear Security

PI	Preservation index
PPC	Pollution, prevention and control
PSA	Property Services Agency
PSG	Project Steering Group
RSA 1993	Radioactive Substances Act, 1993 (as amended)
RWPG	Radioactive Waste Policy Group
SAP	Safety assessment principle
SEPA	Scottish Environment Protection Agency
SHIRE	Site history register
SiLC	Specialist in land condition
SLC	Site licence company
UKAEA	UK Atomic Energy Authority
USDOE	US Department of Energy

Executive summary

Record keeping has been identified by the SAFEGROUNDS learning network as one of the five key principles for the management of contaminated land on nuclear-licensed and defence sites. The Principle states that:

> *"Site owners/operators should make comprehensive records of the nature and extent of contamination, the process of deciding on the management option for the contaminated land and the findings during the implementation and validation of the option. All records should be kept and updated as necessary".*

The term "contaminated land" is used in defining the SAFEGROUNDS remit, but this guidance document uses the term "land quality" to be more neutral and comprehensive. For example, there may be land to be sold or de-licensed that is not contaminated but for which land quality records will be very important.

The activities required to characterise a site, decide on a management option and to implement it could include desk study, site investigation, assessment, decision-making, monitoring, management, remediation and validation. This guide introduces the concept of a "land quality file" to be created for each site with a suggested formalised structure for the records that should be retained to cover each of these activities as appropriate. The contents of the land quality file should be kept referenced, registered and updated in the main records management system of the organisation responsible for the site to enable its proper maintenance, access and preservation. Regular audits should be carried out to ensure that the records are kept up-to-date and accessible. Good practice guidance is given in this document on the scope of the records to be held, record keeping systems and associated protocols.

The expectation of regulators, owners, investors, site workers and the wider public is that:

- records should contain all the information that may be required both now and in the future
- records should be accessible to those who will consult them
- records should be assembled and maintained in a secure form.

By consistently following this good practice guidance, the ability to locate information and meet stakeholder expectations will improve. The guidance should be used to identify:

- why it is important that land quality information should be recorded (Chapter 2)
- what land quality information should be recorded and in what form (Chapter 3)
- how a record keeping system should be set up and maintained (Chapter 4).

Comprehensive records and an efficient record management system are hallmarks of a professional organisation in control of its responsibilities. The cost and implications of losing land quality data can be enormous and the benefits of good record keeping can be realised comparatively cheaply.

1 Introduction

1.1 Background

The SAFEGROUNDS Learning Network is a forum for developing and making available good practice guidance on the management of radioactively and chemically contaminated land on nuclear-licensed and defence sites in the UK. Record keeping has been identified by SAFEGROUNDS as one of the five key principles for the management of contaminated land on nuclear-licensed and defence sites. Key Principle 5 states that:

> *… site owners/operators should make comprehensive records of the nature and extent of contamination, the process of deciding on the management option for the contaminated land and the findings during the implementation and validation of the option. All records should be kept and updated as necessary.*

The theme running through several of the key principles is openness and transparency. If records on land quality are created and kept as intended, protection of people and the environment and stakeholder confidence will be enhanced because the interested parties will know what the potential for contaminated land is, what is being done to manage it and the reasons behind the decisions that have been made. For the full SAFEGROUNDS guidance and further information see <www.safegrounds.com>.

The objective of this document is:

> *… to provide a good practice guidance on records and record keeping for contaminated land and land quality which addresses the knowledge requirements of nuclear-licensed and defence sites and their related stakeholders.*

The term "contaminated land" is used in defining the SAFEGROUNDS remit, but this guidance document uses the term "land quality" to be more neutral and comprehensive. As an example, there may be land to be sold or de-licensed that is not contaminated but for which land quality records will be very important.

This guidance has been developed primarily to assist those organisations responsible for managing land quality (eg site owners, site licence companies and their agents) but will also inform other stakeholders such as regulators, policy makers, non governmental and community based organisations. It has been written to address the need for clarity on the drivers to create records and to provide practical guidance on clearly recording information, and setting up and maintaining the record. The ultimate objective is to make information accessible in such a way that it leads to the enhancement of land quality knowledge.

Detailed technical information is not included here as there are references to other documents where necessary. The guidance is non-statutory; it supplements regulations and associated guidance but has no legal standing.

1.2 Definitions

In SAFEGROUNDS guidance the term "management of contaminated land" means the taking of any actions to control, monitor or remove (wholly or partially) contamination once it has been discovered, and the associated decision-making processes. Prevention of contamination is outside the scope of SAFEGROUNDS.

This guidance focuses on the management of land with the potential for radioactive contamination on or adjacent to nuclear-licensed sites and defence sites. *Nuclear-licensed sites* include civil nuclear sites that are being used for electricity generation or other purposes, defence nuclear sites that are being operated for MOD by contractors, and nuclear sites that are being decommissioned and are the responsibility of the NDA. In line with the main SAFEGROUNDS guidance (CIRIA, 2002), the term "defence site" is used to cover non-nuclear sites on which it is known or suspected that radioactive contamination is present on, in or under the land. The guidance may also be applicable to former and current industrial, medical and research sites where radioactive materials have or are being used, and nuclear defence sites that would be licensed if the Nuclear Installations Act 1965 applied to the MOD.

For the purposes of this document, a record is a piece of information which supports the management of land quality on nuclear-licensed and defence sites. A record can take many forms: written, computer, electronic, photographic, physical model, video, drawing, map. Record keeping is the system used for creating, storing and otherwise managing all aspects of the record including the ability to access the record now and in the future.

1.3 Structure of the guidance

The guidance in this document is structured as follows:

Recording of Information

Why it is important that land quality information should be recorded (Chapter 2)

- importance and benefits of good record keeping (Section 2.1)
- drivers and expectations (organisational, societal and stakeholder) (Section 2.2)
- challenges (practical, technical, temporal) and existing initiatives such as land condition records (Section 2.3)
- regulatory requirements (Section 2.4 and Appendix 1)
- site owner requirements, including NDA *Information Asset Register* and *National Nuclear Archive* and MOD *Defence Records Management Manual* (Section 2.5)

What land quality information should be recorded and the form in which it should be kept (Chapter 3)

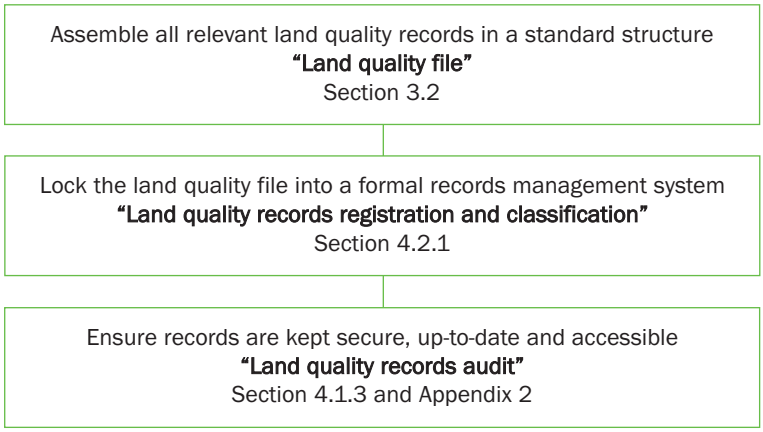
- scope and understanding the ways in which the information may be needed – (Section 3.1)
- proposed structure and contents for a recognised and registered land quality file for each site (Section 3.2)

Setting up and maintaining the record

How record keeping systems are structured and maintained (Chapter 4)

- record management systems, policies and procedures (Section 4.1)
- organisation to ensure land quality records are accessible, now and in the future (Section 4.2 and Appendices 2, 3, 7, 8 and 10)
- optimising usability and retrievability of records while they are actively in use (Section 4.3 and Appendix 5)
- control of records when they are not actively in use (Section 4.4)
- archiving and preservation of records with permanent value (Section 4.5)
- protection, access and security controls (Section 4.6)
- storage environment for different media types (Section 4.7, and Appendices 4 and 6)
- interfaces with other topics (Appendix 9)

The key components of the guidance are:



2 The requirements for land quality records

2.1 Importance and benefits of good record keeping

Successful land quality management is about ensuring safety, environmental protection and stakeholder confidence in a way that represents value for money. Good record keeping is key to achieving this – without reliable records, things could go wrong and work may have to be carried out again. No matter how good the investigation, assessment, decision-making and clean-up is for a site, if it is not recorded in a way that is comprehensive and accessible to future stakeholders, it may seem as though it never happened. Regaining knowledge on nuclear and defence sites can be very expensive and may involve exposing workers to chemical hazards and radiological doses. If an effective records management programme is consistently applied to land quality, issues regarding information loss are less likely to arise and knowledge transfer and enhancement is more likely to occur.

Record keeping can be considered dull, and it has not always been a primary interest of many people involved in contaminated land. It is also quite difficult to manage over the timescales typically required for nuclear licensed and defence sites. Contaminated land has in the past been managed as a series of technical projects and it has seldom been the objective to build up a coherent body of records for a site. Where records do exist, they are often in an informal record keeping system belonging to the individual or department concerned and are not locked into the wider organisation record management system where they can be preserved and made accessible to wider stakeholders.

2.2 Drivers and expectations

A number of recent (and on-going) changes in the nuclear and defence sectors are increasing the focus on land quality record keeping. In the nuclear sector, site licence holders have always had a duty to keep key records, but many sites are currently experiencing great organisational change with the creation of the Nuclear Decommissioning Authority (NDA) and the transition of the BNG (formerly BNFL) and UKAEA sites to new site licence companies (SLCs). Liability protection is now a key driver for site owners and their Tier 1 contractors or agents. It is the licensee, not the site owner, which has the duties and responsibilities under the Nuclear Installations Act 1965 (NIA65). On change of ownership or site licence holder it will be important to establish who will be responsible for which liabilities, past and future. A number of sites are also in the process of moving from their operational to decommissioning phases and the combined effect will be to create a discontinuity from previous working arrangements, with many people leaving the sites and new management structures being created. In the defence estate, change has been taking place for some time and many sites are in the process of change of use, redevelopment or sale. The strengthening of the "polluter pays" principle in legislation has reinforced the need for good record keeping.

At the same time stakeholder interest and expectation of access to site records is increasing. The NDA and MOD have a policy of openness and transparency for all their records where considerations such as national security and health and safety allow. Across all government bodies the effects of the Freedom of Information Act

(2000), Environmental Information Regulations (2004), the e-Government Directive and the EU Directive on Re-use of Public Information (2003/98/EC) are combining to force improvements and standardisation to record keeping. In the future the success of land quality management will be increasingly judged on the quality of its records and record keeping.

Contaminated land is considered by many to be a technically complex area, yet much of what drives interest in it by concerned investors and communities is based on perception and feeling. Stakeholders mistrust or doubt what they can't see and concern or blight on a site can occur if there is a lack of trust or confidence in the unseen condition of the land beneath the surface. Public bodies and many private organisations have come to recognise that openness and transparency are necessary to win confidence in a site and society has come to expect access to information on virtually anything that is not covered by security or commercial confidentiality constraints. Evidence of informed decision-making is required to justify actions. This places a greater onus on record keeping sytems to meet the information needs of stakeholders in ways they can access, understand and accept as satisfactory. Good practice guidance on "community stakeholder involvement" is available in a separate report on the SAFEGROUNDS website.

Records inform many important decisions on future land use with respect to the impact of land quality on people and the environment. All of the member organisations of the SAFEGROUNDS steering group, as well as other stakeholders, have a stake in effective record keeping systems being used and accurate and appropriate records being kept.

Table 2.1 *Key stakeholder groups*

Stakeholder	Responsibilities and expectations
Site owners (NDA, MOD, British Energy and others)	Have ultimate responsibility for liabilities. They require ready access to accurate records on land conditions to inform strategies for land management and to protect their liability. Records will generally be required well into the future. Having consistency of approach for different sites, including some standard record formats, will make site enquiries easier and less time-consuming and will be a requirement for public bodies under various UK government and European Union initiatives.
Tier 1 Contractors and agents for the site owners (site licence companies, MOD organisations and contractors, etc)	It is the licensee, not the site owner, that has the duties and responsibilities under the Nuclear Installations Act 1965 (NIA65). Under the new contractual arrangements for sites owned by the NDA, the site licence companies (SLCs) are responsible for maintaining the records. Tier 1 contractors, MOD agencies and contractors, etc, rely on good site knowledge to be able to provide an effective service for their client organisations. They also need to be able to maintain and update records to provide to the site owners an on-going picture of site liabilities and to hand over records if there is a change in ownership of the site. They need to inform an understanding of how liabilities are likely to change over time. They may also be required to hand over information to sub-contractors and any successors that are appointed to manage site contamination after their contracts come to an end.
Regulators (HSE (including NII and OCNS), EA, SEPA and local authorities)	Require site licence holders to meet their legal obligations. They need to have confidence that records are comprehensive, reliable, accurate and up-to-date and that their storage systems are robust. This will enable important decisions to be made quickly on the level of scrutiny and regulatory intervention required on particular sites. Records are required for day-to-day control of contaminated land until remediation is achieved, for strategy decisions, for remediation planning, for applications for waste disposal authorisations, for applications for delicensing of sites and for stakeholder interactions/public information obligations.

Site workers, Tier 2/3 contractors and visitors	Those accessing the site need to be protected from any known contamination by being made aware of its presence, location and nature, and from any potential contamination by applying appropriate precautions and monitoring. Records on contamination and potential contaminative uses need to be tied into operating procedures, particularly permits to work. The activities of everyone on site need to be appropriately controlled to avoid exposure or spread of contamination.
Site neighbours	Need confidence that they, their land and their activities are not being affected (and do not have a significant potential to be affected) by contamination migrating across the site boundary. They expect records and record keeping systems to be in place to demonstrate this and may require access to information such as monitoring on the site boundary to provide assurance.
General public, non governmental organisations and community-based organisations (including site stakeholder groups)	Need to be confident that the records being used by site owners, contractors and agents and regulators are accurate and up-to-date, and that record keeping systems are robust and access to them is not unduly restricted. They are concerned with community impacts but may not have the knowledge required to interpret very technical information. For them some records will need to be in non-technical language.
Policy makers (eg Defra and Dti)	Need accurate information and data in order to develop effective policy.
Former and future site owners and operators, purchasers, investors and developers	May retain/inherit some contingent liability for contamination hazards on land that has been sold or transferred to another body and need records on the state of the land prior to and during the period of their involvement. Their consultants, advisors and property/due diligence lawyers will require as much original data and evidence as it is possible to obtain, and interest may extend to land adjacent to sites.
Allied sites and supporting activities	Offsite disposal facilities and transport operators will also need records on the nature of any materials handled and transferred to them.

2.3 Challenges and existing initiatives

2.3.1 Timescale issues

A characteristic of many sites covered by this guidance document is the long period of management they will have under institutional control prior to possible full remediation or release for re-use or redevelopment. This period is sometimes referred to as "stewardship" and during it monitoring of land quality, stakeholder involvement and record keeping will be key management activities. A successful land stewardship programme is dependent on retaining all necessary records about the site's history and residual contamination. Information that must be retained includes:

- history of the site
- contaminants of concern
- selected management options
- use of controls along with their monitoring and maintenance records
- any other information judged necessary for succeeding generations to understand the nature and extent of the residual contamination.

(Rocky Flats Stewardship Working Group, 2002).

The long-term stewardship of nuclear facilities provides many challenges for effective record keeping. The following challenges were captured in the findings of a report into US Department of Energy (US DOE) *Managing data for long-term stewardship* (ICF Kaiser, 1998):

1 Most types of information needed for long-term stewardship are already being generated for other purposes.

2 Requirements do not specifically identify what constitutes stewardship data or how to define this discrete subset.

3 Information management requirements and practices are not coordinated with property transfer requirements.

4 Information that has stewardship value is being lost, destroyed, or maintained in formats that may not be useful to future stewards.

5 Some data will not be preserved as long as necessary for stewardship purposes.

6 Some data will be preserved adequately but may not be able to be located, or will not be accompanied by enough descriptive information to be usable.

7 Most records of facilities and site infrastructure are required to be destroyed when facilities are demolished or infrastructure is declared obsolete.

8 DOE has already begun to pay increased cleanup costs because critical data have been lost.

9 Knowledge that archived information about DOE sites exists may be lost.

10 Future users may not know where to search for all relevant information, causing delays in action or the potential for unnecessary risk.

11 Even when such knowledge is preserved, and users know where information is located, it may take too long or be too expensive to gain access to stewardship data.

(ICF Kaiser, 1998)

2.3.2 Organisational issues

Traditionally records have tended to be kept by individuals or departments, rather than within organisation wide records management sytems. In such situations, organisational change can result in loss of material during the transfer of records. For example, in the defence sector the break up in 1992 of the Property Services Agency (PSA) that had looked after the Crown Estate for many years resulted in losses of records built up over decades on some sites. Old files were destroyed and little incentive was given to the new private sector management companies to take on apparently out-of-date local archives. This is an area of potential concern in the nuclear sector as for at least some sites there is an expectation on the part of liability holders and regulators that records will have to out-last the organisations that create them (eg site licence companies).

In many UK organisations land quality records have only been formally incorporated into a records management system when provided and relied on as part of due diligence sale or transfer proceedings. In practice, record keeping of land quality issues has often only been seen as important at the periodic times when the information is actively needed. This poses a great challenge as the land quality interest in a site may lie dormant for many years and for nuclear licensed sites in particular it is a requirement that radioactively contaminated land should be continuously managed from the time of the contamination event, time of burial or time of discovery until remediation is completed, which may potentially span decades or centuries.

Land quality records belong to the set of data that a nuclear-licensed or defence site operator will need to manage for the entire life of the site and if, at the end of the site decommissioning, the land is completely cleared they may even be the only active record required to go forward to the next phase in the life of the site. Other aspects of nuclear-licensed or defence site management that have similar records requirements to land quality might include the condition of radioactive wastes and structures to be placed into long-term safe storage.

2.3.3 Technical issues

Record keeping in the contaminated land sector has often been a problem area. Historically consultants' reports were only available in hard copy and were easily dispersed or lost. In particular reports containing large volumes of geological and chemical data tended not to be valued by non technical custodians and much spatial data was recorded on large sized (A0 or A1) plans that were difficult to store and copy.

The nuclear sector and defence estate have been better at record keeping than most but they have had their share of problems. SAFEGROUNDS members have compiled the following list as representative of the kinds of issues identified.

Recording of information

- records with insufficient information (quantitative information and qualitative information relating to such things as decisions and assessments)
- inadequate spatial information so that records associated with a particular area of land may be difficult to locate in the future.
- poor information about the record (for example, information on the purpose for which the record was originally collected and its reference)
- poor prioritisation of the record in terms of its importance within the context of land condition, site restoration and site end points.

Setting up and maintaining the record

- poorly stored/ filed/ categorised records
- poor tracking of revisions or the reasons for the revisions
- poor identification of such things as who the record "custodian" is
- inadequate protocols for maintenance/amendments/destruction/retention (particularly where records may be needed for purposes other than the original purpose)
- degradation/corruption/obsolescence of the record keeping media (paper or electronic).

Most organisations in the nuclear and defence sectors have relatively good electronic document management systems but many records of relevance to contamination still remain on sites referenced (if at all) only by manual card systems that rely heavily on the experience of the current holders. Where material has been transferred to a central system, inadequate referencing has in some cases made it hard to access records again. An example would be example drawings or documents identified only by a numerical reference with little or no description of their subject matter.

Unintended physical damage or loss of records has also occurred. For example, on one nuclear power station site water ingress into a basement used for records storage resulted in the destruction of records relating to authorised solid waste disposals. The then regulator's copies of the same records could also not be traced.

The variety of inputs to land quality reporting can also cause difficulties for stakeholders trying to access information of relevance to them. The contaminated land sector brings together experts from a variety of backgrounds ranging from chemists, biologists and environmental scientists to engineers and surveyors. Each of these professions will have a different approach to the problem. For example, geotechnical reports may concentrate on the foundation implications of ground and chemical conditions, using terminology unfamiliar to say chemists. Such reports may also fail to

present all the findings and data of relevance to contaminated land risk assessments in a comprehensive and easy to access form. Chemical and radiochemical data is often presented with little indication of the methods used or the uncertainty in the results.

2.3.4 Land condition record initiative

The need to standardise data relevant to site contamination and to inspire increased confidence in brownfield development among investors led to the introduction in 2001 of the land condition record (LCR) initiative by the government's urban task force (see Box 2.1). This is now viewed by regulators and policy makers as the main current initiative to improve record keeping for contaminated land in the UK.

Box 2.1 *Land condition records*

Background

In 1999, the urban task force recommended the introduction of standardised documentation that described the condition of the land. Its aim was: "to ensure that during the sale, purchase and redevelopment of land, all parties had access to the same data sets and could therefore develop some general agreement between them on the levels of risk associated with that particular site and that particular use." A standard format for a land condition record (LCR) was developed by a working group of experienced individuals representing organisations in the property and environmental sectors. This work included input from regulatory authorities and public bodies with large land portfolios, so that the standard format for information on individual sites could be used for a variety of purposes.

The LCR

The LCR is a record of the physical and chemical nature of land contamination, with the intention of presenting factual information relevant to land contamination in a structured format and to increase the technical confidence in the information and assist its evaluation. All information contained within the LCR is appropriately referenced to provide quality assurance, and any gaps in data are described appropriately. The LCR is a factual document, it does not provide direct assessment or recommendations regarding the condition of the land. The LCR does not make any evaluation of liabilities or costs associated with the land. It is designed to form the basis of a structured further assessment of the information for these and other purposes. As a "live report" of the land, the LCR can be kept up-to-date as further information about the land is obtained. This ensures that the document is an ongoing accurate representation of the land. Typically, the LCR will be prepared by, or on behalf of the land owner or developer. In some circumstances, a potential purchaser may wish to commission an LCR. The preparation of the LCR should comply with quality-assurance procedures, ensuring the credibility and accuracy of the document. Although it is envisaged that a team could complete the document, the record should be verified or signed off by a registered individual or specialist in land condition (SiLC – see below). By having the LCR signed off by a SiLC it reinforces the confidence and credibility of the document, verifying it to be a representative record of the condition of the land.

Specialist in land condition

For the LCR to have consistent quality, a high professional standard is required. Individuals that sign off the LCR must demonstrate that they are not only a specialist within their specific field and aware of a wide range of issues, but also recognise where they need advice or input from other professions and follow a professional code of practice, all relevant to land condition. The SiLC registration scheme developed and implemented by a professional and technical panel consists of representatives from relevant professional bodies.

Further information on the LCR and SiLC schemes can be found at <www.silc.org.uk>. A copy of the LCR is given in Appendix 10.

The LCR is a dynamic document following a standard form that travels with the owner of the site and which provides a record of the known physical and chemical nature of the land contamination and the steps taken to remediate it. As such, it may be used as a tool for purely internal risk management of assets and liability, or to inform outside parties (potential purchasers or environmental regulators) of the condition of the land.

This is of particular benefit to sellers of land where there is a desire to provide accurate information to the purchaser and to exclude future liability. The LCR can also be an aid to planning applications and for responding to regulators seeking information under Part IIA of the Environmental Protection Act 1990. For example, developers and development control officers could use the LCR as part of the outline application to indicate what is already known about the land, to inform planning conditions relating to the collection of further information and to demonstrate that specific planning conditions have been discharged.

The value of the LCR scheme is that it sets a benchmark for the production of brownfield site condition reports, predominantly with regard to land transactions, by providing a standard means by which to collate all relevant information in a single factual document. It saves reviewing several documents and reports which may express different opinions, and also provides a more straightforward digest for those such as the lawyers and planners who may not be up to speed on the technical aspects of contaminated land. However, the standardised format is not to everyone's liking. Its scope only covers factual information rather than interpretation and so far its impact has been limited. In the SAFEGROUNDS context it has greatest relevance for defence sites as these are more likely to be the subject of property transactions and brownfield development. However, the aims of an LCR could also have a useful application for some nuclear-licensed sites in planning applications and in providing a structure to capture the factual information on the land condition.

2.3.5 Other initiatives

There are few other widely recognised record keeping initiatives for the contaminated land sector. Guidance on information systems for land contamination was produced on behalf of the Department of the Environment as CLR5 (Meta Generics Ltd, 1994). The bulk of the document is devoted to setting up a computer-based system for a large number of sites, and is likely to be of limited relevance to users in this context. One other initiative that is being considered is an e-Government National Database Project for a proposed national site history register (SHIRE) to assist local authorities with their obligations under The Freedom of Information Act 2000, the Environmental Information Regulations 2004 and Part IIA of the Environmental Protection Act 1990. A pilot study funded by English Partnerships, the Department for Communities and Local Government (DCLG), Defra and the Welsh Development Agency is underway to prove the feasibility of transferring local authority past land use records into a jointly owned national register and if necessary upgrading the data into a standardised on-line format. The register would identify site boundaries and provide the history of all Brownfield land available for development.

In the related area of radioactive waste management, The Radioactive Waste Policy Group (RWPG) chaired by Defra has set up an information management sub-group to develop a strategy for managing information on the UK wide radioactive waste holdings and anticipated arisings. The RWPG is currently developing a draft regulatory code of practice that will cover:

- scope of information to be recorded
- collection and management of information
- security and commercial confidentiality issues
- timescales
- organisation and responsibilities
- national archiving arrangements.

Within the MOD the quantification of risks posed by land contamination and the identification of the most appropriate management responses is achieved through land quality assessments (LQA). Guidance for MOD personnel and contractors is set out in JSP 418, the *MOD Sustainable Development and Environmental Manual*.

2.4 Regulatory requirements

A whole host of regulations and associated guidance notes place record keeping requirements on, or have implications for, those accumulating information. The Environmental Information Regulations and the Data Protection Act impose general obligations. In the public sector additionally the Public Records Act, the Freedom of Information Act (with the associated Lord Chancellor's Code of Practice) and the EU directive on the *Re-use of Public Sector Information* (2003/98/EC) apply. In the nuclear industry, the Energy Act requires openness and transparency and the proactive sharing of information and there are also the Nuclear Industries Security Regulations and Guidance (NISR) and IAEA guidance notes and standards.

In the context of the Part IIA contaminated land regime, a requirement for record keeping derives from the implicit need for owners and occupiers of all UK sites, including nuclear-licensed and defence sites, to ensure that use is consistent with the levels of contamination present (if any) and to provide the enforcing authorities, ie local authority or environmental agency (EA or SEPA), with information on the condition of the land as required (eg for the public register).[1]

On nuclear-licensed sites, additional regulatory requirements are placed on operators to ensure that adequate record keeping arrangements are made and implemented. These are set out in licence conditions made under the Nuclear Installations Act 1965 (NIA65). Licence Condition 6 (*Documents, Records, Authorities and Certificates*) requires that appropriate and adequate records are held by the licensee for a suitable period to demonstrate compliance with licence conditions. Adequate arrangements should identify the records required to demonstrate compliance with licence conditions and should include administrative arrangements for their collection, storage, retrieval, maintenance and disposal (see Appendix 1). Licence Condition 25 (Operational Records) also requires licensees to ensure that adequate records are made and kept of the operation, inspection and maintenance of nuclear facilities. This includes the amount and location of all radioactive waste and radioactive material stored or accumulated on the site, which could include radioactively contaminated land. There are other relevant licence conditions and obligations, responsibilities and liabilities under NIA65 (as amended), which are not limited to the conditions attached to the licence. NII expectations with respect to the preservation of licensee's records were summarised in guidance published in 2001 for inspectors as:

- records should contain all the information that may be required in the future
- records should be accessible to those who will consult them
- records should be assembled and maintained in a secure form.

(HSE, 2001)

1 It should be noted that new radioactive contaminated land regulations are expected in the near future. These may introduce new record keeping obligations on both regulators and licensees.

Records may be stored by media other than hard copy, provided the licensee has established practical safeguards. A check list for the adequacy of the arrangements is given in Appendix 2 (HSE, 2002). Where licensees wish to change their record keeping arrangements, particularly when this involves significant changes in media type and management, this should be discussed with the NII site inspector and a formal modification (under Licence Condition 22 Modification or Experiment on Existing Plant or Licence Condition 36 Control of Organisational Change, whichever is more appropriate) considered.

Safety assessment principles (SAPs) for nuclear facilities (HSE, 2006) have the following requirements for records for radioactively contaminated land:

> **Principle RL.7: Arrangements should be made for recording and preserving the information that may be required both now and in the future for the safe control and remediation of radioactively contaminated land.**

The following records need to be maintained and preserved in order to facilitate the control and remediation of radioactively contaminated land:

- results of investigation, characterisation and monitoring work
- records of any incidents, leakages etc resulting in radioactively contaminated land, and of any management actions
- reports on the remediation of contaminated land
- any other relevant information related to the history and use of the site.

Guidance on the physical nature and the conditions of record storage is given in Appendix 4 (HSE, 2000).

2.5 Site owner requirements

The site owners of the land (the NDA, MOD, British Energy, etc) require records to be held and kept for the long-term and to be available to be passed on to new owners if appropriate.

For nuclear licensed sites the site licence companies (SLCs), which in most cases are not the site owners, are legally responsible for managing all records on their sites and are expected to maintain information following good practice. The requirement for record keeping for the NDA owned sites is made in Clause 12B of the M&O contract between the NDA and the SLCs. It requires the contractor to retain all records for either:

- a period of six years after the expiry or earlier termination of the contract or such longer period as may be required by applicable law or regulatory requirement, or
- in relation to certain records, for such longer period than the statutory or regulatory minimum as agreed between the parties.

The NDA is attempting to standardise the approach to openness and transparency across its sites. It is implementing a national information management strategy and creating an information asset register – a metadata database to create a standard language for records capture and processing – that all SLCs will be expected to populate and update on a regular cycle (eg monthly). In accordance with the e-Government Directive, the government interoperability framework (e-GIF) has been developed. This sets out the government's technical policies and specifications for achieving interoperability and information and communication technology (ICT)

systems coherence across the public sector (Cabinet Office, 2005). Another driver for the NDA is the EU Directive on the re-use of public sector information that may require records produced with public money to be reproducible in an accessible form to anyone who requests it. A working group is currently deciding on the metadata to adopt, with common metadata fields across all the sites, and a guidance document will be produced in due course.

The NDA will use the information asset register to make itself and the SLCs aware of the records and data being created to manage the sites. As all SLCs will have access to the Register, the expectation is that they will use the information to share knowledge on decommissioning techniques and to avoid duplication of effort. Effective record keeping is seen by the NDA as an important tool to realise cost-savings through more efficient management.

The NDA is also looking at establishing a National Nuclear Archive (NNA) to produce consistency across all the different data and information centres. This will hopefully achieve *public records place of deposit* status where data of historical and local interest can be managed effectively and made available to as wide an audience as possible. However SLCs are entirely responsible for the management of records on their sites and should not anticipate a transfer of operational records to this entity until such time as those records are suitable for inclusion in such a facility.

Like the NDA, the MOD requires records and data to manage its sites, identify environmental and health risks, make appropriate decisions and enable regulatory compliance. Guidance is given in *Defence Records Management Manual* in 2003 (JSP 441). This manual sets out MOD records management policy, identifies effective methods of storing information in a coherent manner and covers reviewing and disposing of information in an efficient and cost effective way. It sets out its statutory obligations under the Public Records Acts of 1958 and 1967 and also sets out a framework for the maintenance of electronic records.

3 Guidance on the recording of information

3.1 Scope

Records are required for a purpose. An understanding of the ways in which the information may be needed and the environments in which it could be applied is necessary if records are to be made and kept in a systematic way to meet the needs of current and future stakeholders.

Land quality records should provide information for:

- site worker safety
- onsite environmental protection
- regulatory compliance
- contractual and internal performance requirements/standards/obligations
- confidence building
- public health
- estate management (including site usage and decision-making).

This entails managing a wide range of information (much of it produced with other purposes in mind). All the stages in the life cycle of a site need to be addressed, which in the case of the types of site covered by this guidance could potentially include a combination of the following:

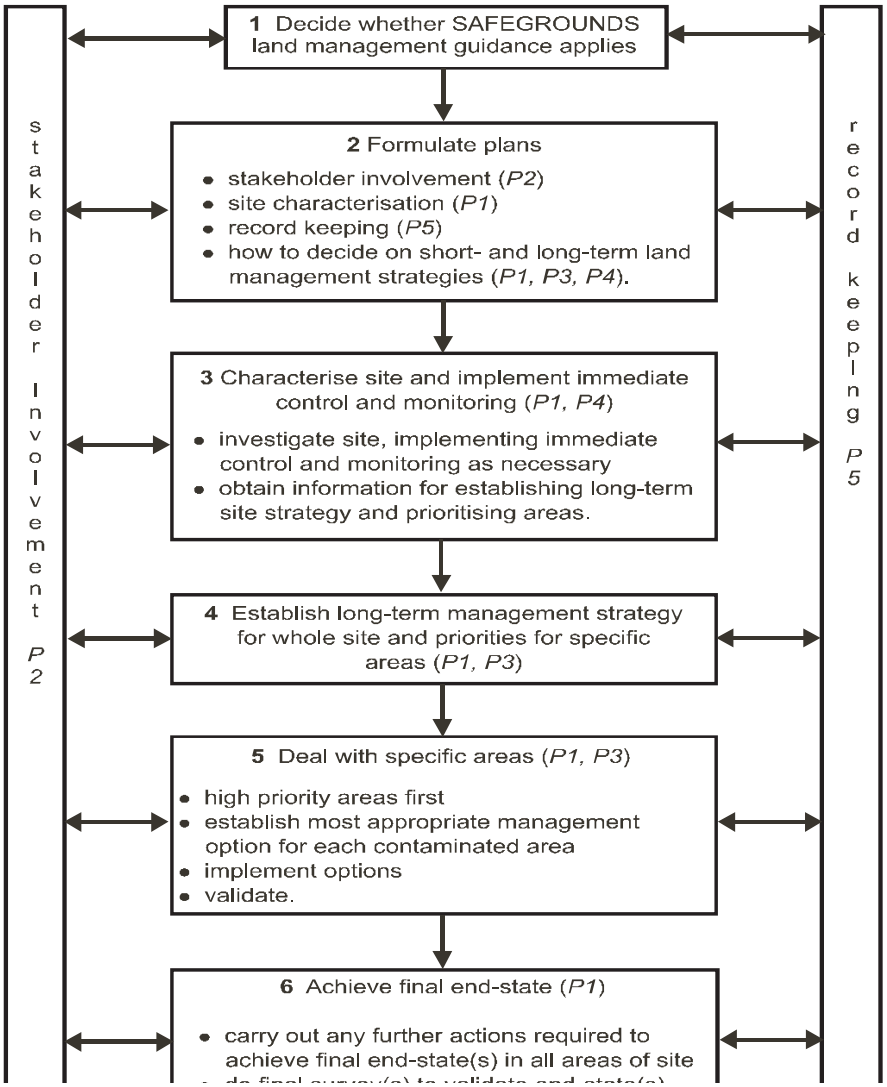
- pre-use (eg wartime airfield)
- operational (eg power station)
- decommissioning (the actions taken to allow contaminated plant or facilities to be decontaminated, dismantled and disposed of as appropriate)
- contaminated land remediation/clean up
- care and maintenance/interim use (eg storage)
- final site clearance (eg delicensing)
- redevelopment/future land use (eg industrial estate)
- institutional control/ stewardship (eg public body).

The tasks for which the information may be needed could include:

- leak/spill detection and remediation
- legacy contamination identification and management
- site liability estimation
- cost optimisation
- waste minimisation
- waste and material management and transfer (on-site and off-site management)
- material re-use
- off site contaminant migration prevention
- planning, layout and design of new buildings

- setting, planning and achieving end states
- delicensing, transfer, sale and development
- confidence building and assurance.

SAFEGROUNDS has provided specific good practice guidance for the management of contaminated land on nuclear-licensed and defence sites and separate guidance on site characterisation, both of which are available on the SAFEGROUNDS website. If it is known or suspected that radioactive contamination is present on the site, the SAFEGROUNDS land management guidance process identifies the need to formulate plans, characterise sites, assess risks, implement immediate short term measures to monitor and control any identified contamination, establish a long-term strategy and priorities for the whole site and to deal with specific areas until the final end state is achieved (the "final end-state" in this context is the one beyond which no further action is required, which may be for the whole site or different final end-states for various areas). A generic flow diagram for the process of managing contaminated land on nuclear-licensed and defence sites has been produced by the SAFEGROUNDS Learning Network (Figure 3.1).



P1, P2 etc are references to the SAFEGROUNDS key principles for the management of contaminated land. For more details please see SAFEGROUNDS *Good practice guidance for the management of contaminated land on nuclear and defence sites* (CIRIA, 2002).

Figure 3.1 *SAFEGROUNDS generic flow diagram for the process of managing contaminated land*

In dealing with the land quality issues on a site, a decision-making process should be used to set objectives, appraise the options available and develop the strategy such as those set out in the SAFEGROUNDS guidance (CIRIA, 2002) and in CLR11 *Model Procedures for the Management of Land Contamination* (Environment Agency, 2004). The steps required to establish the most appropriate long-term management strategy for a site or the most appropriate management option for an area within a site will include:

- identifying envisageable options/strategies
- screening out those options/strategies that are not feasible or are clearly unacceptable
- assessing and comparing the remaining options/strategies on a range of attributes
- deciding on the preferred option(s)/strategy.

The assumptions made and criteria for success need to be recorded in decision records (Environment Agency, 2004) so that validation of the approach can be made once the work has been implemented in order to provide reassurance that the chosen option has performed satisfactorily and as expected. This will usually require measurements, logs of activities and findings, waste records, as built drawings and ideally a photo record. A management manual should be produced on completion that identifies the features of the restoration that require protection, management and maintenance over the lifetime of the scheme.

It is important that future generations are aware of the potential hazards on a site to allow them to make informed decisions concerning its safety, to avoid inadvertent intrusion into contamination and to assist decision-making on its possible reuse. If the records are incomplete, inadequate or become lost over the lifetime of the site, there is a significant risk that any remedial or control schemes may ultimately fail through lack of maintenance, inappropriate usage or lack of confidence.

3.2 Land quality file

In order to raise the awareness and standing of land quality record keeping and to have a structure that good practice principles can be applied to, this guide introduces the concept of a "land quality file" that suggests a formalised structure for the records that should be retained at each site. The contents of the land quality file should be kept referenced, registered and updated in the main records management system of the organisation responsible for the site to enable its proper maintenance, access and preservation. This record keeping entity should be given sufficient status in the management documentation system of a site to ensure that it is populated and consulted appropriately and that it is publicised and promoted to ensure that the benefits of good record keeping are realised.

A fixed structure for each land quality file is recommended for use across an organisation to capture the required information and to allow any gaps in information to be readily identified. For some smaller or more straightforward sites not all the sections may be relevant and its use in these instances should be appropriate to the issues concerned. Equally for some more complex sites the structure could be adjusted to ensure that records are retained for all feasible needs, noting that circumstances can change over the life cycle of a project or site. Creation of a land quality file does not require the duplication of work. Where information is held in other controlled documents, these can be referenced under the appropriate section of the land quality file. The proposed structure draws from and expands on that of the land condition record and is as follows:

1 Overview document

1.1 Land name, descriptors and boundaries

1.2 Key features of site setting, history, contamination, remediation, current and future use

1.3 Gaps in information

1.4 Caveats on information (including critique on quality of reports, practical experience on reliability of records and superseded interpretations)

2 Document management information

2.1 Record of additions and changes

2.2 Metadata

3 Land referencing information

3.1 Property location information (including descriptions and grid references)

3.2 Plans of property (showing site boundary, nuclear licensed site boundary and wider landholding if applicable)

3.3 Photographs

3.4 Contact points for relevant public sector organisations

4 Current and future land use

4.1 Current land use information

4.2 Current site drawings, plans and photographs

4.3 Current service drawings

4.4 Future plans for land use

5 Surrounding land

5.1 Description (including maps and photographs)

5.2 Current and past use of surrounding land (including details of any protected habitats)

5.3 Ownership/occupation/possible future changes of surrounding land

6 Surface waters and groundwater

6.1 Surface water description (including artificial drainage, drainage plans, classification, quality, flow, discharge and abstraction data)

6.2 Groundwater description (including classification, quality and abstraction data)

6.3 Coastal waters description (including classification, quality, discharge and abstraction data)

7 History

7.1 Uses of land/phases of site life cycle (up to, and including, present use)

7.2 Details of operational history for each use/phase (including operational activities, nature and location of materials storage, waste management storage on-site and disposal routes, accidents, leakages or spillages, licence or authorisation for operation as waste management facility or industrial installation, environmental monitoring reports, enforcement actions or notifications, past site drawings, plans and photographs)

7.3 Previous actions carried out on land (filling/recontouring, decommissioning, demolition, remediation)

7.4 Other influences on land (eg sources of natural contaminants)

8 Desk study and factual investigation information

- 8.1 Geological, hydrogeological and geotechnical information
- 8.2 Land quality desk study findings
- 8.3 Contamination investigations, including analytical results, descriptions of ground conditions and photos of trial pits and borehole cores
- 8.4 Non-intrusive radiological surveys
- 8.5 Explosive ordnance/munition surveys
- 8.6 Land quality information from historical pre-use surveys
- 8.7 Land quality information on current non contaminated areas, including previous clearance/delicensing surveys
- 8.8 Pollution prevention and control regulation site reports

9 Live index of areas of potential concern

- 9.1 Contaminant source terms and areas of potential concern

10 Time-series monitoring results

- 10.1 Groundwater and soil gas monitoring programme results
- 10.2 Pollution prevention and control and other regulatory site protection and monitoring programmes

11 Interpretations and assessments

- 11.1 Conceptual site models and validation
- 11.2 Environmental risk assessments
- 11.3 Other interpretative activities including modelling
- 11.4 Time series monitoring trends, fluctuations and anomalies

12 Management of the contaminated land

- 12.1 Management and planning structures and processes
- 12.2 Short-term measures to monitor and control any identified contamination (including arrangements for risk management/ contaminated land safety cases)
- 12.3 Establishment of long-term management strategy and priorities for action
- 12.4 Establishment of preferred long-term management options for specific areas (including decision records)
- 12.5 Long-term management methods implemented for specific areas (including any remediation/intervention actions taken for each source of contamination)
- 12.6 Material movement tracking to minimise waste generation
- 12.7 Identification of wastes and their management and disposal on and off the site
- 12.8 Records of any imported materials used for backfilling voids and landscaping
- 12.9 Records for decommissioning and decontamination of residual below-ground structures
- 12.10 Validation activities (including post-remediation verification surveys of land condition)
- 12.11 Management manuals and maintenance records associated with remediation schemes
- 12.12 Regulatory correspondence and approvals

12.13 Termination documents such as reports for delicensing, revocation of RSA waste disposal authorisation, landfill completion and pollution prevention and control permit surrender

12.14 Achievement of final end-state (including decommissioning reports to show how the objectives of the decommissioning plan have been achieved)

Annex 1 Record of regulatory authority information relevant to the land

Annex 2 Record of site owner requirements/contractual information

Annex 3 Record of desk studies and investigations

Annex 4 Record of stakeholder involvement

Annex 5 Other references

Annex 6 Copies of other key documents

This file will be a live management tool and it is anticipated that Sections 1 and 2 (the *Overview document* and *Document management information* sections) will be used to provide stakeholders with an up-to-date picture of the land quality status of the site and a guide to the available information. These could be easily adapted to provide publicly available summaries such as contaminated land position statements and annual reports. Subsequent sections are structured with the source – pathway – receptor model of assessing contaminated land in mind, recognising this to be a dynamic feature of the sites.

Information on the site and its surroundings given in Sections 3 to 7 provides the context and foundation for subsequent land quality assessment and decision-making. Even if remediation has taken place on a site, it is this material that future stakeholders will come back to in order to gain understanding and confidence in the condition of the land. The importance of recording drawings and photographs is emphasised. These can be some of the most useful sources of information, but also some of the most difficult to capture.

The overall aim of Sections 8 to 11 is to build up a comprehensive body of information, including a realistic conceptual model and a robust risk based analysis of the data. Section 9 is intended to be a live document that keeps track of knowledge on areas of potential concern, some of which may have been identified in a desk study then closed out by subsequent investigation or remediation. Section 10 will enable the build up of a time-series picture of the changes in land quality on sites that have groundwater and/or soil gas monitoring programmes. The results of these should be used to update, confirm or challenge the interpretations and assessments in Section 11. Section 11 will contain the records that document the site's understanding of the significance of ground contamination. Each iteration of a conceptual site model and other assessments and interpretations should be recorded so that the development of thinking can be traced over time. It is important to distinguish any aspects of interpretation that have been superseded. Section 1.4 of the initial overview document should be used to highlight "upfront" the current interpretations that are being used as the basis for management of ground contamination.

Section 12 draws together the planning, management, remediation and/or delicencing actions taken to address land quality issues on the site. It should be used to systematically record the following:

- management and resource planning structures

- measures taken to monitor, control and minimise contamination
- steps in the development of long-term management strategy (objective setting, options appraisal and decision-making)
- information on the implementation and verification of actions to meet stakeholder requirements.

The annexes are intended to provide relevant background on the requirements imposed on the site and to give a logical and comprehensive record of the processes used to characterise and manage the land quality interest. They should also provide detail about the records (for example, information on the purpose for which the records were originally collected) and cross-references to other relevant records. Annex 3 could be used to provide a live index of land quality documents.

Although the concept of a land quality file draws on elements of the LCR, its aim and scope go further. Whereas an LCR aims to provide a concise factual picture of the condition of the land, the land quality file provides a structure for all relevant records, including interpretative information. The two systems are complementary, with a land quality file making it easier to produce an LCR if one is required. The format of an LCR is quite prescriptive in order to meet its objective of providing a standardised report (see Appendix 10). In contrast, the content of a land quality file can be more freely adapted, within the scope outlined, to meet the needs of a specific organisation and site. For example, some sites may wish to subsume the annexes into the main body of the land quality file.

The land quality file for a site is intended primarily as a means of organising diverse types of information (historic, recent, factual, interpretive) and identifying gaps to be filled by ongoing or future work. It is not suggested as a structure for a 'live master report' that summarises or replicates information held elsewhere. This would be unworkable for all but the most straightforward of the sites covered by SAFEGROUNDS. Overall the contents of the land quality file should provide an "audit trail" for the land quality management processes followed, eg as applicable from SAFEGROUNDS *Land management guidance* and CLR11 (Environment Agency, 2004). It should enable stakeholders to find out the extent of available information, to understand what has been done and to engage in the future management.

The LCR has the concept of "parent and daughter" sites to cope with the fragmentation of land holdings for redevelopment. The land quality file could also be subdivided by area for complex sites or where site responsibility is split up.

The management of the file, involving QA, change control, referencing, reporting, archiving, etc can be implemented in a way appropriate to the site concerned, taking full account of the good practice principles outlined in this and the wider body of SAFEGROUNDS guidance. The need for verification by an accredited contaminated land professional such as a SiLC will not be necessary, though perhaps desirable, but regular structured and documented auditing will be required to demonstrate that the land quality file is kept accurate, up-to-date and accessible.

4 Record keeping systems and associated protocols

4.1 Records management

4.1.1 Introduction

The organisations responsible for land quality record keeping on nuclear-licensed or defence sites have existing records management systems. The guidance here is not intended to challenge the knowledge of current practitioners or records management professionals in these organisations, but instead attempts to signpost good practice in the handling and processing of records and information. Particular attention is given to the point of interface between the contaminated land managers and those charged with managing the information for present day and future reference. A case study on the long-term record management strategy at BNG Sellafield and its associated challenges is given in Appendix 7.

Experienced and qualified personnel are required to manage records. The Lord Chancellor's *Code of Practice on the Management of Records* under Section 46 of the Freedom of Information Act (Lord Chancellor, 2002) is a standard reference on record keeping and should already be in use by all those involved in record keeping for bodies subject to the Public Records Act. The Code of Practice is also supported by a "compliance workbook" and model implementation plans (National Archives, 2006). There is more detailed guidance available in the British Standard on records management (British Standards, 2001).

The contents of a land quality file, or any other contaminated land records structure, should be kept referenced, registered and updated in the main records management system of the organisation concerned to enable its proper maintenance, access and preservation. To effectively and efficiently provide information to users, organisations have established systematic record keeping systems for:

- creating new records
- organising records in a logical order
- actively managing the records
- inactively managing records that are not frequently used
- reviewing old records and either destroying those no longer required, or permanently storing those of legal, historical or other significance, or transferring those suitable for preservation in a public records place of deposit (archive).

4.1.2 Life cycle and system requirements

A consistent approach across the whole of a records life cycle is fundamental to providing clear and reliable records. Well produced policies for record keeping combined with automated procedures and systems reduce the potential for losses or inaccuracies and help to maintain the integrity of information in the long-term. In particular, site operators and licensees need clear, transparent and well peer reviewed arrangements to ensure that decisions on retention and disposal (disposition) are appropriate and formalised.

The records life cycle (denoted in Figure 4.1) is commonly used to represent the key stages in the life of a record.

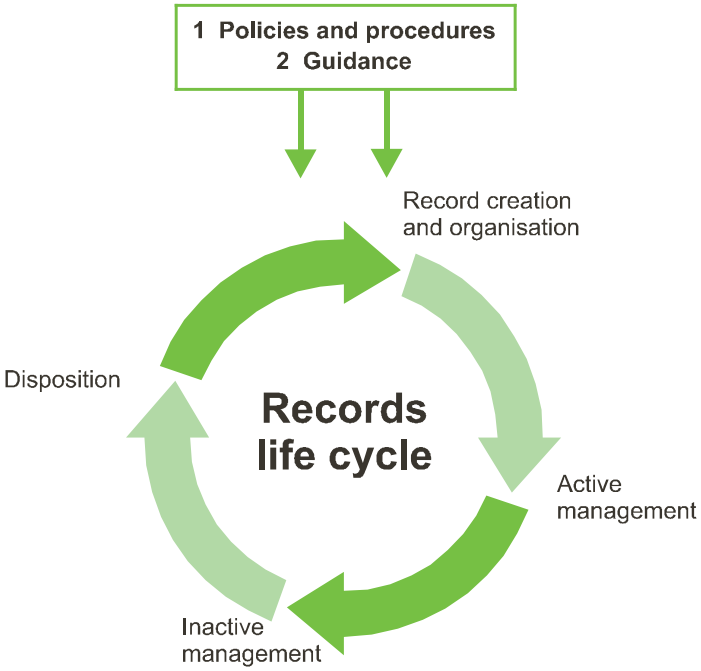


Figure 4.1 The records life cycle

Transferring knowledge from one generation to another is a significantly greater challenge than simply preserving information, requiring more than just the physical transfer of digital and hard copy records. Figure 4.2 provides a graphical representation of the "spheres of influence" or the "why, what and how" aspects of the records management environment. It highlights the interrelationship between stakeholder requirements and expectations (why), the technical information produced as a result of land quality management activities (what) and the records management systems (how).

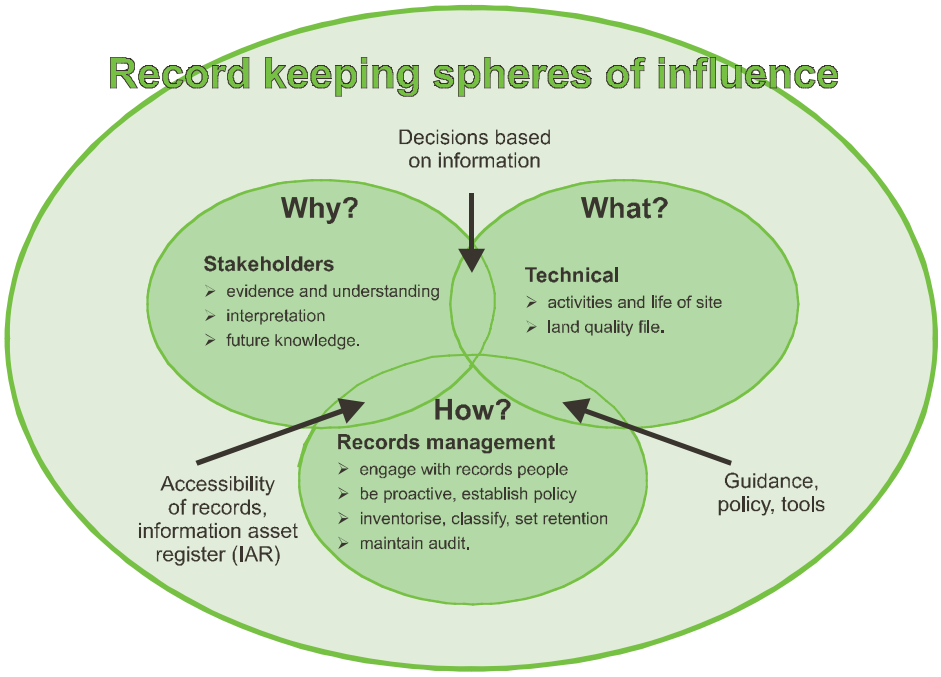


Figure 4.2 Record keeping management environment

The starting point is creating records for the activities on-site in the land quality file. Data about the information ("metadata") and how long it needs to be managed for will also need to be recorded by records classification in the organisation's record management system. While in active use in the technical sphere the land quality records will be kept on-site, but when in their inactive stage the records will probably be kept off-site. Stakeholders will wish to access the information in both stages of the life cycle, possibly via an electronic document management system. Information on their interpretation and the use of the records may also have to be captured and added to the records. The records management system has to enable all these interactions to take place in a controlled and reliable way, so preparation is important. Efforts should be taken to establish systems to meet current and future needs, and where possible the system should be sufficiently flexibile to adapt to requirements not anticipated from the outset.

4.1.3 Processes, policies and procedures

A common problem, especially when records management is in its infancy, is that participation in the records life cycle is reactive rather than proactive, ie individuals will process records in a variety of discretionary ways with no overall planning or foresight. If this is not addressed, it is likely to severely hamper the organisation's ability to meet its record keeping requirements.

Businesses and personnel change over time. If there is no effective process in place to enable successive users to locate records, there will be a clear business continuity risk because the likelihood is that without the record creator items will not be found. Relying on an individual's local knowledge without any effort to commit this knowledge into a coherent and documented records management system will hinder further plans. Should any key individuals be temporarily absent or choose to leave their posts, uninformed individuals will be forced to use unfamiliar and potentially fragmented systems. In the best case this is likely to cause delays in the retrieval of information and in the worst case this may result in the failure to locate information and potentially cause further disruption/fragmentation of the system.

One of the primary roles of a records management programme is to provide services that support the organisation's ability to meet its information needs. Effective record keeping systems require good information management and retention schedules to enable information to be located on request and to ensure the information is kept for the appropriate period. Such systems will typically cover the following record keeping processes:

- records creation and capture
- registration
- classification
- storage and handling
- access and use
- tracking
- disposition.

These processes require consistently applied policies and procedures to "operationalise" or "bring to life" an organisation's records management programme. It is incumbent upon land quality managers to ensure compliance with the appropriate policies and procedures in their area. Simply having an organisational records management policy is not sufficient, workers must use the organisational records management programme in a way that becomes second nature.

Each team should participate in audits to monitor compliance with the records retention policy, records retention schedule and records management procedures, working in conjunction with the records officer. It is suggested here that compliance audits should be conducted at least once each year. As a minimum the audit should verify that:

- hardcopy records sent to inactive records storage are adequately indexed to support timely retrieval
- vital records are being adequately protected
- electronic records, including email, are being properly managed
- records management training is being provided to all personnel with any kind of responsibility for records.

Within the MOD *Defence Records Manual* JSP 441 states in its section on electronic records that "The objective of audit is to ensure that appropriate measures are employed to monitor and document operations and any deviations from designated standards and methods of operation. It is important that all of the procedures used to achieve long-term preservation of electronic records are auditable. This means that procedures must be clearly defined and responsibility for their being carried out assigned". JSP 441 also states that "audit activities should be triggered by particular events or on the transfer of records".

Where areas of non-compliance are discovered, teams should take action to address them and bring them into compliance. Follow-up compliance monitoring should be conducted to verify that all areas of non-compliance have been adequately corrected. Further guidance for inspection of record keeping arrangements is also given in Appendix 2 (HSE, 2002).

4.2 Records organisation

4.2.1 Records registration and classification

The first step in getting land quality records locked into the organisations record management system is to produce a records inventory. A records inventory is a complete and accurate listing of all the locations and contents of the records – whether paper or electronic. Producing a records inventory is a critical first step because it not only identifies but also quantifies all the records held. Ultimately, the records inventory becomes the working document (or database) for preparing a records retention schedule.

A records retention schedule is a tool that organisations use in order to guarantee that records are kept as long as legally and operationally required and that obsolete records are disposed of in a systematic and controlled manner. Groups or classes of records are listed on the schedule along with the approved retention period for each record group. The records retention schedule is intended to ensure that employees adhere to approved record keeping requirements, and do so consistently. The content of a land quality file is a guide as to what should go into an organisation's retention schedule. Most items will be required indefinitely, but guidance or instruction should be given on retention times or trigger events for records that do not need to be held permanently.

Although generally organisations are interested in identifying their record inventory as thoroughly as they can, most cannot afford the time and costs required to list the titles of every single record. For purposes of evaluation, the inventory usually lists record classes that summarise the content of many records that are filed together or used similarly. The record classes are a subset of the total record classification scheme.

Large organisations, for example, may have several thousand record titles, but just a few hundred record classes. Table 4.1 illustrates how using record classes makes the inventory process more manageable than specifying individual record titles. It also shows how creation of land quality record classes along the lines of the proposed land quality file structure could work.

Table 4.1 Example functional classification structure

Record function	Record class	Record title
Accounting	Accounts receivable Accounts payable	ABC Company order DEF telephone bill
Legal	Service contracts Leases	Fax machine contract Lease for 123 Mountain Drive
Personnel	Employee files Job applications	J Doe employee Jan to Feb 2003 job applications
Operations	Quality assurance	Year 2000 quality control sheets
Land quality	Land referencing information Current and future land-use Surrounding land Surface waters and groundwater History Desk study and factual investigation information Areas of potential concern Time series monitoring results Interpretation and assessments Management of the land quality Annexes	Property location plans Current site drawings and plans Maps and photographs Groundwater vulnerability map Incident reports 1990–2000 Contaminated land investigation 2005 APC Log Groundwater quality and abstraction data 2006 Groundwater risk assessment Decision records of option decision-making Site owner requirements

It is possible to incorporate "project specific" material within the wider classification approach illustrated above. This would enable project specific records to be shared by the whole of the project team subject to access privileges.

BS ISO 15489 (British Standards, 2001b), the first international standard on records management, suggests that by following this functional approach to classification the classifications will reflect the business purpose of the information thereby providing a basis for making correct decisions about records. These decisions are usually reflected in policies that direct the management of records and information throughout the life cycle.

Specifically, a classification scheme:

- **simplifies the assignment of retention periods to classes of records**. This facilitates consistency and accuracy, and ensures that records are retained for as long as they are required
- **facilitates indexing of the organisation's active filing system**. Grouping records in an efficient filing system improves access and ultimately facilitates consistency and accuracy
- **enables an orderly transfer of records from active filing to remote storage**. This means improved efficiency and productivity, as well as consistent volume reductions

- **provides input for media decisions**. Selecting appropriate storage solutions for an entire classification of records achieves cost savings and ultimately facilitates improved productivity
- **establishes a vocabulary for organising and implementing records management practices**. This means greater consistency and accuracy, especially when training employees within the organisation.

The land quality file will reference and contain records not originally collected for land quality purposes and a decision will have to be made whether to duplicate this information in the land quality record function or instead to provide a signpost to where it lies in other record functions. In general most information referred to in the land quality file should sit in the land quality record function, even if this requires duplication, to ensure coherence of the record set, ease of access and retention of data no longer needed for its original use. For information that primarily sits in another record function this may cause difficulty in ensuring the most up-to-date version of information is held, for example current site service drawings. However, this should not be a great problem as building up a picture of land quality requires an understanding of all the past configurations of the site. Where use of current data is essential, for example in avoiding service locations when drilling boreholes, contaminated land workers must recognise the need to check they have the most up-to-date version that may be held elsewhere in the records. Working procedures, such as the gaining of permits to excavate, should ensure this takes place where there may be safety or environmental protection implications.

4.2.2 Records access

Organisations need the ability to access records by multiple indexing parameters such as subject matter (content and context), record creator, intended recipient, date, etc. Proper indexing methods are one of the easiest ways to recognise significant returns on investment. Well-indexed records ensure easy access and improved overall efficiency.

Access and indexing are dependent on one another because records must be properly organised to enable timely, accurate and controlled access. An index in a book directs the reader to a specific page, a records index directs the record user to the particular place where the required information is located. The location may be a paper or microfilm filing system or an electronic storage location, such as a network directory or electronic document management system. Once the record location is identified, access can be authorised by various security controls.

Box 4.1 *Email*

Email is often treated as an informal method of communication. However, it should be recognised that emails capture the exact date, time and addresses of sender and recipient – a potentially permanent electronic footprint. The same obligations and rules apply in terms of compliance and retention that affect traditional hard copy communications. Email and all relevant attachments must be managed as part of the whole land quality file. Storing email and other electronic records on backup tapes will not meet regulatory, legal and business access requirements. Backup tapes are designed for disaster recovery; they were never designed for retention or low-cost, long-term archiving of electronic records. Email records should be transferred to a digital archive designed for low-cost, long-term archiving. This archive should have tools for easy searching, organisation and retention management.

Metadata, commonly referred to as "data about data", is used to tag or describe data as an aid to the management and control of records over time. In particular, metadata supports record retrieval by providing information on the contents, context and usage of data.

Metadata records describe data sets in sufficient detail for a user to:

- know enough about each data set to understand what it contains and how the data might be used
- have a means of sifting through a series of data sets to find the specific data that the user needs
- maintain an accessible repository in which data can be preserved and from which they may be accessed.

(ICF Kaiser, 1998)

It may help to conceptualise metadata as the indexing information for traditional paper based records with additional attributes to manage the content. Examples of metadata from the UKAEA records are given in Appendix 8.

The more metadata that a system can hold, the easier it is to define records as unique. This facilitates efficient retrieval and also allows future users to gain a more comprehensive understanding of the information contained within the record. As people interpret and add intelligence to records the metadata can change and/or grow to reflect new understandings. Over time this supports the prioritisation of records within the context of land condition, site restoration and site end points, and allows for more effective management of land quality.

Reference information on metadata can be found in the *National Archives Requirements for Electronic Records Management Systems* (National Archives, 2002). In order to introduce a degree of commonality and consistency in records management across NDA owned sites, the NDA are working on a project to produce a metadata database – the Information Asset Register (IAR). This will be created and owned by the NDA but will require contributions from all SLCs who will still be responsible for the management of records on their sites. The IAR will give the NDA a clear understanding of the types of records being created across their sites.

Searching for the latest copy of a document can be frustrating unless appropriate systems are in place. In the absence of an electronic document and records management system (EDRMS) or other suitable system that verifies the latest version of a record, it is suggested that MS Word and macro forms are used to create templates for key records. Macro enabled fields are updated by the user but help should be sought from an IT department to set up these templates.

Users should be prompted to input the minimum attributes:

- title (can be picked up from document properties)
- date (can be picked up from document properties)
- author (can be picked up from document properties)
- version.

4.3 Active records management

The period of active records management can range from a few days to several years depending on the type of record and its intended use. During this phase the success of a records management programme hinges on the ability to access information efficiently. Consequently, decisions on appropriate filing methods and media formats need to take account of the needs of the information users. For instance, it may be necessary to maintain frequently accessed records in the office area. Currently,

electronic applications provide the best possible means to establish controlled system access to a large population of users. Internet-based applications can be used to extend records access while still allowing the records manager to control who accesses the information.

Protection of the "base" record should be built in, with access provided to a "working copy". If records need correction or updating during the active phase, a suitable authorisation arrangement should be put in place and enforced to ensure that record integrity and version control are maintained.

4.3.1 Physical vs electronic media

The choice of which media format to use will need to take account of a range of factors including:

- the frequency of access required
- the speed of access required
- the volume of records to be managed
- the size of user population
- the geographic dispersion of users.

Highly active records will generally require a storage medium that facilitates ease of access. When dealing with large volumes of records, electronic formats will facilitate access for the greatest population of users. Where the speed of access required is low records can be stored off-line. For small volumes of records, even highly active records, it is usually economical to manage them in hard copy form.

Generally speaking, organisations which maintain large volumes of paper records in-house or in multi-purpose self storage facilities experience the most problems with retrievability. The management of records in the nuclear industry is a considerable task not least because of the volume and diversity of paper records kept. Transfer to a medium other than paper can be very attractive and there are no legal barriers to this provided certain safeguards can be met, particularly with respect to the quality and accuracy of images created.

Scanning documents and storing them as digital images may be more costly than retaining the documents in paper form. The added costs of document imaging are often best justified when:

- fast retrieval of documents is required either from a remote location or simultaneously from multiple locations
- workflow processes can be established in conjunction with the imaging system to enforce common procedures, prevent lost documents, and provide verification of proper and timely processing
- the source documents are too voluminous or cumbersome for everyday use. In such cases, the originals can be scanned and then sent to secure storage, while the digital images are used as the "working" versions
- the source documents are irreplaceable or too valuable to be subjected to everyday use. In other words, scanning documents is crucial to the protection of the record. Again, in such cases, the originals can be scanned and then sent to secure storage, while the digital images are used as the "working" versions.

When transferring records from hard copy to electronic formats, site owners and operators should give careful consideration to the legal and commercial risks of doing so, particularly with regard to the disposition of original records that have been copied into electronic form. Current thinking is that it would be surprising if a company was to conclude that all its documents were suitable for imaging and destruction. It would be equally surprising if it were concluded that none were. Some original records have to be kept as a legal obligation. For example, documents such as consents, approvals, HSE specifications, licence instruments, the licence itself and safety cases should be kept as original documents.

With respect to the use of records as evidence in court, the two factors to consider are admissibility and the weight that the court gives to the evidence. It is the accepted view that electronic records will be admissible, particularly if they have been properly managed and controlled. Copies of documents, photographs and microfiche have been admissible for years. It is the weight that the court gives to the evidence where there is greater uncertainty. Where an original document is available this should be produced (HSE, 2000). The BSI have produced a *Code of Practice for Legal Admissibility and Evidential Weight of Information Stored Electronically* (British Standards, 2004).

Ultimately, organisations require a record management system that provides:

- users with an appropriate level of access to records
- users with records in a format that supports them in carrying out their daily work
- secure and controlled access
- maintains document history
- flexible search capabilities.

To future proof their records management programme, organisations should look for flexible technological solutions that are scalable and can be adapted to keep pace with future developments. There are potential risks of proprietary electronic tools and data formats being no longer available in the future and inflexible solutions may suffer from eventual obsolescence and prove costly.

4.3.2 Geographic Information Systems (GIS)

The ability to provide information on land quality issues within the geographic context of the site can enhance the understanding of users and support engagement with stakeholders. Contaminated land reports often contain numerous references to boreholes or trial pits, chemical results and locations on-site. The usual result is that decision makers seldom get a clear picture of the problem and the issues involved, which can lead to uncertainty on what should be done. The use of Geographic Information Systems (GIS) enables the information provider to illustrate to the user the spatial distribution of information and the relationship of one piece of information to others. The use of GIS has proven to be a powerful tool in achieving shared understanding of information and consensus in decision making. Increasingly, large amounts of monitoring will be required to demonstrate the validity of chosen land quality management strategies, and the use of GIS is likely to have an important role in presenting the data in a clear and meaningful way. The UKAEA IMAGES system is an example of a GIS and database system developed for contaminated land management, see Appendix 5.

While GIS systems can be powerful land quality management and assessment tools, they are not always ideally suited for use as an archive for records. Difficulties can arise where their construction is bespoke to a site and if the software becomes outdated. For

example, a state of the art GIS system developed for a former chemical weapons production and atomic research site in 1998 was found not to be maintainable by a team brought in to record the site's history in 2005 following site remediation. Data was stripped out of databases and individual files where readily apparent to the team, but the complex and by that time obsolete system blocked the retrieval of much of the valuable descriptive/contextual information. As a result, it may be difficult for users of the retrieved information to appreciate its significance if the original GIS fails. This could be a problem for any GIS system that does not allow data export using standard formats.

More recent advances in GIS technologies have seen a shift towards integrating GIS systems with mainstream database formats. Instead of GIS systems storing data in proprietary bespoke formats, they are increasingly relying on databases to perform the data storage and management operations. The GIS is then only used for spatial querying, analysis and graphical presentation. Many GIS systems are now based on industry-standard database formats such as Oracle and SQL Server. This has improved the longevity of this type of system and has also opened up opportunities for the integration of GIS with other database systems. As with all IT systems, ongoing maintenance and support, and planning for the eventual transition from an operational to an archived state is essential to safeguard and maximise their future use.

4.4 Inactive records management

During this phase records are consulted infrequently. To reduce costs and free up valuable office floor space the records are usually stored in a "non office" area. This can be securely out sourced to a reputable commercial records vendor that has specific expertise to facilitate the transfer of records to inactive records storage and to manage the retrieval and refiling process.

Fragmented systems by nature incur higher maintenance costs than consolidated systems due to the need for the continual cross-referencing of data and sub systems. Productivity may also suffer as a result of inefficient searches for files and boxes. Usually there is a need to establish a consolidated records management system that links the organisation's records to its record classification scheme. This is another driver for the creation of a comprehensive land quality file that can form a complete record class (see Section 4.2.1 for information on record classes).

An inventory management system is often the key to the successful implementation of this stage of the record life cycle. An in-house records management system should include some form of system for tracking the location of records in all formats. An outsourced supplier will often provide a bar coded tracking system that will track the movement of all records on the supplier's premises. There is potential for this type of system to be used in conjunction with an in-house bar coded tracking system for use on the customer's premises. From time to time circumstances may arise when the custody or ownership of a record changes either within an organisation or when the records are transferred from one organisation to another. To manage such a situation, the records management system should register the original owner of the record. This will enable either the change of ownership to be recorded or the records to be identified, retrieved and physically transferred to a new owner or custodian. The details of all such changes will be recorded permanently on a suitable system.

Appendix 3 provides an example of a generic set of practical guidelines for handling land quality records which may be amended to reflect the needs of a particular organisation.

4.5 Records disposition – archiving/preservation

The final stage of a record's life cycle involves either destruction or permanent storage. Records might be eligible for destruction when the organisation no longer needs them and when there is no longer any legal or stakeholder requirement to keep them. The difference between an archive and an inactive records centre is that while the inactive records centre stores records for operational and legal purposes, the archive stores records purely for historical and research purposes. In addition to scholarly research, which could include informing future land quality decisions, an organisation's archives are often used for public information purposes.

For government departments, such as the MOD, the statutory obligations for records disposition are set out in the Public Records Acts of 1958 and 1967. These place a duty on all government departments to review the records which are generated within the department, to select those which are worthy of permanent preservation and transfer them to the National Archives, and to destroy all records that are not selected. The 1967 Act stipulates that all surviving public records should normally be released to the public 30 years after their creation. There are exemptions to the 30 year release rule, usually on the grounds of continuing administrative requirements or sensitivity, but these need approval by the Lord Chancellor. The Lord Chancellor can authorise the transfer of public records to places other than the National Archives if it is thought that, for some reason such as their technical nature or their special local interest, they would be more suitably preserved there. The National Archives should be consulted about proposals to make such transfers, since the Lord Chancellor´s consent will depend on his being satisfied that the proposed place of deposit is suitable and that the authority responsible for it agrees.

The NII requires that site licensees retain permanent records for at least 30 years. However, most land quality records will be archived or permanently stored to provide an audit trail, which assists and builds confidence in the long-term management of the land. The reference document T/AST/033 (HSE, 2000) points out some of the legal and commercial risks that a nuclear site licensee takes in deciding to destroy records. Site operators and licensees need to ensure they have clear, transparent and well peer reviewed arrangements to ensure that decisions on retention and disposal are appropriate and formalised.

Box 4.2 *National Nuclear Archive (NNA)*

A project by the NDA to create a National Nuclear Archive (NNA) is being planned for the future. This will establish an industry-wide information and records store "where data of historical and local interest can be managed effectively and made available to as wide an audience as possible". (pers. comm. Simon Tucker, NDA information manager, 2006). However, the project is still in its early stages and is currently subject to the completion of a feasibility study to accurately scope the work needed to bring the project to life. Site licence companies and stakeholders must be clear that the purpose of the NNA will not be to manage their operational records. Site licence companies are entirely responsible for the management of records on the sites they operate up until de-licensing and should not anticipate a transfer of records to the NNA until such time as those records are suitable for inclusion in such a facility.

A certain amount of archived material may be designated for preservation in the records retention schedule. If a record is assigned a permanent retention period, there should be a clear justification for this decision.

4.6 Protection, confidentiality, access and security controls

Effective maintenance of records should ensure that, irrespective of format, they receive adequate protection from fire, flood, theft, corruption, unauthorised alteration and other forms of catastrophic loss. The maintenance regime should also ensure that the records can be easily located and retrieved when required (National Archives, 2006). In addition security procedures must be established to ensure the confidentiality, availability and integrity of protectively marked records. This includes both physical security and security of IT systems which may require formal security accreditation. BS ISO 15489 (British Standards, 2001) is clear that control measures may exist within a particular system or be external to it.

External records centres should have as a minimum:

Fire protection

- sophisticated fire detection systems linked directly to a central monitoring station
- Loss Prevention Council (LPC) approval
- full system generator backup
- optical and ionisation fire detectors
- no smoking facilities
- basic fire fighting training for all employees
- fire drills undertaken quarterly and supervised by nominated fire wardens
- routine testing and inspection of the fire systems in accordance with BS 5839 *Fire Detection and Fire Alarm Systems for Buildings. Code of Practice for System Design, Installation, Commissioning and Maintenance* (British Standards, 2002a)
- fire suppression using a double knock water sprinkler system (paper based records)
- inert gas fire suppression within magnetic media
- off-site data protection storage areas and specialist storage areas.

Physical security

- minimum 2 m high perimeter fencing
- CCTV cameras monitoring all access points and the building perimeter
- PIR (passive infrared sensor) security lighting
- external doors and windows fitted with electro-magnetic blocks, linked to the alarm system.
- intruder detection systems linked to a central monitoring station
- 365 days per year manned security
- access to facilities restricted by a secure entry system
- visitors allowed on-site only with a prior appointment
- proof of identification requirements for visitors
- accompanied access to storage areas only.

Freedom of information is required to achieve transparency and confidence, which is a guiding principle for public bodies. Public recording of land condition and remediation would also be required for any sites falling under the EPA90 Part IIA or planning regimes. Exemptions are allowed under the Freedom of Information (FOI) Act, such as on the grounds of national security, and health and safety. It should be noted that information is not necessarily to be withheld simply because it has a security classification. FOI exemptions are issued on a case by case basis.

Security at nuclear sites is kept under regular review in the light of the prevailing threat to security. The threat levels have been significantly enhanced since the terrorist attacks in the USA on 11 September 2001. The security of sensitive nuclear information, such as site security arrangements, is covered by the Nuclear Industries Security Regulations (NISR, 2003), though premises used for defence purposes are excluded from the scope of the Regulations. A person to whom these regulations apply must "maintain such security standards, procedures and arrangements as are necessary for the purpose of minimising the risk of loss, theft or unauthorised disclosure of, or unauthorised access to, any sensitive nuclear information within his possession or control". The Anti Terrorism Crime and Security Act (Section 79) is also relevant.

The Office for Civil Nuclear Security (OCNS), which is part of the Nuclear Directorate of the HSE, is the security regulator for the UK's civil nuclear industry. It has published a guidance document to assist officials and others involved with the civil nuclear industry to manage the risks associated with compliance to their legal obligations. The document entitled *Finding a Balance* addresses how to reconcile the needs of security with the needs of those who require or have a legitimate interest in the information being available (OCNS, 2005). Those regulated by OCNS are required to comply with the classification guide CWP/G8 – *Information Concerning the Use, Storage and Transport of Nuclear and Other Radioactive Material*. They are also required to protect information in accordance with the *Manual of Protective Security*, commensurate with the protective marking of the asset. Official disclosure of information concerning nuclear materials, other radioactive materials and the facilities that contain such material should be considered only after this guide has been consulted.

Overall, records for public release need to be generated to be as free of sensitive security content as possible. In the context of nuclear licensed sites this means avoiding the inclusion of information that could be used by terrorists as targeting information. This includes references in plans, text and photographs, information on security features (fences, cameras, guardforce, etc), details of building functions and details of the materials stored within buildings.

Details of the construction and layout of stores and process areas relevant to the prevention of theft or sabotage, including drawings or plans held on any media, merit a protective marking. For Category I & II sites, vital areas and nuclear power stations the protective marking should be "confidential" and Category III & IV sites merit a protective marking of at least "restricted". The type of detailed information contained in safety cases and the BRIMS database would attract a protective marking of at least "restricted".

The security and control of sensitive information is only achieved by maintaining an organised and compliant records management programme which allows access to authorised personnel only. To minimise any business interruptions that may be caused by inappropriate use of an organisation's computers, employees should be well-versed in computer operating and security policies. The intention should not be to encumber the use of computers, but rather to protect the resources of the organisation and confidential information held within records. Computer users should take reasonable precautions to prevent unauthorised access including, logging out of systems when leaving their work area, not leaving access information in areas where it may be compromised, not sharing passwords and account information, and using "locking" functions where available when systems must be left unsupervised.

4.7 Storage environment for different media types

Summary information on types of record keeping media and their preservation is provided by the NII for the benefit of its inspectors (HSE, 2000) and relevant sections from this are reproduced in Appendix 4. It draws on references from BS Standards and IAEA publications, but is slightly dated in respect of electronic records. The increasing use of electronic records – everything from email to images – has created a strategic challenge for organisations today. The main area of concern surrounding the electronic storage of records is ensuring the validity and integrity of the data. The use of WORM (write-once-read-many) media, such as CD-Rom, and formats such as PDF/A goes someway to addressing the issue, but does not account for records held within database systems. *The Code of Practice for Legal Admissibility and Evidential Weight of Information Stored Electronically* (British Standards, 2004) sets out a standard for ensuring that electronic records are admissible in a UK court of law. The code's central ethos is that all records submitted to an archive are authenticated, cannot be altered and must be retrievable for the purposes of audit.

Data loss or inaccessibility resulting from technological faults or obsolescence are sometimes given as good reasons to avoid using electronic media for long-term storage purposes. However, with the advent of escrow agreements (legal agreements to protect software source code should the developer no longer support it) and continual technological advancements, electronic media is likely to play an increasing role in record keeping. The key to success is to choose a system that accepts software independent media formats. Reputable providers will be able to consolidate electronic records from a customer's system into a secure internet-accessible archive where records can be easily protected, authenticated, managed, searched and retrieved.

Paper has traditionally been the preferred choice of media for long-term preservation of records. As paper is an organic material it ages as its own constituents react with each other and with the atmosphere. This aging will occur even under optimum storage conditions. The rate at which paper ages is determined primarily by its exposure to changes in temperature and humidity, but the air quality (presence of pollutants) and exposure to light will have some impact. As temperature and humidity vary, the paper expands and contracts minutely and this, over years, weakens the structure of the paper.

Research has been carried out by a number of institutions into the performance of paper and other media in varying storage conditions. Recent research by the Image Permanence Institute based at Rochester Institute of Technology (New York, USA) has developed measuring techniques that enable predictions to be made when the typical annual range of temperature and humidity fluctuations is known.

Preservation index (PI) is a concept introduced by the Image Permanence Institute to express the "preservation quality" of a storage environment for organic materials, including paper. PI has units of years. The higher the PI, the better the conditions are for preservation of organic materials. In general the results of the Institute show that the temperature and humidity ranges exhibited in a typical temperate Northern European climate do not significantly accelerate natural aging, provided the material is stored in a reasonably stable environment ie avoids extreme fluctuations of temperature or humidity. As a baseline, if modern paper records are stored permanently in a typical office environment with a temperature of 68°F (20°C) and relative humidity at 45 per cent (ie set for human comfort rather than simply storage), then it will take 50 years before significant deterioration occurs. Significant deterioration would be noticeable discolouration or embrittlement, with some risk of

losing functionality. If both the temperature and humidity detailed above can be reduced, then the length of time before significant deterioration of the paper will increase.

By taking the temperature and humidity readings over a period of time - say a year - it is possible to average these and, assuming that the measurements for one year will be broadly the same in coming years, predict how long it will take for paper to begin to deteriorate.

Modern record warehouses are constructed for high-density storage with records held in boxes. These are generally large weatherproof buildings. A warehouse creates a significant mass that is very slow to react to temperature fluctuations – in particular diurnal variations. The fact that records are boxed further reduces the impact of temperature and humidity fluctuations as well as virtually eliminating the impact of air pollutants and ultraviolet light exposure. The environmental conditions in these facilities do not encourage mould or fungus.

The conditions within these facilities coupled with the typical temperature and humidity ranges experienced in our temperate climate generally ensure that even modern acidic paper will not begin to show deterioration for at least 60 years. Appendix 6 gives a case study of the migration of Nirex letter of compliance (LOC) records onto archive-grade paper and their transfer to a managed archive facility.

Suppliers can provide highly secure facilities to store both physical and electronic records. The supplier should provide appropriate storage environments that meet the specific standards required for particular record media types. These could include BS 5454 *Recommendations for the storage and exhibition of archival documents* (British Standards, 2002b); BS 1153 *Processing and storage of silver-gelatin type microfilm* (British Standards, 1992); BS 1143 *Secure storage units. Requirements, classification and methods of test for resistance to burglary* (British Standards, 2001a) and BS 4783 *Storage, transportation and maintenance of media for use in data processing and information storage* (British Standards, 1988).

5 References

Cabinet Office (2005)
e-Government Interoperability Framework, Version 6.1
Cabinet Office, London

CIRIA (2000)
SAFEGROUNDS *Best practice guidance for site characterisation – a report from the SAFEGROUNDS Learning Network*
CIRIA W14, London

CIRIA (2002)
SAFEGROUNDS *Good Practice Guidance for the Management of Contaminated Land on Nuclear and Defence Sites*
CIRIA W22, London

ENVIRONMENT AGENCY (2004)
Model Procedures for the Management of Land Contamination
Contaminated Land Report 11, EA, Bristol

HSE (2000)
Record Storage
Nuclear Safety Directorate Technical Assessment Guide T/AST/033 Issue 001 HSE, Bootle

HSE (2001)
Management of Radioactive Materials and Radioactive Waste on Nuclear Licensed Sites Appendix 7 Records for Radioactive Waste Management and Decommissioning
Nuclear Safety Directorate Technical Assessment Guide T/AST/ 024 /Issue 003, HSE, Bootle

HSE (2002)
Guidance: LC6 Documents, Records Authorities And Certificates
Nuclear Safety Directorate Technical Inspection Guide T/INS/006 Issue 001, HSE, Bootle

HSE (2006)
Safety Assessment
Principles for Nuclear Facilities, HSE, Bootle

IAEA (1996)
Document control and records
NUSS 50-SG-Q3, IAEA, Vienna

ICF KAISER (1998)
Managing Data for Long-Term Stewardship
ICF Kaiser Consulting Group, Washington p3-7

LORD CHANCELLOR (2002)
Lord Chancellor's Code of Practice on the Management of Records
Under Section 46 of the Freedom of Information Act 2000 Department for Constitutional Affairs, London

META GENERICS LTD (1994)
Information systems for land contamination
Contaminated Land Report 5, Department of the Environment, London

MoD (2003)

Defence Records Management Manual
MoD, JSP 441 <www.mod.uk/defenceinternet/home>

NATIONAL ARCHIVES (2002)
Requirements for Electronic Records Management Systems – 2: Metadata Standard
Public Record Office, Kew

NATIONAL ARCHIVES (2006)
Complying with the Records Management Code: Evaluation Workbook and Methodology
Public Record Office, Kew

NUCLEAR SAFETY DIRECTORATE (2002)
Guidance: LC6 Documents, Records Authorities And Certificates
Technical Inspection Guide, T/INS/006 ISSUE 001

NUCLEAR SAFETY DIRECTORATE (2001)
Technical Assessment Guide Management Of Radioactive Materials And Radioactive Waste On Nuclear Licensed Sites
T/AST/ 024 /Issue 003 March

OCNS (2005)
Finding a Balance: guidance on the sensitivity of nuclear and related information and its disclosure
Issue 2. Office for Civil Nuclear Security, Harwell

OCNS (no date available)
Information Concerning the Use, Storage and Transport of Nuclear and Other Radioactive Material
CWP/G8

ROCKY FLATS STEWARDSHIP WORKING GROUP (2002)
The Rocky Flats Stewardship Toolbox: Tools for Long-Term Planning
Rocky Flats Coalition of Local Governments, Westminster CO, pp 4-5

5.1 Standards

BS 4783:1988 *Storage, transportation and maintenance of media for use in data processing and information storage. Recommendations for disk packs, storage modules and disk cartridges*

BS 1153:1992 *Recommendations for processing and storage of silver-gelatine type microfilm*

BS 1143-2:2001 *Secure storage units. Requirements, classification and methods of test for resistance to burglary. Deposit systems*

BS ISO 15489-2:2001 *Information and documentation. Records management. Guidelines*

BS 5839-1:2002 *Fire detection and fire alarm systems for buildings. Code of practice for system design, installation, commissioning and maintenance*

BS 5454:2002 *Recommendations for the storage and exhibition of archival documents*

BIP 0008-1:2004 *A Code of Practice for Legal Admissibility and Evidential Weight of Information Stored Electronically* (3rd edition)

Acts

Nuclear Installations Act (1965) (as amended)

Public Records Acts (1958 and 1967)

Environmental Protection Act (1990)

Water Resources Act (1991)

Radioactive Substances Act (1993) (as amended)

Data Protection Act (1998)

Freedom of Information Act (2000)

Anti Terrorism Crime and Security Act (2001)

Energy Act (2004)

Regulations

Environmental Information Regulations (1994)

Nuclear Industries Security Regulations (2003)

Pollution Prevention Control (England and Wales) Regulations (2000)

Pollution Prevention Control (Scotland) Regulations (2000)

5.2 Useful websites

BSI
<www.bsi-global.com>

dTi
<www.dti.gov.uk/energy/sources/nuclear/safety-security/index.html>

DEFRA
<www.defra.gov.uk/environment/land/contaminated/pubs.htm>

Environment Agency
<www.environment-agency.gov.uk>

EUGRIS
<www.eugris.info>

HSE
<www.hse.gov.uk/nuclear/index.htm>

IAEA
<www.iaea.org/>

Image Permanence Institute
<www.imagepermanenceinstitute.org>

National Archives
<www.nationalarchives.gov.uk>

SAFEGROUNDS
<www.safegrounds.com>

SEPA
<www.sepa.org.uk/contaminated-land/index.htm>

SILC
<www.silc.org.uk>

A1 Nuclear-licensed sites regulatory requirements

A1.1 Licence conditions

The regulatory requirement for licensed site operators to ensure that adequate record keeping arrangements are made and implemented is set out in Licence Condition 6:

Box A1.1 *Licence Condition 6*

1 The licensee shall make adequate records to demonstrate compliance with any of the conditions attached to this licence.

2 Without prejudice to any other requirements of the conditions attached to this licence the licensee shall make and implement adequate arrangements to ensure that every document required, every record made, every authority, consent or approval granted and every direction or certificate issued in pursuance of the conditions attached to this licence is preserved for 30 years or such other periods as the Executive may approve.

3 The licensee shall submit to the Executive for approval such part or parts of the aforesaid arrangements as the Executive may specify.

4 The licensee shall ensure that once approved no alteration or amendment is made to the approved arrangements unless the executive has approved such alteration or amendment.

5 The licensee shall furnish to the Executive copies of any such document, record, authority or certificate as the Executive specify.

The purpose of this condition is to ensure that appropriate and adequate records are held by the licensee for a suitable period to demonstrate compliance with licence conditions. Adequate arrangements should identify the records required to demonstrate compliance with licence conditions and should include administrative arrangements for their collection, storage, retrieval, maintenance and disposal.

Guidance on arrangements for Licence Condition 6 is given in Nuclear Safety Directorate Technical Inspection Guide T/INS/006 ISSUE 001 2002 *Guidance: LC6 Documents, Records Authorities And Certificates*. The following list of elements provides NSD's view on what a licensee's record management system should include to meet the requirements of the Licence Condition and also align with current best practice:

Box A1.2 *Nuclear Safety Directorate's view on what a licensee's record management system should include*

1 Responsibilities for the identification (normally through record schedules) and control of records.

2 Methods, conditions and monitoring of storage/retention commensurate with the nature of the record and the media used.

3 Means of retrieval.

4 Levels of security to protect from corruption, unauthorised access, loss or damage.

5 Duration of storage.

6 Arrangements for the review and disposition of records.

7 Arrangements for the periodic auditing of the control and storage of records.

8 References to national/international standards on record related aspects such that best practice is aimed for.

The list is not exhaustive and will be subject to review and revision. Absence of any aspect on the list with respect to the licensee's arrangements does not necessarily mean that the arrangements are inadequate provided similar controls are applied in this way. Licence Condition 25 also requires licensees to ensure that adequate records are made and kept of the operation, inspection and maintenance of nuclear facilities. This includes the amount and location of all radioactive waste and radioactive material stored or accumulated on the site, which could include radioactively contaminated land.

The record preservation period of 30 years, as required by LC6, reflects the requirements of the Nuclear Installations Act 1965 with respect to third party liability. This period starts from the time when decommissioning and decontamination of the plant is complete and all radioactive waste has been transferred to another location or disposed of (Nuclear Safety Directorate *Technical Assessment Guide Management Of Radioactive Materials And Radioactive Waste On Nuclear Licensed Sites* T/AST/ 024 /Issue 003 March 2001 Appendix 7 *Records for Radioactive Waste Management and Decommissioning*). NII expectations with respect to the preservation of licensee's records can be summarised as:

Box A1.3

NI expectations

- **records should contain all the information that may be required in the future**
- **records should be accessible to those who will consult them**
- **records should be assembled and maintained in a secure form..**

(HSE, 2001)

Records may be stored by media other than hard copy provided the licensee has established practical safeguards such as:

1 The continued ability to read the data must be assured taking into account the technological changes that may occur between making the record and its subsequent retrieval. (This may mean upgrading the record in line with new technology). NB For records relating to radiological waste packages particularly those destined for long-term storage in a national repository this aspect is of major significance as the ability to read the record will need to be maintained for periods of up to hundreds of years.

2 The integrity of the computer programme should be confirmed (eg is it a proprietary product? has it been adequately tested and de-bugged?).

3 Evidence of maintenance of the system hardware must be available.

4 Assurance of the security of the system including the use of passwords and control of software amendment must be available.

5 There must be sufficient back-up of recorded data to guarantee preservation of the information so that records can be regenerated in the event of loss/deterioration of the original. Alternative locations for record storage should be used.

6 The system for recording and storing data must prevent the degradation of data

7 Data must be readily obtainable from the storage system only by "authorised persons".

8 The copy (in whatever medium is being used) must be (or be able to produce) an exact representation of the original record (warts and all). Controls must be in place to ensure that the transfer is accurate. Quality control checks of the image to be stored eg immediately following scanning, must be an integral part of the system.

A check list for the adequacy of the arrangements is given in Appendix 2.

Where licensees wish to change their record keeping arrangements, particularly when this involves significant changes in media type and management, this should be discussed with the NII site inspector and a formal modification (under LC 22 or LC 36, whichever is more appropriate) considered.

A1.2 Safety assessment principles

Guidance as to what NII expects for nuclear plant safety is given in the HSE's *Safety Assessment Principles for Nuclear Facilities* (HSE, 2006). The guidance is for the NII's own inspectors but is published to inform licensees and others. The requirements for records for radioactively contaminated land are covered in Principle RL.7.

Box A1.4 *Principle RL.7*

Principle RL.7: Arrangements should be made for recording and preserving the information that may be required both now and in the future for the safe control and remediation of radioactively contaminated land.

The following records need to be maintained and preserved in order to facilitate the control and remediation of radioactively contaminated land:

- results of investigation, characterisation and monitoring work
- records of any incidents, leakages, etc resulting in radioactively contaminated land, and of any management actions
- reports on the remediation of contaminated land
- any other relevant information related to the history and use of the site.

Depending on the circumstances, some of the requirements in Principle RW.7 (which addresses records for radioactive waste) may also be relevant, particularly for any radioactive waste resulting from the management of radioactively contaminated land.

A2 Check list for inspection of record keeping arrangements

From Nuclear Safety Directorate Technical Inspection Guide T/INS/006 ISSUE 001 2002 *Guidance: LC6 Documents, Records Authorities And Certificates*.

This list is not exhaustive and will be subject to review and revision in light of experience. It does, however, list aspects that can be examined during routine inspections.

A2.1 Inspection of arrangements

- check that arrangements exist that deal with the identification arrangement and control of records (this is normally part of the licensee's quality or safety management systems)
- check that responsibilities and processes are clearly detailed for:
  - the identification
  - classification
  - generation
  - collation
  - indexing
  - storage (including duplication and remote location where reasonable)
  - security of access
  - review and inspection
  - disposal

  of records that are required under LC6 ie those that demonstrate compliance with the conditions of the licence
- check that records have been identified. This can be by some form of schedule, list or in individual procedures
- check that owners of records can be identified
- check that records have been classified as either permanent or non permanent and assigned an appropriate retention period
- check that permanent records are retained for at least 30 years
- check that non permanent records have been assigned a retention period and a review prior to disposition
- check that sound judgement has been applied to classifying non permanent records eg the record has been superseded by a subsequent record or it has ceased to be relevant for its original purpose or it will exist for less than 30 years due to the installation ceasing to be a licensed site. The record that demonstrates compliance with a particular licence condition may not need to consist of all the documents that have been used as the means to the achieve compliance eg work order cards for maintenance tasks but there should be a record that indicates that all the maintenance tasks have been completed and verified and plant history maintained
- check that storage conditions are appropriate for the media type used. Generally the licensee will have specified these. T/AST/033 details the storage conditions for most media types

- check that the condition of all records are reviewed to ensure no deterioration and that update, transfer, refresh facilities are used to maintain accuracy and clarity
- check that records such as radiographs and physical specimens are also stored appropriately to avoid damage/deterioration/loss
- check that records are readily retrievable
- check that access to records is controlled and restricted to authorised personnel
- check that documents requiring disposal have been dealt with in appropriate fashion
- check that the arrangements are periodically audited
- check for new records (ie records not already entered onto a schedule or detailed in procedures) that these are classified as either permanent or non permanent and assigned an appropriate retention period eg following an LC 36 organisation/ management process change
- check that records required to be amended following a plant/safety case modification have been so amended. This check can be used to check most aspects of the licensee's arrangements
- check that the licensee can relate the records it keeps with the LCs.

A2.2 Inspection of implementation of arrangements

- check that individuals with responsibilities connected with the management of records are familiar with these and carry them out
- check that there exists a current record schedule, list and/or the records required to satisfy LC 6 and LC 25 are identified in procedures
- check for a sample of records that someone is identified as the owner/custodian
- check that records that are complete are stored in approved locations ie document centres, archives, libraries etc and not in individuals offices etc. Check that for electronically held records that:
    1. The continued ability to read the data is assured taking into account the technological changes that may occur between making the record and its subsequent retrieval (this may mean upgrading the record in line with new technology).
    2. The integrity of the computer programme is confirmed (eg is it a proprietary product? Has it been adequately tested and de-bugged?).
    3. Evidence of maintenance of the system hardware is available.
    4. Assurance of the security of the system including the use of passwords and control of software amendment is available.
    5. There is sufficient back-up of recorded data to guarantee preservation of the information so that records can be regenerated in the event of loss/ deterioration of the original. Alternative locations for record storage should be used.
    6. The system for recording and storing data must prevent the degradation of data.
    7. Data must be readily obtainable from the storage system by "authorised persons".
    8. The copy (in whatever medium is being used) must be (or be able to produce) an exact representation of the original record (warts and all). Controls must be in place to ensure that the transfer is accurate. Quality control checks of the image to be stored eg immediately following scanning, must be an integral part of the system.

- check out a number of permanent and non-permanent records with respect to their classification in relation to their retention periods. Has appropriate judgement been used to establish the classification
- check that particular records can be retrieved quickly (choose a sample)
- following a modification to the plant check that related records have been updated eg as built
- check that the arrangements have been audited and corrective actions resolved satisfactorily
- check that access to records or storage areas is controlled.

A3 Generic practical guidance for records handling

This sample document provides an example of a generic set of practical guidelines for handling land quality records which may be amended to reflect the needs of a stakeholder organisation.

A3.1 Active records management

Records related to "open" or in-process activities are called active records. These records are typically referred to on a regular basis in response to internal and external business requirements. The period of time during which records are active varies by record class and by departmental requirements.

Active records are normally maintained on-site at the business location, within the departmental areas. Active records may be sent off-site to an approved outsourced records centre if space does not permit them residing within the department.

Hardcopy records (paper, photographs, microfilm records, and production films etc) should be stored in filing equipment appropriate to the record media, size, and security status. All employees are expected to maintain their files in a manner that is secure and logical for the type of record being maintained.

To ensure that electronic records can be identified and located when needed, a standard naming convention should be established within each department.

Electronic records that meet the criteria of official records (records containing information that is required to be retained for business or legal reasons) should be moved to shared network drives and placed in the proper folder to ensure that the record is being protected and retained in accordance with the records retention schedule. Official records should only be placed on drives or other media that are secure and backed up on a regular basis.

A3.2 Inactive records management

Official records with infrequent access requirements or those that refer to closed, completed, or concluded activities, are inactive records. Inactive records have outlived their active stage but must be retained for operational reference purposes or to meet legal retention requirements. In order to properly manage inactive records follow the instructions in the sections below.

A3.2.1 Purge of office records

Each department is responsible for scheduling and implementing annual purges of on-site records to manage office space whilst preserving all records relevant to health, safety and environmental protection. As part of this process, employees must determine which inactive official records should be retained on-site, which should be sent to off-site storage and which records are candidates for immediate destruction review in accordance with an appropriate records retention schedule. Unofficial records (convenience copies, drafts, etc) should be discarded at this time.

Purging is the process of removing inactive material from active storage areas for inactive storage, for destruction or for permanent preservation in a suitable archival facility. Follow these six easy steps to purge active records.

Step 1 Examine files by record class. A record class is a group of similar or related records that reflect an area of information. It is likely that files are already organised this way, but you may want to consult the records retention schedule for record classes in your department.

Step 2 Sort and pull out files that are older than 12 months or otherwise inactive. Records that are frequently retrieved or require instantaneous access should remain in the active filing system regardless of age.

Step 3 Group files by record class and age to the extent possible.

Step 4 For files containing records with a range of ages, define the age of the file (for storage purposes) as if the entire file were the age of the newest record.

Step 5 Pack records within each box (boxes are most commonly used for storing records off-site, records held within on-site file stores may be held in filing cabinets, glide racking or indeed boxes) by record class, avoiding mixing record classes if possible (refer to packing boxes for instructions).

Step 6 Complete the information for records being sent to off-site storage as shown under Section 2.2.2 *Describing Records Using a Records Transmittal Sheet*. Refer to your retention schedule as a guide to assign the appropriate record class codes for each box.

Official records which were not sent to inactive storage and whose full retention period indicated in the records retention schedule has expired should be indexed so they can be incorporated into the destruction review and approval process. The indexing should be a list that contains the following information for each record eligible for destruction:

- record description
- date of record
- record class code
- department name.

Once the list is completed the records should be boxed and held in the department area until the destruction candidate list is approved. The records officer will review the department list for any global retention holds imposed by the legal, internal audit, risk management, and regulatory compliance departments. An approval notification will be returned to the department.

Departments should not initiate destruction of on-site records without approval of the records officer. The destruction process will be managed by the records officer in accordance with the confidential destruction procedures. When destruction has been completed, the records officer will maintain the approved list, approval notification, and destruction notification.

A3.2.2 Transfer of records to and from offsite storage

All inactive official records which require to be retained for longer than routine business use may be transferred to an approved commercial storage vendor.

Inactive records can be maintained in offices as long as space, equipment, cost, security, access, and retrieval meet suitable criteria for security and access (see Section 4.6 *Protection, confidentiality, access and security controls*).

Only official records should be sent to an approved commercial storage vendor. Duplicates, convenience copies, drafts and other types of unofficial records should remain on-site and be destroyed as soon as possible after their useful life, and should never be retained longer than the official record.

To send your records to off-site storage, there are three major steps involved.

These include:

Step 1 Packing boxes

Step 2 Describing records using a records transmittal sheet (or data sheet)

Step 3 Transferring records to an approved commercial storage vendor.

These steps are detailed in the following paragraphs.

A3.2.2.1 Boxing records

Approved storage boxes

Only boxes designed for record storage can withstand the weight and handling when fully packed. Accordingly, use standard records storage boxes for storage.

A standard letter/legal size container accommodates most business/transactional records. Its dimensions are 15”L x 12”W x 11”H with handholds on each end. It is designed to fit standard letter size files packed lengthwise or standard legal-size files packed width-wise.

Micrographics media (microfilm, microfiche) and electronic media (tapes, diskettes) can be boxed in special containers.

Packing boxes

When packing records into approved storage containers, please follow these simple guidelines:

- group similar records into a box by record class code and date range – this facilitates accurate reporting and processing.
- choose a logical system of organisation – pack files into a box in a logical sequence if possible, either numerically, alphabetically, or in date order.
- letter sized documents – pack files in the same direction and facing the end of the box to be labelled (this is the information panel located on one of the handholds sides).
- legal sized documents – files should be packed facing in the same direction toward the long side of the box.
- don’t over pack the box – pack boxes to a maximum 90 per cent capacity, leaving about an inch and a half of free space behind the last file. This will make it easier to retrieve files and will give you room for future interfiles. Also, a box that’s too densely packed will be too heavy for you to comfortably lift.
- don’t under pack the box – files in boxes that are packed at less than 90 per cent capacity may not remain organised, and the box could collapse under the weight of other boxes once shelved. If a box cannot be packed to capacity, consider combining those files with files in another box, keep the files in-house until you have an entire box worth, or fill the empty space with waste paper.
- pack only official records – boxes should contain only “official records” as defined in the records management policy. Convenience records should be discarded or handled separately.

A3.2.2.2 Describing records using a records transmittal (data) sheet

Records inventories are commonly maintained and tracked within a records management system. If records are sent offsite the vendor will often ask for records to be described on a transmittal or data sheet. This sheet, which may be filled in physically or electronically, contains spaces for data relevant to records to be captured (often referred to as metadata, see note below). Data on a records transmittal sheet is entered into the database (see also Section A3.2.2.3 *File level indexing*).

This sheet is used to identify the contents and ownership of boxes sent to storage, and is the source document from which information is recorded in the database. The bar code number attached to the sheet and the corresponding bar code label on the box become a box's unique identifier for requesting and tracking purposes. Such databases are the primary tracking systems for inactive records. Separate databases are not recommended, but existing departmental inventories can be used as a secondary tracking system.

Bar codes are extensively used by approved commercial storage vendors to track records throughout their lifecycle. Record centre operations are designed to leverage bar code technology to reduce data entry errors and to validate accuracy as part of a total quality process.

Bar code technology accurately tracks and audits inventory status, transactions, and movement of materials. Bar code technology also helps avoid errors associated with the data entry. Further, bar codes speed refiles and at the file level, ensure that files are refiled in the correct box and in the correct place within the box.

In instances where stakeholders have their own records management systems in place, it is also possible to utilise bar codes to provide a file level tracking system from "point to point" throughout an organisation. This will sometimes involve utilising an interface with a system such as TranSearch™ whereby each file is assigned a unique bar code to establish its identity on the system and one is also assigned to work areas (a desk for instance) to register a location. It can also be extended to individuals.

Clearly and logically describing box contents will enable ready identification and access to records (see also Section A3.2.2.3 *File level indexing*).

Completing a transmittal (data) sheet and bar code label

1 One (or more if needed) transmittal sheet must accompany each shipment of new boxes sent to an approved commercial storage vendor (or if appropriate, in-house file store). Enter the correct information in the areas indicated, clearly and legibly printing all information.
   - a Print your customer ID on both the records transmittal sheet and a large peel-off bar code label.
   - b Print your (stakeholder name) in the space provided at the top of the sheet.
   - c Print your name, today's date, department, and your telephone number in the spaces provided at the top of the sheet.
   - d Division ID: Print the division ID of the department that owns the records.
   - e Department ID: Print the department ID of the new boxes.
   - f Customer box number: Only complete this field if your department has an established numbering system that needs to be maintained. Otherwise, the approved commercial storage vendor's bar code number will serve as the box identifier.

g Record classification code: Enter the record class code from the records retention schedule.

i) Example: LQF300 for boxes containing “land referencing information”.

ii) Example: LQF400 for boxes containing “current and future land uses”.

iii) Example: LQF500 for boxes containing “surrounding land”.

Please contact your records officer for assistance in classifying records or a reputable third party. If the records retention schedule does not accommodate your record type, please coordinate with your records officer to request modification of the next publication of the records retention schedule.

h Date range from: The oldest date of records contained in the box.
Date range to: The most recent date of records contained in the box.

Destruction eligibility is calculated using the date range to date and the record code, **do not** enter a destruction date. This is required even if the files will later be indexed at the file level.

i Alpha from: Enter the beginning alphabetical/numeric range of the records contained in the box.
Alpha thru: Enter the ending alphabetical/numeric range of records contained in the box.

The “from” and “thru” alphabetical/numeric range fields can be used to describe a name range (Jones through Smith), a numeric file sequence (20450 through 20576) or an alphanumeric file range (AD123 through BZ784). This is required even if the files will later be indexed at the file level.

j Create date: The date the materials were packaged and labelled for storage.

k Event date: If using event date retention, enter the close date of the event making up the contents of the box.

l Destruction review date: do not complete this field. The destruction review date will typically be calculated by an approved commercial storage vendor’s records management system (or the internal records management system where the function is not outsourced) according to the (stakeholder name’s) records retention schedule.

m Hold code: There are often specific retention hold codes, to be used in specific situations. Your records officer may have more information.

n Major description: Identify the main description of the box contents. This should correlate with the record class name. Be as descriptive as possible.

i) Example: Site landholding maps

ii) Example: Site service drawings

iii) Example: Photos of surrounding land

In the event that your records are such that they cannot be described in the space provided in this field and the minor description field of the label, the box may require a file level inventory (see also Section A3.2.2.3 *File level indexing*):

o Minor description: Identify any additional description you wish to associate with the box. This is a continuation of the major description field above. If additional titling space is required, attach a separate sheet to the transmittal sheet with the extended description.

i) Example: Land registry maps

ii) Example: Site drainage plans

iii) Example: Photos of adjoining land to south.

2 Affix one large bar code label onto the information panel or narrow end of the storage box, and affix the identically numbered, much smaller bar code label onto the transmittal sheet.

3 Once you have completed all of the transmittal sheets for the group of boxes you are sending, count the total number of sheets and place this total on all of the sheets (Sheet 1 of 5, etc).

4 Place the original transmittal sheets in an envelope addressed to the approved commercial storage vendor and attach it to the boxes. Where the stakeholder organisation utilises an on-site file store and no off-site facility, address the transmittal envelope to your in-house records officer. Be sure to include a photocopy of the transmittal sheets in each box and retain a copy for your records.

A3.2.2.3 File level indexing

In some instances a description of the records at the "box" level is not sufficient and, additionally, identification and description of each file within the box is required. Typically the criteria that warrant file-level identification are:

- highly active files, requiring a high degree of access
- "case" files, in which each file folder refers to a person, project, case, or event and the file inventorying and storage process does not lend itself to describing the files by the use of "ranges" at the box level.

An approved commercial storage vendor should provide file-level inventory identification and indexing for each folder in the box in addition to identifying and tracking items at the box level, which is why all information on the transmittal sheet is required.

A3.2.2.4 Sending new boxes to off-site storage

Once you have packed and labelled all new boxes, contact your records officer to set up a pickup and send all records transmittal sheets to the records officer, who upon receipt will arrange either for pick up by an approved commercial storage vendor or transfer to the in-house file store. Irrespective of who is storing the material, upon receipt, records transmittal sheets must be cross-referenced to boxes and notification made of any discrepancies.

To request a pickup, the records officer will need to provide:

- the type of material to be picked up: New boxes, entire box refiles, individual file refiles, interfiles, or tapes/vital records
- the exact quantity and size of the boxes so that an appropriately sized vehicle can be dispatched
- any special instructions or restrictions regarding the pickup.

A3.2.2.5 Returning previously retrieved boxes to storage

Once you are ready to return your retrieved boxes to the approved commercial storage vendor or in-house file store call or e-mail a request to your records officer. Provide the following information to your records officer so that a pick-up order can be placed:

- the type of material to be picked up: Entire box refiles, individual file refiles, interfiles, or tapes/vital records
- the exact quantity and size of the boxes so that an appropriately sized vehicle can be dispatched
- any special instructions or restrictions regarding the pickup.

A3.2.2.6 *Interfiles*

Interfiles are new files or documents that must be inserted into boxes already stored. When sending an interfile, please contact your records officer for interfile labels and instructions. Interfile labels should be completed and returned to the approved commercial storage vendor or in the case of in-house file stores your records officer with the interfile request.

A3.2.2.7 *Retrieving off-site records*

Retrievals are items that you wish to have temporarily returned to you from storage at an approved commercial storage vendor or in-house file store. After consulting with the records officer, an inventory report or your records management system, you can request either a box or a specific file within the box to be returned to you. Access to inventory reports is typically provided by your records officer.

A3.3 Historical records

All records deemed worthy of permanent preservation for historical reasons, irrespective of their format are considered historical records and should pass to the archives when they reach the end of their business use.

The records officer will review the records retention schedule in order to identify record classes that contain historical records so that department managers or technical officers may identify those records that should pass to archives at the end of their designated life.

It is the responsibility of the department manager or technical officer to notify the records officer in the event that additional potential historical documents (ie in addition to those indicated on the records retention schedule) have been identified within the department. The records officer will review the records to determine which records should ultimately be archived.

Ownership and physical custody of records designated as archival should pass to the archives where they are held in preservation conditions. Access is allowed in line with any instructions from the depositing area and in accordance with any security restrictions.

Records should be transferred to archives using the indexing form provided by the records officer. The use of this form ensures that sufficient supporting contextual information is captured so that the records can be understood and accessed in the future.

Certain electronic records may, for technical reasons, be more appropriately archived by the creating department in a manner agreed with and documented by the records officer.

A4 Types of record keeping media and their preservation

From Nuclear Safety Directorate Technical Assessment Guide T/AST/033 ISSUE 001 *Record Storage* (October, 2000).

A4.1 Types of media

The medium which represents the record may come in a variety of forms. Examples of these are as follows:

i) Paper (ideally with an acidity level of between pH6 and pH9).
ii) 35mm roll film.
iii) Silver-gelatin-type microfilm.
iv) Microfiche.
v) Magnetic tape or disc.
vi) Optical laser disc.
vii) Hardware such as graphite samples, weld samples or other materials which have been or are able to be subjected to qualification testing.
viii) Electronic firmware (computer or component) such as thermal luminescent dosimeters.
ix) Radiographic film.

Records that require special processing and control, such as computer codes and software and information stored on high density media or optical disks should be maintained and controlled to ensure they are readily retrievable and useable.

A4.2 Duration of storage

Once a statutory record has been made it must be kept for the requisite period. If it has to be reproduced because of deterioration or technology change then clearly the copy becomes the extant record, but its use as evidence would be linked to its provenance and certification of authenticity.

NUSS Guide 50-SG-Q3 *Documentation Control and Records* provides the following information on media type and retention periods. The following media are considered to be acceptable for records with retention period up to and greater than 30 years:

i) Hard paper copy retained in a controlled environment with an indexing system to allow retrieval in a reasonable time, for example, 1 working day; A controlled environment involves temperature, humidity, fire and security controls. The importance of the records may require duplicate storage arrangements.
ii) Microfilm or other microforms prepared appropriately and stored in adequate conditions. Computer output microform (COM), such as COMFICHE is acceptable.
iii) Punched paper tape or Hollerith cards where the information is stored as physical artefacts on a paper/card medium. The storage should be in equivalent environmental conditions to hard paper copy.

iv) Magnetic media stored and maintained appropriately, such as disc packs, storage modules (including hard discs), disk cartridges and magnetic tape on open spool.

The following media are considered to be acceptable for records with retention periods up to five years: any of the above, plus optical discs, where the information is stored as laser etched pits in a vinyl medium.

The following media are considered to be acceptable for records with retention periods up to three years: any of the above, plus flexible disk cartridges (floppy disks) and magnetic tape cartridges stored and maintained appropriately.

The preparation and storage requirements for the different media should reflect any manufacturer's guidance.

A4.3 Features of storage facilities

All records should be securely stored and maintained in such a way that they are readily retrievable (this implies suitable indexing) in facilities that provide a suitable environment to minimise deterioration or damage and to prevent loss.

Factors such as the record media, environmental conditions (including insect or fungal infestation), safety significance (duplication of copies in diverse locations), duration of retention, security and both active and inactive records will determine the type of storage facilities required.

Records should be retained in record facilities appropriate to the media and conflicts between the specific medium storage environments should be avoided, in particular cellulose nitrate film should be stored in a separate facility.

Unsuitable environments can cause more damage to records than any other single factor. A dry or polluted atmosphere may lead to embrittlement of documents; dampness and poor ventilation may cause the growth of mould; excess heat may accelerate chemical damage. All three conditions can lead to irreparable damage of records. Careful control and observation of temperature, humidity and ventilation within the records facility is therefore essential. In general, low temperatures with adequate air movement are preferable.

Fire precautions, including limitations on distance of travel for means of escape and the physical dimensions of the storage facility, are the subject of national legislation and local by-laws. The fire precautions adopted however, should be designed to protect the contents and structure of the facility from damage caused by fire-fighting operations, as well as to ensure the safety of staff and to limit the fire to its source. The possibility of fires or explosions in adjacent facilities and the proposed type of fire fighting chemicals to be employed to counter such events should be taken into account when the facility is chosen.

Loose material should not be permitted or encouraged and smoking should be prohibited at all times in the storage facility. Fire door and barrier arrangements must be observed.

Precautions should be taken over the storage and handling of the records to avoid fingermarks, dust or scratching on microfilm records (by the provision of suitable hand covering), unnecessary bending or cracking of paper (by the suitable positioning on adequately designed shelving) and failure of components due to static discharge (by the provision of static handling precautions).

Records entering the record archive facility should be registered. To protect the integrity of the records, the facility should be secure and wherever possible copies of archived records should be taken for reference rather than permitting the removal of the master record.

A4.4 Storage facilities for microfilm (and any other type of photographic film)

The following storage conditions are considered suitable for the storage of microfilm records for a period not longer than that sufficient for general business purposes. As an example, such a period might be 10 years, but could vary depending upon specific conditions.

- **relative humidity and temperature**

  the relative humidity of the storage facility should not exceed 60 per cent and the temperature should not rise above 25°C. Rapid changes of humidity and temperature should be avoided.

- **protection against fire and water**

  microfilms using safety film are difficult to ignite and combustion speed is low. To provide effective protection of microfilms against fire, as much attention should be paid to the presence of steam as to high temperatures. Investigation of the protection available in a given room should take into consideration conditions special to that room and also the following general conditions.

  - microfilm stored at 40 per cent relative humidity can withstand a dry heat of 120°C for a period of 24 hours without appreciable loss of its legibility and printability. At a dry heat of 150°C some distortion may take place after six hours but individual microfilms of texts or figures are still printable. The action of dry heat of 180°C for at least six hours causes deformation of microfilms and reproduction generally becomes impossible.
  - in the presence of water vapour, temperatures of 90 to 110°C produce serious distortions, cause adhesion of coils or surfaces in contact and prolonged action or condensation will make the emulsion melt. Fire proof cabinets and safes thermally insulated by water vapour production are therefore not suitable for storing microcopies unless they have an inner moisture-proof chamber or the films are placed inside suitable sealed airtight containers. To obtain complete protection from fire, safes or cabinets should be placed on premises which are fireproof themselves. Microfilms should be protected from the action of water such as leaks, fire sprinklers or flooding, by being stored above basement levels on shelves at least 150 mm from the ground. If films are immersed in water, allowing them to dry, even partially, will cause the layers to stick together. The films should be placed in water-filled containers until they can be washed and dried properly.

- **chemical contamination**

  various noxious emanations can cause slow deterioration and a gradual fading of the image on the film. Attention is drawn to the danger presented by peroxides which may originate from bleaching agents, glues, varnishes and other products used in manufacturing storage cabinets of film containers. Hydrogen sulphide, ozone, sulphur trioxide, ammonia and oxides of nitrogen are the most common, but not the only, atmospheric gases which harm film. Such fumes should be eliminated or an alternative store found.

  Chemical products in the immediate vicinity may also cause the presence of other

impurities in the atmosphere. If dust and liquid particles suspended in the air are deposited on the preserved microfilm they may impair its legibility and cause permanent scratching. Microcopies on silver-image film should not be kept with other photographic records which do not conform to these recommendations, not with those films explicitly excluded, such as microfilm on a nitrate film base. Cross contamination between microcopies can occur by the transfer of free thiosulphate to sodium (or ammonium) thiosulphate-free film if they are stored with the emulsion sides in contact.

- **additional recommendations for archival (in excess of 10 years) storage conditions of Microfilm**

  i) Air purification

  Air should be filtered to remove dust, purified from noxious gases and circulated by means of forced draught.

  ii) Relative humidity

  If sealed airtight containers are not used, the air in the archival storage facility should be conditioned to maintain the relative humidity at a level between 20 and 40 per cent. If air conditioning is used, dehumidifiers using calcium chloride or other chemical desiccants should not be used. An electrical dehumidifier is recommended. If humidifiers are used, they should be of a type that does not produce rapid change in the relative humidity.

  iii) Temperature of the archival premises

  The temperature in the archival storage area should be maintained between 15 and 25°C, but preferably should not exceed 20°C. If film which has been stored at a low temperature is handled in a room where the temperature or relative humidity is comparatively high, condensation will occur on the cold film surfaces. In these circumstances the film should not be removed from its closed container or the place where it is stored until the storage temperature has been brought up to the approximate temperature of the room where the film is to be handled.

  iv) Containers

  The following two types of container are recommended:

  a) The closed non-airtight container.

  b) The sealed airtight container.

  If the recommendations for relative humidity and temperature of the archives are observed, containers for storage of microfilm can be of the closed non-airtight type. Sealed airtight containers should be used if there are no other means of protection against the danger of an ambient atmosphere of which the relative humidity or temperature goes beyond the limits recommended in this guide or which contains chemical impurities or dust. The containers used should be made from materials meeting the requirements below. These containers may be placed in boxes of paper or board, but such boxes alone should not be used.

  iv) General precautions for the long-term protection of microfilm records

  a) The use of non-corroding materials for containers is recommended but, whatever the materials used for the containers, their corrosion resistance coating and their airtight seals should not melt, ignite, decompose, develop fumes, distort or be subject to excessive dimensional changes when subjected to a temperature of 150°C for four hours.

  b) Care should be taken to avoid the dangers of rust, rubber joints, rubber bands and gum on certain types of envelope, and of lignin and other peroxide-forming substances contained in certain boards.

c) Microcopies stored in roll form may be mounted on reels or on cores. Rolls more than 30 mm long wound on cores should be laid flat unless the core itself is carried on a horizontal spindle which prevents the lower part of the film from supporting the load of the core and its contents.

vi) Additional precautions for sealed airtight containers

a) Fire

In case of fire, the container should be of a type which will prevent steam reaching the film. Containers with a high resistance to corrosion are recommended. The container and its airtight seal should withstand an excess pressure inside the container of 70kPa without rupture of the seal or other injurious effects.

b) Relative humidity

The relative humidity inside sealed airtight container should be within 20 to 40 per cent at the storage temperature. Relative humidity exceeding 60 per cent encourages the formation of mould which, in time, can completely destroy the image. Below 15 per cent the film tends to curl and become more brittle as the relative humidity decreases.

A4.5 Storage facilities – paper

The relative humidity of the storage facility for paper should be within the range of 55 to 65 per cent and the temperature should be within the range of 13 to 18°C. However, if the paper is in bound volumes and is little used, it may be stored at a relative humidity of 40 per cent. Rodent attack and insect infestation should be guarded against.

A4.6 Storage facilities for magnetic tape or disc – optical laser disc hardware – electronic firmware

Magnetic tape or disc, optical laser disc, electronic firmware and general hardware records should be archived in accordance with manufactures requirements or the component media and/or the relevant British Standard.

USNRC have issued the following guidance (generic letter 88-18) when using an optical disc imaging system:

a) The optical disk technology does not allow deletion or modification or record images.

b) The image of each record is written onto two optical discs (the use of a three disc system is becoming the norm).

c) The legibility of each record image should be verified to ensure that the image is legible. If the image is illegible, the hard copy record is maintained as the record copy.

d) To ensure permanent retention of records, the records stored on an optical disk are acceptably copied onto a new optical disk before the manufacturer's certified useful life of the original disk is exceeded. This includes verification of the records so copied. In a multi-disc system transfer and update are a standard part of the process.

e) Periodic random inspections of images stored on optical disks are performed to verify that there has been no degradation of image quality.

f) If the optical disk document imaging system in use is to be replaced by an incompatible new system, the records stored on the old system's disks must be acceptably converted into the new system before the old system is taken out of service. This includes verification of the records so copied.

A5 Example contaminated land management GIS and database tool

The following text has been extracted from information provided by UKAEA. The information is provided for illustrative purposes only and should not be taken as endorsement of the product by SAFEGROUNDS or CIRIA.

IMAGES

The Information Management and Geographical Evaluation System (IMAGES) provides a total management solution for all contaminated land and environmental monitoring data.

IMAGES was initially developed by the United Kingdom Atomic Energy Authority (UKAEA) in conjunction with ESiT Ltd to support the restoration of its site.

IMAGES is comprised of a suite of integrated data management modules consisting of:

- Building Register
- Photograph Register
- Document Register
- Radiation Survey/ Health Physics
- Ground Investigation Data
- Water Quality Data
- Excavation Manager
- Land Assessment/Sentencing
- GIS Manager
- GIS Viewer

IMAGES is designed to enable users to select the modules appropriate for their requirement. Each module can function either standalone or in conjunction with other modules, allowing you to build up a comprehensive database with a logical route to access your information.

The following sections outline some of the key components of IMAGES and how the system can help address environmental issues on industrial sites and integrate with the site restoration process.

IMAGES – Data Control

With IMAGES all data is securely stored within an ORACLE relational database with the following additional controls managed by the IMAGES software:

- Workflow Management
- User Privileges
- Archiving information
- Tracing (of data back to original source)
- Quality Marking and Validation

IMAGES – Data Access

Information held within the system can be accessed through a variety of mechanisms dependent on your requirements.

The standard client interface gives the user full functionality of IMAGES modules and tools.

IMAGES also has a web-based interface for users who may only require a simpler view of information in the system. This requires no client installation but still enables searching and reporting of information and links to Geographic Information Systems (GIS) to display location-based data (see below)

IMAGES – Geographical Location

The majority of information relating to environmental data has a geographic 'component'. A useful way of visualising, analysing and presenting this type of data is by means of a Geographical Information System (GIS). IMAGES has both an in-built GIS Viewer and also links to more specific external software.

IMAGES has been developed to integrate with ESRI's ArcGIS, enabling information such as laboratory results to be dynamically displayed on a map of the site.

This type of functionality enables the user to easily assess where sampling has been undertaken or more importantly where any site-specific criteria for land quality may have been exceeded (above).

IMAGES – Data Capture

Data capture takes place on a series of standard electronic templates to ensure consistency between users and to allow information to be captured remote from the live system, e.g. out in the field. Automatic routines are then available to 'load' new data into the live system with checks carried out to ensure it meets predefined criteria (e.g. to convert field and laboratory data into standard units).

IMAGES – Data Searching

Once within IMAGES, environmental data can be queried using a set of powerful search tools. For complex queries, the system administrator can build predefined queries to allow more general users of the system to obtain specific information. The use of GIS can also provide a spatial element by providing searching by geographical location.

IMAGES – Data Reporting

Reports can be generated by the system into a number of formats such as Microsoft Word and Excel. This can also facilitate further data analysis using more specialist data analysis tools if required.

IMAGES – Land Quality Management

The IMAGES modules combine to help the user derive risk assessments for land quality issues identified on the site, based on the source-pathway-receptor model.

The system provides a transparent view of site issues and enables risks and management actions to be justified using the detailed documentary and survey evidence held within the other modules.

IMAGES can also be integrated with an organisation's contaminated land programme by prioritising land quality issues and tracking actions from the planning stage through to undertaking site work.

IMAGES – Effective Communication

The various reporting tools within IMAGES and presentation capabilities of GIS allows often complex information on site conditions to be communicated to stakeholders at all levels. Effective communication of data in this way, and knowing robust system processes underpin it, improves confidence in site environmental management to regulators and the public.

IMAGES – Scalability

A key benefit of IMAGES is that it can be implemented at a variety of scales depending on site requirements. This can range from a single installation for a small site to a large networked application, as has been implemented at UKAEA sites. IMAGES currently runs on ORACLE but is also compatible with Microsoft Access and could be configured for other database platforms if required. The GIS element of the system is also scalable in a similar manner.

A6 Case study – Migration of Nirex letter of compliance (LoC) records onto archive-grade paper

Migration of Nirex letter of compliance (LoC) records onto archive-grade paper and their transfer to a managed archive facility.

A6.1 Introduction

In November 2000, Nirex started a programme of work with the object of identifying issues relevant to the long-term management of records. The first phase of the work was a study of the media commonly employed and this highlighted areas needing further consideration when developing a long-term records management strategy. Nirex subsequently used the outcomes of this work to contribute to the development of an industry-wide strategy and recommendations to waste packagers reviewing their own records management arrangements.

In Phase 2, Nirex investigated the practical aspects of preparing hard-copy records for long-term management. This included the migration of information from existing paper files to a specialist paper capable of being stored in a managed environment for hundreds of years.

A6.2 Background

The project was undertaken in two phases, as follows:

Phase 1

- a study of the characteristics of various recording media
- identification of best practice and techniques
- production of records media guidance.

Phase 2

- identification of records management resources
- migration of Nirex records.

Phase 1a - Recording media study

Nirex engaged two specialist contractors to examine the issues relating to choice of media. The first focused on hard copy media whilst the other undertook a review of "electronic media"'. These two categories were defined as follows:

- hard copy – included all types of paper, microform and solid substrates (metals, composites, minerals)
- electronic – included solid state memory, magnetic tape, magnetic disk, optical disk, CD-ROM and holographic memory (media relating to "born-digital" information and that which is subsequently digitised, were included).

The objective of this phase was to identify the intrinsic features and characteristics that could affect the long-term stability of the medium and accessibility to the information. This necessitated an understanding of the optimum storage conditions. The outcome was a set of recommendations that could be taken forward as advice to waste records custodians and as input to the work developing a national policy.

Phase 1b – Identification of best practice

It was concluded that, while the type of media employed is an important consideration, there are much broader management decisions to be made when adopting a long-term information management strategy. One of these is the early establishment in the project of the information management system and identification of the media characteristics and associated risks.

The outcome of this phase of the study suggested that fewer risks are encountered when good quality archive paper is used as the basis of the information system. The adoption of a paper-based radioactive waste information management system is consistent with that employed by ANDRA (the organisation responsible for overseeing radioactive waste management in France). ANDRA has established a national system for hard-copy radioactive waste records management that includes the use of both industry-based and public archive facilities. Currently, the records associated with the waste disposed of at Centre de l'Aube and Centre de la Manche are copied onto archive grade paper and distributed to archives under the control of the local town council and the national records office in Paris. Copies of the records are also retained on-site.

Examples of best practice also showed that to guarantee, as far as possible, the longevity of the media and the information recorded on it, only high quality materials should be used and that they should be stored in a controlled environment under a strict management regime.

Phase 1c – Records media guidance

Based on the outcomes of Phases 1a and 1b, Nirex produced a document that summarised the findings. This document was used as the basis for the trial that Nirex was to carry out in Phase 2. The document *The Long-term Mamagement of Information and Records* was issued to waste custodians in order to assist them in the development of local records systems.

Phase 2a – Identification of records management resources

The objective in Phase 2 was to undertake an exercise that involved the migration of information contained in records located in the Nirex offices to a long-term media for storage in a managed archive facility. It was decided to undertake this trial on paper-based records as it was considered that this was the media used for many historical records. The intention was to:

- identify a set of genuine records requiring long-term management
- identify the sources and costs of the required materials, equipment and labour
- develop a procedure for paper-based information migration
- share lessons learned with the waste management community.

Nirex approached its Phase 1 contractors with a view to identifying potential suppliers of archive grade paper. A number of suggestions were made and internet searches undertaken. Quotes were obtained from a small number of potential suppliers and on the basis of cost, expertise and face-to-face meetings, a company was selected. Although

the company had not been involved in the management of information for the time periods envisaged, it was able to supply all the necessary materials. In addition, they suggested the use of "corrosion intercept bags" in which the papers could be placed to inhibit degradation of the media that could result from fungal growth and contamination and also to protect the contents from external effects such as pollens, insects, dust and smoke particles and water.

The company had demonstrable experience of working with museums and archives and were used to advising companies on the optimum methods of preserving artefacts and papers. However, they did not have the resources necessary to undertake the copying and indexing of the LoC records.

The company supplied the following materials:

- archive-grade acid free paper
- purpose designed archive boxes
- corrosion intercept bags
- archive box labels.

Phase 2b – Migration exercise

Nirex identified a set of records for the exercise. These records contain information that is expected to be of value to future waste custodians. Access to the information over a period of at least 100 years is anticipated. The information exists in both hard-copy (letters, specifications, reports) and electronic form (correspondence, photographs, spreadsheets) but only the hard-copy records were included in the migration exercise.

The records, totalling about 30 linear metres of shelf space are contained in box-files and are routinely accessed. As a result some records have become lightly damaged through, for example, handling and sheets of paper being stapled together. The paper used is "standard" recycled office paper and the box-files are constructed from card with metal fixings. Other materials are contained in the files such as plastic folders, photographs, "blueprint" drawings, treasury tags, paper-clips and adhesive tape.

The copying was to be undertaken on a dedicated, refurbished digital copier. The supplier was requested to ensure that the copier was free of any cleaning and lubricating chemicals which could potentially contaminate the paper and interfere with its longevity. The toner used was a "carbon black"-based product (as opposed to a dye) – this was specified because of its excellent long-term stability, fastness and adhesion.

The copier was used exclusively for the exercise in order that the standard of cleanliness was preserved and contamination from other materials prevented. Use of the copier by unauthorised personnel was prevented by the application of a security code. The copier was also located in a room that was secured with a standard combination lock. During the period of the exercise, there was no requirement for maintenance, but discussions were held with the supplier who was informed of its use and the particular requirement that no chemicals were to be used that could potentially damage the archive paper.

Only files that had been "closed" (where it was expected that there was to be no more paper records added) were migrated – this amounted to about 300 box-files (about 130 000 sides of A4 paper). The contents of these files varied and included some records which were larger than A4 so these were scanned and reduced to A4 for

convenience. However, it was recognised that some detail may well be lost on the reduced size record (original copies were retained in the files). The contents of each file were to be copied, single-sided, onto the A4 size archive paper and placed into "corrosion intercept bags". Care was taken not to overfill the bags and to ensure that they could be manually sealed.

The bags and their contents were then to be placed in specially designed storage boxes constructed from the same materials as the paper and free of any component materials that could interfere with the paper (for example metal staples). The boxes are made of a dense cardboard that gives limited protection against fire (although they are not 'fire-proof') and water.

Two sets of sample archive boxes were produced. The purpose of these samples were to enable Nirex personnel to monitor the state of the records deposited at the archive facility without having to disturb the master set. In addition, one set was used during the migration exercise to provide assurance of the process and confirm the quality and consistency of the materials.

Nirex researched a number of archive facilities where the records could be stored for the long-term. The principal requirements were:

- security
- appropriate environmental conditions
- appropriate storage shelving
- controlled access
- "double-knock" fire suppression system
- company stability/security
- cost.

A commercial records management organisation was selected that could meet Nirex requirements in full at a reasonable cost. A security audit of the company's facility was undertaken by the Nirex facilities and security manager and a full report provided to the Office of Civil Nuclear Security (OCNS) who endorsed the findings. The Nirex contracts department also undertook some research to provide assurance that the organisation was a financially stable company with an acceptable track record in archives management.

The master copies and the sample sets were to be transferred from Nirex to the records management facility in three batches. This ensured that there was a compromise between transport costs and storage of the records in an uncontrolled environment at the Nirex offices.

An operating procedure was written for use by the operator and their management. This covered all aspects of procedure, materials control, recording and checking.

A6.2.1 Migration exercise costs

A quote was obtained from an external supplier for the supply of all materials and labour. The company selected did not normally supply labour for such activities but was willing to provide it, through a third party, on this occasion. The quote came to £35 000 with the labour being almost 50 per cent of this. It was therefore decided that Nirex would provide the labour under existing arrangements. This also had the advantage that the original records could remain within the Nirex building, that

training was minimised, additional security checks were not required and that the staff possessed an intrinsic knowledge of the material. It is believed that time will have been saved in dealing with queries.

The costs (at 2005 prices) were as follows:

Raw materials	£6300
Equipment	£7000
Copying	£617
Archive	£343
Labour	£3234
Total cost for the exercise was	**£17 494**

There are of course ongoing costs associated with the storage of the copied records at the Iron Mountain facility and these are currently approximately £100 per month.

A6.2.2 Migration exercise findings

The process for copying, referencing, packaging and transporting the records appeared to work very well although the task did take a little longer to complete than originally envisaged. All the identified records have been copied and transferred to the records management facility where they will reside for the foreseeable future.

Having identified the records for copying, the process worked well. Box files were transferred to the copying room where they were reviewed for completeness and existing binding and staples removed. The copies were made and then re-bound. The latter task was found to be very time-consuming and this contributed to the additional time required to complete the exercise.

Some additional effort was necessary to index the records. The records management company records database was used to register the files prior to transferring them to its facility. The database is a convenient means for checking the location of archive files but some advice from the Nirex packaging team was required to provide appropriate keywords and references in order that files can be quickly identified in the future.

The industry uses a great deal of jargon and abbreviations are profuse. Where possible, these were not used in any referencing and glossaries were provided in the archive boxes where necessary. Some of the original records were themselves poorly copied and in a few cases, text was found to be missing. It is therefore an important lesson that original records must be carefully checked and, where necessary, reproduced to ensure clarity.

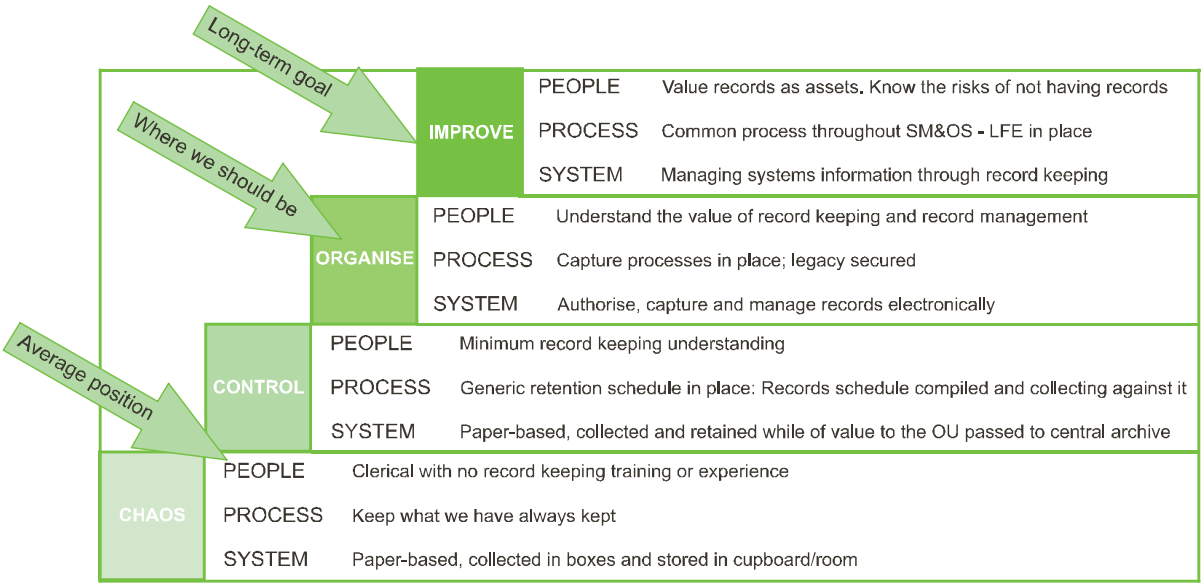
The room used for the copying was relatively small (approximately 3 m × 3 m) and although it was equipped with air conditioning, it became quite hot. The amount of space required for file sorting, record preparation and copy compilation was also limited and a larger room would have been more comfortable.

A7 Case study – long-term record management strategy at BNG Sellafield

Extracts from a paper given by Graham Farrington (BNG Sellafield records manager) at *Nuclear Information Management over the Millennia Workshop 24 Nov 2006*.

Start state

- history of diversity
- do what we have always done
- keep everything - find nothing
- uncontrolled storage
- no planned preservation
- no retention schedules
- no records systems.



Blueprint for the records programme

- common process and system
- consistent capture
- search and retrieve from a single system
- electronic authentication
- preservation strategy embedded
- deliver service for the business.

What we have always done

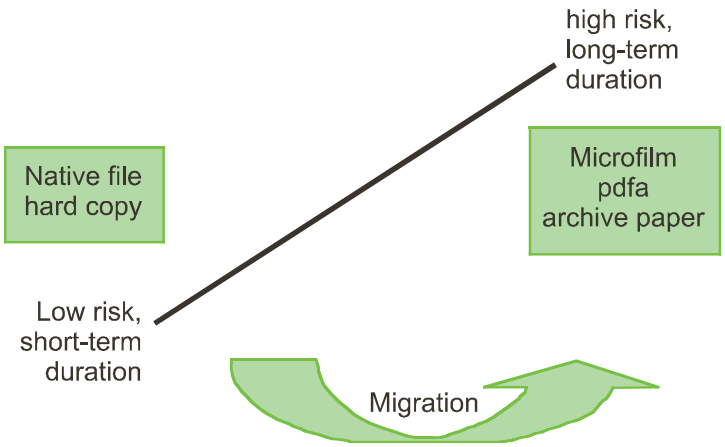
- policy of hard copy wet signed
- hard copy scanned for information (but not records – awaiting EDRMS)
- microfilm taken of 30 year records for preservation

- the only exception is for drawings created electronically, approved by workflow, tiff created and microfilm taken
- simple to implement
- time and not value recognised
- costly solution.

Preservation considerations

- retention time (commonly three, six, 12 and 30 years, indefinite)
- value to the business – "vital" records comprise three groups
  - COSR (continued operations safety report) and its underpinning documentation
  - environmental records of footprint, discharges, etc.
  - waste and product records
- media choices
  - hard copy
  - microfilm
  - digital.

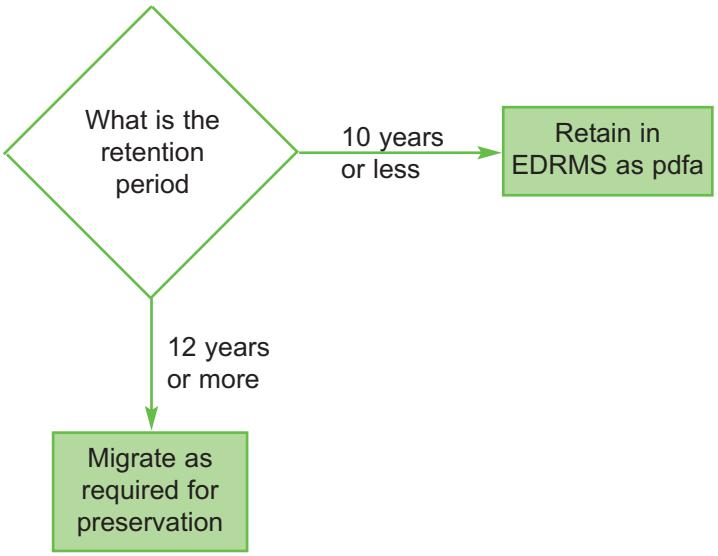
Preservation strategy



What are we seeking to achieve?

- retention Schedule produced with notion of value recorded by "vital" annotations EDRMS with metadata to represent the business needs and future migrations
- interim preservation strategy to take us towards digital but not headlong
- create parameters within which the service can be delivered – choices.

Preservation algorithm



So what?

- in transition between paper and electronic and the transition period could be long!
- the algorithm is simple in theory but harder to introduce (manage the change)
- in practice, we need to educate/train those handling the process in what is vital, recognition not by rote but by type/nature of record and how to use the retention schedule
- introduce electronic authentication and ways of working
- migrate out of poor electronic methods (shared drives)
- consider scanning hard copy records
- consider what to do with the "legacy" records
- stop microfilming everything > 30 years.

A8 Examples of metadata from the UKAEA record management catalogues

Note: Scheduled records are records with a predetermined review/destruction date - linking to retentions quoted in the UKAEA record retention schedules. The unscheduled records are reviewed to determine whether they should be destroyed or kept for a longer period (ie business requirement or historical significance for eventual disposal to the National Archives).

A8.1 Metadata examples – unscheduled records

#FILENO AG/4/02 #PT 1

Hill_LG

#OYEAR 1959

#CYEAR 1964

TITLE

Negotiations with local authorities on site development

KEYWORDS

County council, planning department

DIVISION

#DIVN Security_and_General_Services_Department

CLFN

U

LOCATION

The National Archive #PRO AB77/0027

DATE TO A OR PRO: #TRANS 1988 Any

ACTION

#REV 1984

NOTES

Cleared for PRO by RM Fishenden Nov 1987.

#FILENO HS/222/03 #PT 02

#OYEAR 1999 Jan

#CYEAR 1999 June

TITLE

United Kingdom Atomic Energy Authority Safety And Environment Advisory Committee

KEYWORDS

USEC, USEP, JET, HSE, NII, DTI, BNFL, SED,

DIVISION

#DIVN London_Office

CLFN

U

LOCATION

Archives #BOX 19964

DATE TO A OR PRO: #TRANS 2005 Dec

ACTION

#REV 2024

#FILENO ACRPI

#OYEAR 1985 Apr

#CYEAR 1985 Oct

TITLE

Advisory Committee on Radiological Protection Instrumentation; agenda, minutes and papers Vol 8

KEYWORDS

ACRPI

DIVISION

#DIVN Harwell_Records_Office

CLFN

U

LOCATION

Archives #BOX 13250

DATE TO A OR PRO: #TRANS 2002 Oct

ACTION

#REV 2010

NOTES

Contains 85 A4, M9, A17, M20. P1-3, 5-8, 8 rev, 10, 12-16, 18, 19.

A8.2 Metadata examples – scheduled records

Created by Audrey Gibson on 21/11/2001 11:36
Modified by Audrey Gibson on 10/09/2004 11:05

Box No:	00326
Title:	Purchase ledger invoice batches
Depositor:	Finance
Keywords:	BO29201-BO29328
Rev/des date:	Apr 2007
Archivedate:	Apr 2002
Ownership:	UKAEA
Loan authorisor:	
Loan authorisor contact details:	
For:	
Notes:	
Comments:	

Created by Janice Cummings on 22/03/2004 15:26
Modified by Sandra Benge on 26/01/2006 12:54

Box no:	18539
Title:	Tenancy and lease, Services to purchasers of North Drive houses
Depositor:	Property management
Keywords:	PM585/01 part 2; PM477/01 part 2; PM455/01c part 1; 371/01 part 4; PM540.1/01 part 2; PM300/16/04 part 4; Sheep grazing ranch
Rev/des date:	Apr 2026
Archive date:	Jun 2005
Ownership:	UKAEA
Loan authorisor	
Loan authorisor contact details:	
For:	
Notes:	
Comments:	

Created by Jane Peters on 21/11/2001 11:38
Modified by Robert Marsh on 22/11/2004 14:54

Box no	14300
Title	A328 Decommissioning, Phase 2
Depositor	Risley
Keywords	Plant clearance certificates; method statement; log book; demolition; chimney
Rev/des date	Dec 2045
Archive date	Nov 2004
Ownership	UKAEA
Loan authorisor	
Loan authorisor contact details	
For	
Notes	
Comments	Formerly in Risley box 14835

A8.3 Examples of metadata from the Dounreay record management catalogues

Records management index

Created by Annabel Murray on 05/01/2001 14:06
Modified by Annabel Murray on 05/01/2001 14:08

Document reference no	001/RRP-CR1:4
Document issue no	1

Document title	RRP Shutdown/Control Room Record Sheets 31/08/98-03/09/00
Document author	NA
Date of document	03/09/2000
Document review date	03/09/2030
Document destruction date	
box reference	DO/706.6
Comments	D8781
Record owner	ATO
Type of loan	
Start of loan period	
For	
Tel No	
Date due for return	
Loan remarks	

Records management index

Created by Lindsay Archer on 05/07/2001 14:16
Modified by David Scott on 24/09/2001 12:47

Document reference no	40540
Document issue no	1
Document title	Quality Record-PFR, WP Butterfield Ltd-40540 (Risley 2294)
Document author	NA
Date of document	14/10/76
Document review date	14/10/2001
Document destruction date	
Box reference	DO/750.200(2294)
Comments	D8781
Record owner chief technologist	Dounreay
Type of loan	Reviewer
Start of loan period	30/08/2006
For	Rachel Coghill
Tel No	803432
Date due for return	
Loan remarks	

Records management index

Created by Jenny Cormack on 03/10/2001 09:13
Modified by Sharon Cameron on 16/12/2004 08:19

Document reference no	KIN/AWARD(83)
Document issue no	1
Document title	Kinchin Award – Support File, Volume 2 (1983)
Document author	NA

Date of document	31/12/83
Document review date	31/12/2010
Document destruction date	
Box reference	00724
Comments	D8542
Record owner dounreay director	
Type of loan customer	
Start of loan period	10/01/2005
For	Colin Gregory
Tel No	751 6060
Date due for return	10/02/2005
Loan remarks	Loan No: 576
Email	Email st by reviewer to CVG

A9 Interfaces with other topics

A9.1 Environmental management and environmental discharges

For sites regulated under the PPC Regulations (the Pollution Prevention and Control (England and Wales) Regulations 2000 – SI 2000/1973 and the Pollution Prevention and Control (Scotland) Regulations 2000 – SSI 2000/323) a site report on ground conditions is prepared (normally a desk-based study) and the requirement is that the authorised plant do not degrade land quality. Records will be required to demonstrate the effectiveness of pollution prevention arrangements throughout the life of the site authorisation through a site protection and monitoring programme which may require the sampling of soil and water.

A9.2 Waste management

Guidance as to what NII expects for nuclear plant safety is given in the HSE's *Safety Assessment Principles for Nuclear Facilities* (2006). The guidance is for the NII's own inspectors but is published to inform licensees and others. The requirements for records for radioactive waste management are covered in Principle RW.7.

Box A9.1 *Principle RW.7*

Information that might be required now and in the future for the safe management of radioactive waste should be recorded and preserved. Such information includes:

- **a Details of the ownership of radioactive waste.**
- **b Characteristics of the radioactive waste including the radionuclide inventory, the amount, radioactive waste category, physical, biological and chemical form and associated uncertainties in the estimates of the radioactive wastes. For waste containing fissile material this should include criticality-relevant information.**
- **c The origin of the waste.**
- **d The location on site.**
- **e Research and development.**
- **f Development and specification of conditioning recipes and packages.**
- **g Details of packaging.**
- **h Operational history of processes and stores.**
- **i Records of non-compliances with specifications.**
- **j Records of waste disposals.**
- **k The safety case(s) relevant to the waste and its storage.**
- **l Record of incidents.**
- **m Regulatory interactions.**
- **n Records that might reasonably be foreseen to be required by an authorisation granted under RSA.**

Licence Condition 32 requires records to be kept of radioactive wastes accumulated on nuclear-licensed sites. The records should be maintained in a secure and accessible form for as long as the information could be of value. Records should be kept in such a

way that sufficient information could be identified for both current and future needs for each individual waste package. Given the current expected timescales for decommissioning and the provision of long-term management facilities, the storage duration for many records associated with on-site radioactive waste management might be greater than one hundred years.

The British Radwaste Information Management System (BRIMS) provides a means of accumulating and storing the data required for the future safe management of radioactive material and radioactive waste, pending final disposal. Information is recorded within three related modules in the database. The

Inventory module deals with the characteristics of the radioactive waste itself, the waste management module deals with the buildings and facilities used to store the waste, and the packages module deals with the packages in which waste is transferred and may ultimately be disposed.

The Radioactive Waste Policy Group (RWPG) has set up an information management sub-group to make recommendations on a national radioactive waste information management strategy covering:

- information requirements and the sources of that information
- the role that BRIMS might play
- the role/actions of waste producers, regulators, Nirex, others
- provisions for long-term management of information (>100 years).

The RWPG is currently developing a draft code of practice that will cover:

- collection/recording of information
- cataloguing/ indexing
- information disposal/ retention/condensation scheduling
- security, commercial and confidentiality issues
- QA arrangements
- timeframes
- changes in organisations and responsibilities
- national archiving arrangements
- preservation of records.

For non-radioactive waste, if any site has a waste management licence, the Environment Agency is now under a statutory duty to issue a completion certificate only when it is satisfied that the condition of the land is unlikely to cause harm or pollution. (Section 39(5) of the Environmental Protection Act 1990). Assessment under Section 39 should be restricted to activities carried out while a licence was in force. Any previous unlicensed waste management activities are covered by the Part IIA contaminated land regime. However if the EA is not satisfied that the pollution or harm that is being, or is likely to be caused, is from historical activities, then it will reject the application to surrender the licence. Records from background, or baseline, site investigations will play an essential role in this process.

A9.3 Decommissioning

The requirements for records for decommissioning are covered in Safety Assessment Principle DC.6.

Box A9.2 Principle DC.6

Throughout the whole life-cycle of a facility the documents and records that might be required for decommissioning purposes should be identified, prepared, updated and retained. Particular attention should be given to the following records:

a The as-built facility design and subsequent modification.

b Operational history.

c Incidents.

d Radiological surveys.

e Radioactive substances and radioactive waste quantities, locations, condition and ownership, with specific focus at the end of normal operations.

f Safety cases.

g Regulatory interactions.

h Physical condition of the facility, including examination, inspection, and testing records.

i Decommissioning history.

j Decommissioning reports to show how the objectives of the decommissioning plan, including the planned end-state for the facility, have been achieved.

Documents and records for decommissioning purposes should be generated, retained and owned in an appropriate manner and form, taking due account of the timescales over which they may need to be retained and accessed. In cases where decommissioning operations span significant periods of time, arrangements for maintaining the dutyholder's corporate memory of a facility should include retention of the knowledge of relevant staff.

A9.3 QA

Quality assurance (QA) aspects in nuclear installation and waste disposal facilities are addressed in IAEA publications *Quality Assurance for Safety in Nuclear Power Plants and other Nuclear Installations*: *Code and Safety Guides* Q1– Q14, *Safety Series* No. 50-C/SG-Q, IAEA, Vienna (1996) and *Application of Quality Assurance to Radioactive Waste Disposal Facilities*, IAEA-TECDOC-895, Vienna (1996). Newer documents have recently been released on "Management Systems" (GS-R-3 *The Management System for Facilities and Activities* and GS-G-3.1 *Application of the Management System for Facilities and Activities* IAEA, Vienna 2006).

The quality management system should be applied through the whole process of cleanup and release of a site from regulatory control until the final decision on compliance with the release criteria. Record keeping and reporting of the quality management system should be designed and implemented to provide assurance that:

- the objectives, and safety requirements and criteria are adequately defined and met
- adequate strategies for cleanup and monitoring for compliance have been developed and implemented
- appropriate management arrangements are in place with clear allocation of responsibilities between operator and contractors
- required staff competency, and interfaces are in place
- adequate selection, calibration, maintenance and testing of equipment of appropriate monitoring techniques has been performed

- adequate procurement control, including subcontractors' services has been implemented
- appropriate sampling and measurement (location, media, number of samples, frequency, etc) has been performed
- verification and analysis of results has been carried out
- appropriate qualification, experience and training of personnel has been involved in site cleanup and release
- adequate auditing covering internal, external audits and regulatory inspections has been performed
- measures for identification of non conformance and adequate corrective actions have been provided.

For UK nuclear site licence holders, Licence Condition 17 requires that adequate quality assurance arrangements are developed and implemented by the licensee. An essential part of these arrangements is the development of procedures which detail the generation and control of records. These procedures should, as a minimum, detail:

- responsibilities for the identification (normally through record schedules) and control of records
- methods, conditions and monitoring of storage/retention commensurate with the nature of the record and the media used
- means of retrieval and update
- levels of security to protect from corruption, unauthorised access, loss or damage
- duration of storage
- arrangements for the review and disposition of records
- arrangements for the periodic auditing of the control and storage of records.

A10 Land condition record form

The information in this appendix has been reproduced from the 2000 edition of the land condition record form.

Contents

Standard disclaimer

The land condition record has been prepared by [ ]. [ ] has exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant experienced in preparing land condition records of a similar scope, nature and complexity to this land condition record. However, to the extent that the land condition record is based on or relies upon information contained in records, reports or other materials provided to [ ] which [ ] has not independently produced or verified (and which are listed in the schedule attached to the land condition record), [ ] gives no warranty, representation or assurance as to the accuracy or completeness of such information.

This land condition record is prepared solely for the benefit of present freeholders and/or leaseholders and those who subsequently become freeholders and/or leaseholders of the property identified in the land condition record. It may not be relied on by any other party without the prior written consent of

[ ].

Those using this information in subsequent assessments or evaluations do so at their own risk.

Additional disclaimers

A1 Executive summary

A1.1 Land identifier/reference number(s)

LCR reference number	
LCR version number	
Related LCR reference number	
Relationship to this LCR	Parent site ☐ Daughter site ☐ Overlapping site ☐
Current land reference number	
Project reference number	
Property name	
Property address	
Post code	
Land registry title number(s)	

A1.2 Key features

A1.3 Gaps in information

A1.4 Caveats on information

A2 Document management information

A2.1 Status

LCR reference number

LCR version number

Related LCR reference number

Relationship to this LCR Parent site ☐ Daughter site ☐ Overlapping site ☐

State of completion

Draft ☐ Verified ☐ Approved for issue ☐

Availability of document

Open ☐ Commercial-in-confidence ☐ Restricted (state reason below) ☐

A2.2 Completion and approval for issue

Information entry

Date	
Signature	
Name	
Position	

Project reference no

Organisation/address

Verification

Date	
Signature	
Name	
Accreditation reference	
Position	

Project reference no

Organisation/address

Approval for issue

Date	
Signature	
Name	
Position	

Organisation/address

Other contact details

A2.3 Record of changes to previous version

Reference/ Version	Section/ Changes	Date	Entry by	Verified by	Approval by

A3 Land referencing information

A3.1 Land identifier/reference number(s)

Current land reference number (project reference number)	
Land registry title number(s)	

A3.2 Property name

Current name(s) of property	

A3.3 Property address

Name/Number/Street	
District	
Town	
Post code (at [date])	

A3.4 Previous names or addresses by which the property was known

A3.5 Property location

Map references		
The property is marked on	Fig	(1:50 000 scale)
Its boundary coordinates are		
Boundaries are shown on	Fig	(1:1250/2500 scale)
OS references of centroid		

A3.6 Plan of property

Detail of current layout of property, showing boundaries	Fig
Ref to plan(s) showing any relevant zones	Fig

A3.7 Photographs

Photograph reference no(s)	Description

A3.8 Description of location of property

A3.9 Land area

Area (hectares)	

A3.10 Contact points for relevant public sector organisations

Organisation	Name/contact details (relevant reference(s)/date)
Local authority (refer to planning, environmental health, building control or other relevant department)	
Local planning authority (if different)	
EA/SEPA (region/area)	
Statutory nature conservation body	
Statutory heritage body	
Government Office	
Statutory regeneration agencies (eg RDAs, WDA, SE)	
Other (eg HSE, Coal Authority) (use extra row button on toolbar for more organisations)	

A4 Current land use and access

A4.1 Current use of land

Note: Further details of operational activities to be given in Section A10.7)

Brief description

Details of current planning permission/conditions (must be cross-referenced to information in Annex 1.

CATEGORY	Present? (please tick)	Brief description, including approximate %	Use classes order or other relevant classification
Agricultural (inc forestry)			
Commercial (active/derelict)			
Industrial (active/derelict)			
Other open space			
Public open space			
Residential			
Other (give details)			
Protected habitats (give details)			
Listed buildings (give details)			
Current licence or authorisation for operation as waste management facility or industrial installation (Refer to Annex 1)			

A4.2 Current ownership of land

Name	
Address	
Information source and date	

A4.3 Current occupation of land

Name	
Address	
Information source and date	

A4.4 Access to property

Access route	Description
Nature and security of perimeter	
Road access to property	
Other forms of access to property	

A4.5 Provision of services

Service	Brief description, including condition and status (live or disused) and references to any plans showing locations and report ref. no (s)
Water	
Gas	
Electricity	
Telecom	
Sewerage/drainage (foul, surface and stormwater)	
Other	

A4.6 Way leaves etc

Description	
Plan/map reference	
Other reference	

A4.7 Future changes to use of the land

Description	Information source

A5 Surrounding land

if this information is NOT known, tick here ☐ then go to Section A10.6.

A5.1 Description

General description	
Ref to map or plan showing surrounding land considered	Fig

A5.2 Current use of surrounding land

Category	Present? (please tick)	Brief description, information source and date	Location relative to property
Agricultural (inc forestry)			
Commercial (active/derelict)			
Industrial (active/derelict)			
Other open space			
Public open space			
Residential			
Other (give details)			
Protected habitats (give details)			
Listed buildings (give details)			
Current licence or authorisation for operation as waste management facility or industrial installation (refer to Annex 1)			

A5.3 Ownership/occupation/possible future changes of specific surrounding land

For each surrounding property	
Location of land	
Ownership of surrounding land	
Name	
Address	
Information sourceand date	
Occupation of surrounding land	
Name	
Address	
Information source and date	
Possible future changes to use of any surrounding land	
Description	
Information source and date	

A6 Proximity to controlled waters

If this information is NOT known, tick here ☐ then go to Section A10.7.

A6.1 Surface water including artificial drainage

Brief description, location relative to property	
Ref. in report and prime information source (eg maps)	
Details of discharges (eg under WRA 91)	
Ref. in report and prime information source (eg maps)	
Surface water quality objectives/classifications	
Ref. in report and prime information source (eg maps)	

A6.2 Groundwater

Brief description, including aquifer classification, location	
Ref. in report and prime information source (eg maps)	
Location and use of abstraction points or groundwater authorisations	
Ref. in report and prime information source (eg maps)	
Groundwater quality objectives/classifications	
Ref. in report and prime information source (eg maps)	

A6.3 Coastal waters

Brief description, location relative to property	
Ref. in report and prime information source (eg maps)	
Coastal water quality objectives/classifications	
Ref. in report and prime information source (eg maps)	

A7 History

By different parts of the property or for adjacent properties.

If this information is NOT known, tick here ☐ then go to Section A10.8.

Does this correspond to whole of in A10.1? Yes ☐ No ☐

If not, enter name or other identifier for part of property or other land (zone), or reference to map or plan showing zone to which this history refers. Click A10.7 on toolbar to repeat this section for each zone.

Name of zone	
Ref. no.	

A7.1 Uses of land (up to and including present use)

Earliest known use	Use 1 (for each subsequent use click A11.7 on toolbar)
Dates	
Report reference no.	
Type of use	
Description of use	
Primary source	
Ref. in report:	

A7.2 Additional details of operational history for each use above, including present

Use	
Operational activities	Details Report ref. no.
Storage of materials (nature, location)	Details Report ref. no.
Waste management, including any storage on site and disposal routes	Details Report ref. no.
Accidents, leakages or spillages.	Details Report ref. no.
Licence or authorisation for operation as waste management facility or industrial installation	Details (Refer to Annex 1)
Enforcement actions or notifications	Details (Refer to Annex 1)

A7.3 Previous actions carried out on land

Filling/re-contouring	
Details of location and type of fill	
Details of controls/monitoring	
Date of action/report ref.	
Decommissioning	
What was de-commissioned and how	
Details of controls/monitoring	
Date of action/report ref.	
Demolition	
What was demolished and how	
Details of controls/monitoring	
Date of action/report ref.	
Remediation (other than that covered in A9)	
Objectives of remediation	
What was done	
Details of controls/monitoring	
Date of action/report ref.	

A7.4 Other influences on land (eg sources of natural contaminants)

Information	
Report ref. no or primary source	

A8 Desk study and investigation information

(to include plans and photos)

If this information is NOT known, tick here ☐ then go to Section A10.9.

Pre-remediation in A10.9 ☐ Post remediation in A10.9 ☐

A8.1 Visual appearance of land

Summary including details of exposed soil etc:	Ref. in report/date
References to plan or photographs	

A8.2 Significant topographical and ground stability

FEATURE	Present? (Please tick)	Description	Ref. in report/date
Changes in slope			
Fill or overburden			
Excavation			
Landslip, other collapse			
Subsidence			
Mining			
Flooding			
Other, eg solution features			

A8.3 Physical conditions

Description of vegetation

Vegetation type	Vegetation condition	Ref. in report(s)/date

Details of exposed ground, soils and rocks (geological setting)	Ref. in report(s)/date

Geological map reference

Structures and services – summary

Type	Condition and size, and location	Ref. in report(s)/date and plan reference
Surface structures		
Underground structures		
Services		

A8.4 Chemical and biological conditions

(by zones where relevant)

If this information is NOT known, tick here ☐ then go to Section A10.8.5

Zone or sub-area of land – name and plan reference no.

Substances/ contamination looked for or discovered	Reason for investigation	Details of methods given in Annex 3?	Range of concentrations found, by known species	Physical state and other relevant parameters	Likely distribution by area and depth (plan reference)	Established by and confidence limits: (summary of approach)	Ref. in report

Associated soil or ground type and other properties	Description/results	Methods given in Annex 3?	Summary	Ref. in report
Soil or ground type				
pH				
Moisture content				
Soil organic matter				
Clay content				
Other soil or ground properties				

Additional information, eg relevant weather conditions, odours

Caveats

A8.5 Hydrogeological investigation

If this information is NOT known, tick here ☐ then go to Section A10.8.6.

Surface water investigation

	Description	Ref. in reports(s)
Summary of rationale/ approach(es)		
Are details of methods given in Annex 3?	Yes ☐ No ☐ Partial (give details below) ☐	
Summary of surface water characteristics (drainage patterns, type of surface water, quality)		

Substances/contamination looked for or discovered	Reason for investigation	Nature/extent/location	Ref. in report

Other information

Caveats

Groundwater investigation

	Description	Ref. in reports(s)
Summary of rationale/ approach(es)		
Are details of methods given in Annex 3?	Yes ☐ No ☐ Partial (give details below) ☐	
Summary of groundwater characteristics (pathways/ flow direction/quality)		

Substances/contamination looked for or discovered	Reason for investigation	Nature/extent/location	Ref. in report

Other information

Caveats

A8.6 Surrounding land

If this information is NOT known, tick here ☐ then go to Section A10.9.

	Description	Report ref. no(s)
Key visual features		
Topography		
Physical conditions		
Chemical and biological conditions		
Surface water		
Other key features		
Caveats		

A9 Most recent remediation

If this information is NOT known, tick here ☐ then go to Annex 1

If this information is NOT relevant, tick here ☐

state reason _____ then go to Annex 1

Zone or sub-area _____

Plan reference no. _____

A9.1 Remediation actions taken (by each zone or sub-area of land)

Dealing with _____

Technical remediation objectives given in report	Action	Summary	Report ref. no(s):	Statutory controls, eg licensing	Verification report ref. no(s)
	☐ off site disposal				
	☐ process treatment 1, (give details here)				
	☐ process treatment 2, (give details here)				
	☐ containment/barriers				
	☐ other, (give details here)				

A9.2 Ongoing arrangements for risk management

	Details	Report ref. no(s)
Controls on discharges to air, other land or water		
Controls on access		
Other controls		
Monitoring		

Annex 1 Regulatory authority information relevant to the land

Permits, approvals and licences (including planning permission)

Permit/approval/ Licence type and description (including any conditions)	Reference numbers	Issuing authority	Held by	Relevant dates	Details

Enforcement actions or notifications

Enforcement action/ Notification type and description	Reference numbers	Relevant authority	Served on	Date	Details

Communications

Type/reference numbers	Originator/ organisation	Recipient/ organisation	Copied to	Date	Summary of content

Annex 2 Record of contractual information

Warranties

Reference(s)	
Parties	
Details	

Insurance

Reference(s)	
Parties	
Details	

Payments made for remediation (ie those falling within the description of paragraph D53 of the statutory guidance in DETR circular 2/2000)

Reference(s)	
Parties	
Details	

Bonds(s)

Reference(s)	
Parties	
Details	

Assignment of reports

Reference(s)	
Parties	
Details	

Other (eg details of remediation contractor)

Reference(s)	
Parties	
Details	

Annex 3 Record of desk studies and investigations

List of studies and investigations

Report ref. no	Title and reference	Author/ organisation	Date	Investigation type *								Other
				1	2	3	4	5	6	7	8	

1 Desk study
2 Walkover survey
3 Exploratory investigation
4 Full intrusive investigation
5 Laboratory analysis
6 Modelling
7 Monitoring
8 Verification

Study/investigation report summary – one to be completed for each report

Report ref no.		Title	

Key organisations

	Organisation name	Contact	Address	Project reference
Client				
Contractor/consultant/ laboratory				
Sub-contractors				

Type of study/ investigation	Phase 1A?	1B?	2?	Other (specify)	Zone	Carried out?	Start date	Finish date
Desk study								
Walkover survey								
Exploratory investigation								
Full intrusive investigation								
Laboratory analysis								
Modelling								
Monitoring								
Verification								
Other								

Title	
Author	
Date	
Available from	

Reference number	
Version number	
Price of report	
Availability	
Assignment	☐ See Annex 2 ref

Project objectives and constraints

Report ref. no.

	Client specification	Contractor description
Objectives	Ref. in report	Ref. in report
Constraints	Ref. in report	Ref. in report

Overall rationale for study or investigation design, including assumptions made

Given?	Ref. in report	Summary
Yes ☐ No ☐		

Type or part of study (select from list in previous section)		Results reported in (ref. in report)	

Activities carried out	Summary sheet no.	Activities carried out (contd)	Summary sheet no.

Quality assurance information for each activity

Report ref no. and summary sheet number

Information on reason for choice of methods adopted

Type or part of study/ investigation		**Activity**	

Given?	Ref. in report	Method	Source	Reason
Yes ☐ No ☐				

Summary of assumptions made during this activity	Ref. in report

Summary of QA/QC procedures used	Ref. in report

Significant features, including contractor's conclusions	Ref. in report

Annex 4 Other references

Ref no for LCR	Title and ref no	Details

Annex 5 Copies of other key documents